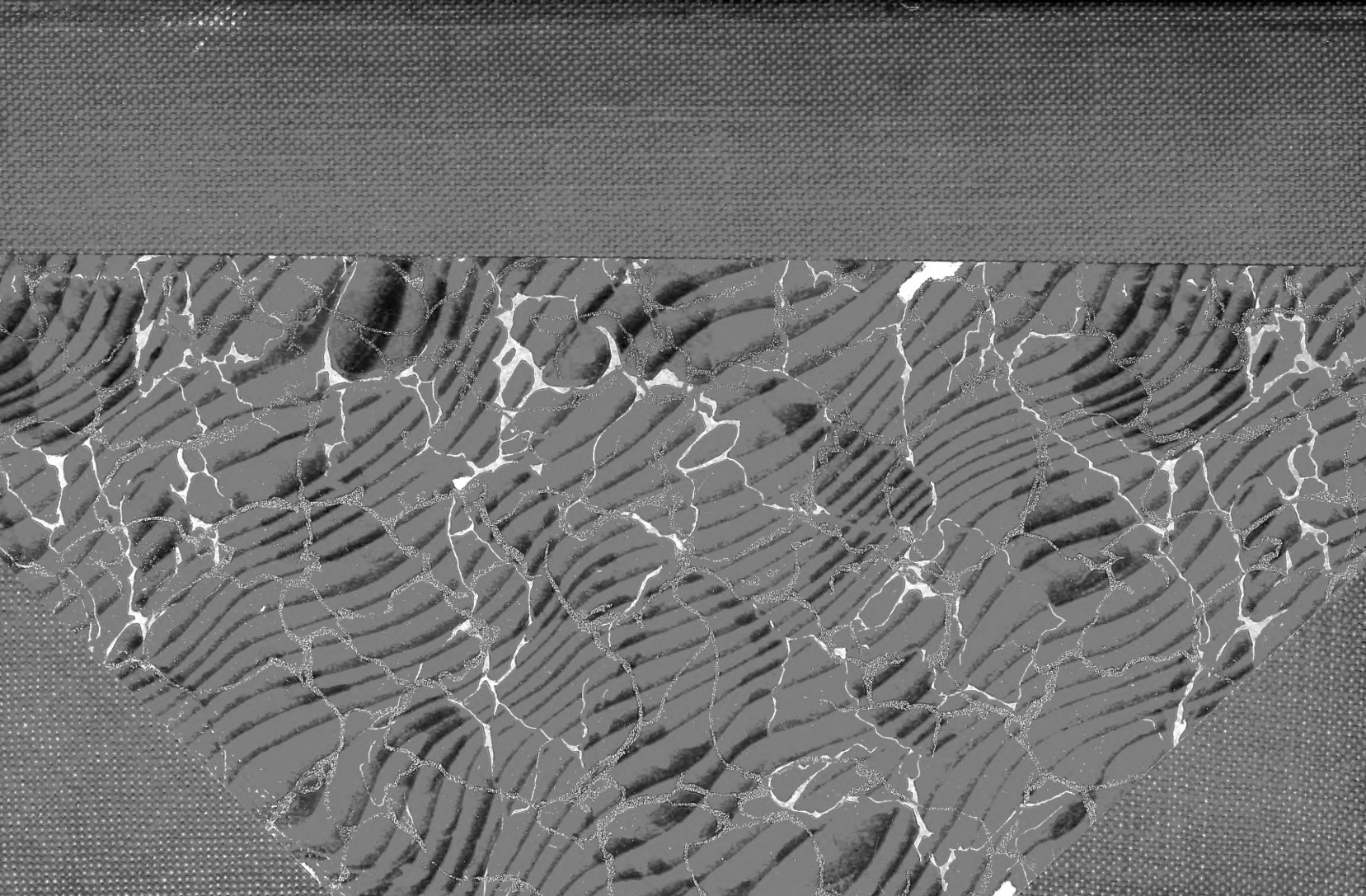

THE

VICTORIAN NATURALIST:

THE JOURNAL & MAGAZINE

OF THE

Field Naturalists' Club of Victoria.

VOL. V.

MAY, 1888, TO APRIL, 1889.

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

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ERRATA.

Page 54.—Insert "ATHRIXIA CRONINIANA" as 10th line from bottom.
Page 111.—For "(Minolia) vectiliginea" read "(Minolia) vitiliginea."
Page 112.—For "(Ampullarina) *Quoy and Desh.*" read "(Ampullarina Quoyana, *Desh.*
Page 113.—Insert "PAPHIA" as 13th line from bottom in 1st column.
Page 114.—For "LUCINÆ" read "LUCINA" in 3rd line, 1st column.
Page 123, line 38.—For "western" read "eastern."
Page 123, line 41.—For "eastern" read "western."
Page 123, line 42.—For "western" read "eastern."
Page 124, line 13.—For "western" read "eastern."
Page 124, line 22.—For "Eastern" read "Easter."
Page 125, line 26.—For "western" read "eastern."
Page 126, last line.—For "Australian" read "Australasian."

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PROCEEDINGS OF THE FIELD NATURALISTS' CLUB OF VICTORIA.

ANNUAL CONVERSAZIONE.

Address by the President, A. H. S. Lucas, Esq., M.A., B.Sc.

Ladies and Gentlemen, Members of the Field Naturalists' Club of Victoria,

In rising to speak of the work and progress of our Club during the past year, I am at once reminded of the eloquent address you have become accustomed to listen to at our annual *conversazione* from my genial predecessor. Mr. Halley has retired, after three years' occupancy of the presidential chair, and we miss the familiar voice and presence of our able and popular chairman. It is, however, a great pleasure to me that we are still able to rely upon his counsel and hearty co-operation in the important work of the Club.

The Club is in a highly prosperous condition. Our numbers keep up. Happily, our ranks have not this year been invaded by death. Two of our prominent members—both former Vice-Presidents of the Club—Dr. Lucas and Mr. Forbes-Leith, have left the colony, but both continue to send us communications—the former from Queensland, and the latter from Britain. On the other hand, we have to record the accession of several valuable workers. Our finances are in a healthy condition. Unlike some other societies, we have not the benefit of a Government grant. But we are able to pay our way, and especially to support the expense of the journal by means of which we endeavour to spread abroad the information we acquire. I am glad to say that we are not without recognition of our work from England and from the other colonies. But we could wish for a wider circulation, and for ampler means to extend and to illustrate our publication.

Our meetings have been well attended, and there is no evidence of the interest in them falling off. The papers have shown that members have been actively working and thinking

during the year, and—a hopeful feature—they have given rise more frequently to discussions. Mr. Sayer has described his brilliant first ascent of Mount Bellenden Ker; Messrs. Le Souef and French have recorded their observations on the animals and plants respectively of the Mallee district, near Lake Albacutya; and Mr. Stirling has written of the flora of Mount Hotham. Mr. A. J. Campbell has added to oological science a description of the nest of Queen Victoria's Rifle Bird of Paradise, and of the eggs of sixteen species of Australian birds not previously described. Mr. Hunt has speculated in an interesting manner both on nidification and on the colouration of birds' eggs. Messrs. Gatliff and Bracebridge Wilson have furnished well-authenticated lists of Victorian Mollusca. Baron von Mueller has continued his original descriptions of Australasian plants, including that of a fine New Guinea Rhododendron, and has also given a supplemental list of over 300 hitherto unrecorded Australian lichens. The Cryptogamists, indeed, have given us several papers:—Mr. Tisdall on Fungi; Miss Campbell on Vegetable Pathology; Mr. Sullivan on Mosses; and the Rev. F. R. M. Wilson, two papers on Lichens. They have also added about 100 species to our lists of evascular plants. The exhibits, both at the ordinary meetings and at the Wild Flower Show, have been good and varied. At the latter no less than 250 species of wild flowers were exhibited in the living state. We cannot, in justice to all exhibitors, and in mercy on your patience, enumerate all the objects that deserve mention. But we cannot pass by in silence the very excellent water-colour drawings by Mr. Brittlebank, in which he has delineated faithfully the different stages in the life histories of so many of our insects. This is new ground. The work is very valuable, and it is a great source of regret that the Club's finances are not such as to enable them to reproduce Mr. Brittlebank's careful and beautiful studies in the *Victorian Naturalist*.

The committee have this year made a new and wise departure, in drawing up at its commencement a programme of excursions for the whole twelve months. By this arrangement a more systematic and more varied series of outings has been secured, and interest has been revived. As railway communication is extended it becomes easy to reach, especially on holidays, localities affording fresh forms and phenomena, and the opportunities of the year have not been neglected. Parties of the Club have visited the Trentham Falls, Bacchus Marsh, Croydon, Ringwood, Lilydale, the Dandenong Creek, Berwick, and the Plenty River at Bundoora, in addition to the well-handled collecting grounds near town.

But the great expedition of the year has been that to King Island. There have been campings out in previous years at Lily-

dale and on Phillip Island; but in November last twenty-six members of the Club devoted themselves for over a fortnight to the exploration of King Island, and the examination of its flora and fauna. The Hon. Commissioner of Customs kindly allowed the use of the Government steamer—the *Lady Loch*—to convey the members of the expedition to and from the island. The members worked hard throughout, and full reports of the results secured by them have already appeared, constituting the January number of the *Naturalist*. I will not here recapitulate them, but will simply quote the general conclusion of Professor Spencer that "there is little doubt, from the evidence obtained, negative and positive, that King Island is allied naturally, as well as politically, to Tasmania." The expedition does not pretend to have exhausted King Island, and I have little doubt but that, profiting by the experience now acquired, a future party of our naturalists will succeed in wresting further spoil and knowledge from the difficult parts of the island not as yet reached. That much has been done the exhibits from King Island to-night testify.

We have not forgotten our duties to the State this year. The subject of the protection of our native birds has been again brought under the notice of Government, and we have found the Commissioner of Customs very favourably disposed to our views. The Government have gone, indeed, even further in this matter than we ventured to suggest, and have proclaimed permanently-closed seasons for a large number of our useful and persecuted birds. I would especially call your attention to the fact that it is now illegal at any time to take or destroy the Lyre-bird; and it is to be hoped that the public will endeavour to support this attempt of the Government to save these rare and curious birds from extermination, by giving information should they become aware of any breach of the law.

At the August meeting Mr. Gregory brought before the Club the desirability of at once taking steps to secure the permanent reservation of Wilson's Promontory as a national park. The motion he introduced was carried unanimously, and it was decided to ask the other scientific societies of Victoria to unite in making strong representations to the Ministers of Lands and Customs on the subject. Accordingly, after much careful consideration had been given to the question by these bodies, a deputation, representing the Royal Society, the Geographical Society, and the Academy of Arts, as well as our Club, waited on the Minister of Lands, and pointed out to him the peculiar advantages of the Promontory for the purpose specified, its natural and effective boundaries, its variety of scenery, its future accessibility, the absence of vested interests, and the utility of part as a forest (kauri) reserve. The deputation was well received, and we are hopeful that Victoria will follow, in

this respect, the good example set by the United States of America, by New South Wales, and by New Zealand, and will preserve this wild locality as a recreation ground for the colony.

In other ways the Government has shown itself alive to the importance of developing our natural resources by scientific methods. Too much praise can scarcely be accorded to the boldness and scope of the scheme of irrigation for the Interior. The effect in steadying, in extending, and in improving our agricultural and pastoral industries cannot be calculated. With a network of watercourses, as Baron von Mueller has pointed out, the crops can not merely be grown, but can be also insured against fire. For years, too, the Government botanist has strenuously advocated not merely the maintenance of certain of our present forests, but also the establishment of plantations of our most important native, and of suitable imported, timbers. Victoria, it is said, imports annually foreign timber to the value of over £1,000,000, and it is, perhaps, one of the countries of the world best suited for the growth of serviceable timber. The Minister of Lands has professed himself alive to the importance of fostering this native industry, and, whatever may be our general views on economic questions, few of us, I think, will be inclined to object to the protection of our valuable forest trees.

The deterioration of our fishing grounds and inadequate supply of fish for even Melbourne consumption have made themselves felt, and the Government have accordingly secured the services of a highly-distinguished expert—Mr. Savile Kent—who has been occupied in examining the condition of the seas, lakes, and rivers of Victoria, and has already furnished valuable reports, full of exact information, and pregnant with suggestions for future culture.

The office of Inspector of Fisheries has become vacant, and it is to be hoped that the Government will follow up their wise beginning by appointing a man of scientific training and wide experience to superintend our fisheries, for no one else could be capable of coping with the complicated problems which are sure to arise, and which are ever changing their form from season to season. Our knowledge of the distribution of the food, of the enemies, and of the rivals, of our food-fishes and edible crustacea and mollusca is exceedingly scanty, and we know next to nothing of the localities where our fish spawn. To acquire this knowledge, which is essential to scientific fish-culture, and, to meet special difficulties as they are encountered, a properly qualified officer should be appointed.

Here we may naturally turn to a good work which has been initiated during the year by the Royal Society. That body has appointed a committee to collect information as to the distribution, life history, associations, and incidentally the commercial value, of the life forms of Port Phillip, and, further, made a

grant of £50 for the practical expenses of the work incurred in dredging and preservation of specimens and in their conveyance to specialists for exact identification, etc. The work was commenced in July last, and a good deal has been done both in the waters near Melbourne and in those near the Heads. You will be interested to know that several members of our Club are serving on that committee, and amongst them Mr. Bracebridge Wilson, of Geelong, whose knowledge and experience of the dredging grounds of Port Phillip are unique. It is hoped, too, that memoirs of scientific value will be forthcoming on the material acquired.

The year has been signalised at the Melbourne University by great developments. Students have been working through the first year of a scientific course for the newly-established Degree in Natural Science. One of the most noteworthy features of this course is that, after his first year of more general work, a student is required to specialise, to devote himself to one only of the four natural groups of sciences—to physics, to chemistry, to biology, or to geology. We may now look forward, then, to having amongst us men well and thoroughly trained in these sciences, who shall be able to speak with the authority of first-hand knowledge, and who, by their presence and influence, will be able to communicate to the University and to the commonwealth more—much more—of general scientific culture than could possibly be the case if all acquired the same smattering of some of the elementary, but of none of the advanced, principles and methods of all the sciences. Most satisfactory is the provision already made for practical work. Under the skilled guidance of Dr. Masson, a well-equipped primary chemical laboratory has been erected, and is now in full working order. There are signs that the great difficulties of furnishing adequately a physical laboratory will be fairly grappled with.

We are naturally most interested in the School of Biology. A new chair was created at the close of last year, and has been filled by the appointment of Professor W. Baldwin Spencer, of Oxford. Professor Spencer was already distinguished in Europe, on account of his researches in embryology, and by his magnificent monograph on the "Pineal Eye in Lizards." And he has shown himself an enthusiastic worker in all departments of his subject since his arrival in the colony. A first instalment of the Biological Laboratories is approaching completion, and is expected to be in readiness for the use of students in a few weeks. But lately Professor Spencer has been joined by Mr. A. Dendy, B.Sc., who has been previously engaged at the British Museum, and is the author of one of the important monographs of the Challenger Reports on the horny sponges.

Additional "signs of the times" may, perhaps, be found in the

cordial reception by the members of the University Union of Mr. Topp's valuable and suggestive lecture on the study of natural history, and by the recent declaration of the master of Queen's College (whom we are glad to welcome as a member of this Club) of the intention of that college to pay special attention to natural science. I may add that Trinity and Ormond Colleges do not by any means purpose to neglect "the science side."

I will now refer to some of the more interesting publications in the year relating to Australian natural history. In our own colony Professor M'Coy has brought out Decades XIV. and XV. of his "Prodromus of Zoology." In these are beautifully-executed plates, by Mr. Bartholomew and Dr. Wild, of several of our lizards and fish, including Banks' oar-fish *(Regalecus Banksii)*, which the professor considers to be the genuine "sea-serpent" of mariners, the gorgeous parrot-fish *(Labrichthys Bleekeri)*, the sea gar fish, whose silvery sides reflect the light in the lithograph almost as in the water, and the familiar, rugged form of the Melbourne crayfish, which Professor M'Coy identifies with the palinurus of the Cape of Good Hope and of New Zealand, after close examination of the type specimens at Paris. The decades have now illustrated thirteen species of our snakes, nine of our lizards, and forty-four of our fish, besides examples of many other classes. Dr. M'Gillivray continues his work on the polyzoa, and Mr. Bale on the hydrozoa. Professor Spencer has in hand a monograph of the giant Gippsland earth-worm for the Royal Society, in which he is exhaustively studying and illustrating its anatomy and histology. I will read the following note from Baron von Mueller as to the botanical work done during the year :—

"As particularly noteworthy should first be mentioned, that in conformity with the volume on Myoporinæ a dozen decades of the 'Iconography of Australian Acacias' has been issued by Baron von Mueller within the year under the aid of Mr. G. Luehmann, the drawings and the lithographing throughout being by Mr. R. Graff. What makes this large contribution to pictural illustrative Botany all the more remarkable is the absolute originality of the work, none of the 120 species of Australian genuine Acacias, —thus already delineated,—having ever been depictured before. This can be said of but few works in the whole range of botanic literature within the precincts of one genus. Pallas' Species Astragalorum published in 1800 certainly illustrates about a hundred species partly of Astragalus and partly of Oxytropis, but only scanty analytic details are given. Boissier's Icones Euphorbiarum published in 1856, also exhibit about 120 species of that genus, but the Iconography of Australian Acacias is to be

extended to about 80 congeners more, as gradually the material may be completed, Baron von Mueller never publishing pictures of any plants without giving analyses from bud to embryo. Boott's extensive work 'Illustrations of the genus Carex,' published between 1858 and 1867, contains however 600 plates; but in many cases more than one plate is devoted to a species and of numerous of the species, illustrated, pictures appeared previously in other works. Baron von Mueller's intention is to elaborate now delineatively next the about 120 species of Australian Salsolaceæ, so many of our 'Saltbushes' being highly valuable for pasturage, he foreseeing that in time the most nutritive kinds will have to be methodically reared on the cattle and sheep-runs.

"His dichotomous key, we learn, has now been printed about three-fourth, all the orders, all the genera and most of the dicotyledoneous species having passed through the press. Though the completion of the descriptive volume of the work became unavoidably delayed, this finally now proves a gain, because he found that to render such a publication really useful, he had to combine the brief dichotomia of the characteristics with a kind of abridged descriptive flora, a task almost doubly as great as such would prove for the whole British flora. Some progress has been made with descriptive elaboration of Australian plants, and it is hoped that when the more urgent work, just now requiring attention, shall have been finished, both Australian and Papuan plants will more extensively come under examination than latterly was possible. Since the last Victorian edition of the 'Select plants for Industrial Culture and Naturalisation' did appear in 1885, much additional information has been collected for a new issue of this work, which will be brought out in time, to be used for the Centennial Exhibition. Another supplement to the census of Australian plants is due also, and indeed the manuscript ready for it. A wish has been expressed by some of the few, who are here particularly engaged in the study of evascular plants, that a descriptive volume concerning them should be prepared for Australia purposely or at all events for Victoria. The list of the evasculares, given in the eleventh volume of the fragmenta phytographiæ Australiæ 1881, comprises 3516 species; since then vast additions have accrued in this direction of research; so that, if even the descriptions were reduced as in Kuetzing's classic work 'species Algarum' and the synonymy and records of special localities mostly omitted, we would still require for the evasculares of all Australia a volume quite as large as that given in 1849 by the venerable author above mentioned, whose 80 years' jubilee was celebrated a few months ago. But if the descriptions and quotations are to assume the extensiveness of detail displayed in the meritorious volume on

the 'Lichen-Flora of Great Britain and Ireland,' by the Rev. W. A. Leighton, who devoted the spare time of half a century to the elaboration of this work,—then we would need now already for Mosses, for Lichens, for Fungs, and for Algs a volume each, to elucidate the Australian plants of these four large orders of vasculares, or two good sized volumes for Victoria alone. It seems therefore to our Gov. Botanist advisable, considering the large expenditure involved, and the enormous labour required to do justice to such an undertaking, that in first instance a small descriptive volume should be constructed for the *genera* of the Australian Evasculares only; that would enable amateurs in cryptogamic Botany to work under some particular literary guidance, and meanwhile we would learn a great deal more of the specific forms pertaining to Australia, of their geographic and regional distribution, and of the limitability of their characteristics, which latter in almost endless instances are still obscure."

The Linnean Society of New South Wales maintains its position as the foremost science society in the colonies, and we cannot be too grateful for the solid series of papers issued in its journal. This year Mr. Masters completes a catalogue of 7200 described Australian coleoptera. Mr. Meyrick describes the 6ooth of his micro-lepidoptera, and is, moreover, at work on a revision of the larger moths, which have come into a sad state of confusion; and for other work on insects we are indebted to the veteran M'Leay, and to Mr. Sidney Olliff, formerly of the British Museum. Mr. Haswell has succeeded in obtaining some of the stages in the development of the embryo of the emu; and his observations are of interest, inasmuch as the development of a member of the struthioid group of birds has not before been traced. The observations are very incomplete, but the author has been able to throw light on some controverted points in avian development, and, amongst other things, claims to have shown that "the foundation of the mesoblast of the whole embryo is laid by the cells of the lower layer" (hypoblast). An appreciation of the difficulties of investigating this subject will be gathered from the fact that the period of incubation of the emu is three* months, as contrasted with the three weeks of the fowl. Mr. Haswell has also illustrated a genus of trematoda, ecto-parasitic on astacopsis, in the Q.J.M.S. Mr. Fletcher has been engaged in skilfully sorting our earth-worms, and has found time also, in conjunction with Mr. Hamilton, to work out some of the Australian land planariaus. He has been the first, too, to record the distinguished find of Peripatus in Australia.

* I am informed by Mr. A. J. Campbell that he estimates the term of incubation of the emu as about eight weeks.

Peripatus has, then, been found in Gippsland, and also by Mr. Olliff in New South Wales.

Mr. Caldwell has published the first part of his researches on the embryology of our marsupials and monotremes in the proceedings of the Royal Society of London. He secured material in Australia, which has enabled him to trace the growth of the egg-membranes in these low types of mammals, and to institute comparisons between these envelopes in the different classes of vertebrates. It is curious that the shell-membrane of the platypus contains carbonate of lime, while that of the echidna apparently does not. The segmentation in both monotremes and marsupials is partial and telolecithal, thus connecting the group with the sauropsida. Further details and conclusions will be awaited with much interest.

An unexpected discovery has been recently made by Mr. E. B Poulton It is also recorded in the Royal Society's proceedings. He found true mammalian teeth, agreeing in disposition, in histological details, and in development with those of higher mammalia in the young platypus, beneath the site of the horny plates, which subserve mastication in the adult animal. These rudimentary teeth indicate that the platypus is a degenerate form of a higher type, and the presence of the functionally useless "marsupial bones," taken in conjunction with Mr. Caldwell's results above alluded to, indicates that that higher form was marsupial. It seems probable that a similar investigation of the jaws of the young echidna would be rewarded with a like discovery.

The year has, then, been no barren one. Our knowledge is growing, and the number of workers is increasing. An Association was formed, a few months ago, in Sydney, to undertake for New South Wales the work which this Club has now been engaged in for eight years in Victoria. We wish it all success. The life-forms of Australia are but rarely confined to any one colony, and union amongst workers in all parts of the continent is essential if we are to obtain comprehensive views of the affinities and distribution of our peculiar groups of indigenous plants and animals. I will conclude, therefore, by expressing my satisfaction—the satisfaction, I think, of all of us—that in 1888 will be held the first meeting of the Australian Association for the advancement of Natural Science, and that henceforth there will be an annual opportunity for our naturalists and men of science to be cheered and strengthened by intercourse with fellow-workers in our sister colonies.

D. M'Alpine, Esq., F.C.S., delivered a lecturette on "The Movements of the Edible Mussel and its Various Parts," illus-

trated by diagrams and preparations. The following is an abstract:—

"The edible mussel, so common on our coasts, and occasionally sold on the streets of Melbourne, is naturally fixed to some object by means of a tuft of strong, silky hairs, called its beard, or *byssus*. But, although thus naturally anchored, it may, on an emergency, move about a little. It has been observed to move both with and without its shell, and perhaps stranger still, if certain parts are detached from it, they, too, move about in various ways. The entire mussel has been seen to crawl up the sides of a glass vessel to the extent of three inches in a single night; and without its shell it moves in a rotatory manner. This latter movement is due to innumerable delicate, microscopic, hair-like filaments, called *cilia*, which cover various parts of the body. Portions of the body, when cut off, might naturally be thought to be dead and incapable of movement, but here large and important portions exhibit movement, when free to do so. Of these moving detached parts the principal are the mantle, which covers the body, as with a cloak; the gills, which hang down by its side; the so-called foot—a little, fleshy, tongue-shaped body on the under-surface; and two triangular flaps on each side of the mouth, called labial palps. Each part has its own peculiar mode of motion, and some can stop and start again, can reverse the direction of movement and resume the original, and can even back out from obstacles when meeting with them in their path. The *nature* of the movement is usually either rotatory or translatory, or both combined. When rotatory the direction may either be the same as that of the hands of a watch or the reverse. The *rate* of rotation is variable. An average of 50 rounds gave 5 minutes per round, and the quickest was performed in 1½ minutes. The rate of forward movement is likewise variable. It may be as slow as an inch in 4 days for the foot, or as quick as an inch in 2 minutes for the gill. The quickest recorded for the gill was at the rate of an inch a minute, or 44 days per mile.

"In the case of the gills they can move when placed either horizontally, vertically, or when turned upside down. Their vertical movement may average 1 inch in 10 minutes.

"As to the *duration* of this power of movement, it has been known to last for at least 8 days. The fact that parts can move at all when detached from the body is sufficiently interesting, but that they do so in a definite manner and direction, even sometimes exhibiting a certain amount of will-power, increases the wonder. And while these movements throw new light on the uses of the parts concerned, they are not without some practical bearings on parts of our own bodies, for the lining membrane of the nose and of the windpipe, for instance,

is richly ciliated, and the cilia are in active motion. The investigation of the action of cilia in the mussel, and the action of reagents upon them to increase their speed when they are sluggish, to revive them when they are drooping, or even to start them again when they stop, may find application in the domain of medicine. It has been generally believed hitherto that cilia, when clothing parts of the body, act always in the same direction and in a mechanical way, but the mussel teaches us different, for there not only may the cilia be stirred into action by appropriate stimuli, such as the prick of a pin, but the direction may be reversed and even stopped altogether for a little."

DESCRIPTION OF AN HITHERTO UNRECORDED GOODENIA, INDIGENOUS ALSO TO VICTORIA,

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

Goodenia pusilliflora.

Annual, never tall, generally diffuse or ascending, rather scantily beset with spreading hairlets; stems slender, nearly always branchless and only leafy at the base and inflorescence; radical leaves crowded, pinnatilobed or some merely short-incised, the lobes mostly from semilanceolar to deltoid, entire or occasionally indented, the upper often somewhat confluent; floral leaves small, from rhomboid-cuneate to lanceolar, with but few incisions or indentations or completely entire; stalklets elongated, very thin, corymbously or somewhat racemosely approximated, unprovided with bracteoles; flowers quite small; lobes of the calyx comparatively broadish, about as long as the tube or longer, the latter at last considerably extending beyond the insertion of the lobes; corolla minute, almost or quite glabrous, downward dark-streaked, all its lobes expanding on both sides into yellowish or soon whiteish or purplish membranes; style very short; stigma-cover dorsally invested with very minute hairlets; fruit globular-ovate, nearly unilocular, hardly exceeded by the calyx-lobes, few-seeded; dissepiment narrow crescent-shaped; seeds rather large, collateral, quite flat, when ripe blackish, surrounded by a pale broadish membrane. Generally on sandy or somewhat saline ground.

Yorke's Peninsula, O. Tepper; near Flinders-Range, F. v. M; near the Broughton-River, Miss L. Wehl; near Mount Parry. Prof. Tate; Richardson's Creek, Dr. Curdie; Wimmera, D. Sullivan; Lake Coorong, C. Walter; Looma-Rapids, Miss Campbell; Lake Albacutya, Ch. French; Murray-River, Mrs. Holding; Edwards-River, F. v. M.; Murrumbidgee, Dr. Lucas; Darling-River, Brueckner; Lachlan-River, F. v. M.; Tarella, W. Baeuerlen.

The plant is of bitter taste and produces sometimes thread-like offshoots; the stigma-cover is comparatively broad and slightly contracted in the middle, so as to indicate some approach to that of Calogyne, which genus indeed might be considered a section of Goodenia. The appendages on the upper corolla-lobes for the protection of the stigma-cover are present. G. pusilliflora is generally not so large as G. pinnatifida, of more depressed and probably always annual growth, its vestiture is less dense and more spreading, the floral leaves are proportionately broader, the flower-stalklets more dispersed, the flowers always very much smaller, but the calyx-lobes broader; the corolla is never so brightly yellow, the membranous expansions are on both sides of all corolla-lobes developed; the dissepiment is not reaching far up into the cavity of the fruit; the seeds are fewer in number and not of much less length and breadth than the pericarp, Individual plants of G. pinnatifida, which might show a close approach to G. pusilliflora, may have possibly arisen through hybridism, both growing occasionally intermixedly.

From G. coronopifolia the species now described is separated by its laxer habit, more developed vestiture, broader leaves with less distant and not so narrow lobes, the floral leaves particularly being never so elongated-linear, by which means the aspect of the whole becomes very different, but the flowers and fruits of both species are very similar, though the stigma-cover of G. coronopifolia is not at all bilobed; the seeds of the latter plant are not yet available for comparison in our collections here. The relationship of G. O'Donnelli, which species has recently been brought by Mr. Nynlasy also from the sources of the Victoria-River, is more distant.

The writer of these remarks avails himself of this opportunity to draw attention to another Victorian Goodenia, but concerning which further field-observations should be instituted. It is treated by Bentham in the Flora Australiensis as a variety of G. glauca, of which indeed it may only be a form; it differs however from the typical state of that species in more developed vestiture, in dark-green and also partly indented leaves, more crowded near the root, the upper generally quite narrow, in usually smaller flowers, in bright yellow dilatations of the corolla-lobes, in almost glabrous style, in more compressed fruit with thinner pericarp and in the nucleus of the seeds being not so perceptibly pointed at the base;—from G. pinnatifida it diverges in often lobeless basal leaves, in the frequent presence of one or two stem-leaves below the flowers, in the corolla never glabrous outside nor its upper lobes unequally dilated, in nearly or quite glabrous style and in not black colour of the seeds;—from G. elongata it is separated by less scattered leaves, outside densely invested corolla, nearly glabrous stigma-cover, never reversed

stalklets of the fruit, quite flat and broadly margined seeds. This plant, to which as a mere variety or as a distinct species the name *subintegra* might be assigned, has a far wider range than the ordinary form of G. glauca; thus it is now known from Sturt's Creek and Flinders-River (F. v. M.), Field-River (W. Field), Eyre's Creek (Kayser), Finke-River (R. Warburton), Charlotte-Waters (Chr. Giles), the Thompson-River (Dr. Poulton), Lake Eyre (E. Giles), the Paroo (L. Morton), the Ballandool (Looker), Gosse's-Range (Rev. Mr. Schwarz), Lake Blanche (Burkitt), Barcoo (Dr. Wuth), Stokes-Range and Wills' Creek (Howitt), the Bulloo (R. S. Moore), Grey-Range (W. Neal), Maranoa (Sir Thos. Mitchell), Dawson-River (F. v. M.), Comet-River (O'Shanesy), Warrego (Mrs. Cotter), Lachlan-River (Brueckner), Darling-River (Dr. Beckler), Lake Urana (H. Crouch), Edwards and Murray-River and Wimmera (F. v. M.)., Yorke's Peninsula (Tepper), Burenda (Miss Hood).

The following are as yet unrecorded localities for species of this genus:

G. hederacea: Genoa 3500' (W. Baeuerlen).

G. elongata: Cudgegong (Dr. Barnard), Upper Murrumbidgee (Miss Chamberlin), Genoa (Bauerlen), Cann-and Bemm-River (Edwin Merrah).

G. barbata: Genoa (F. v. M.), New England (F. Campbell).

G. glabra: Warrego (Mrs. Cotter), Paroo (Mrs. Spencer).

G. incana: Pallinup-River (Miss Crouin).

G. pterygooperma: Israelite-Bay (Miss Brooke).

G. calcarata: Mt. Poole (Baeuerlen).

G. Chambersi: Near Lake Eyre (Hon. J. Newland).

G. cycloptera: Rawlinson's Range and Lake Eyre (E. Giles), Cooper's Creek (Flierl), Finke-River (Rev. H. Kempe), Gosse's Range (Rev. J. Schmidt), Storm-Creek (Lieut. Dittrich), Field's River (Winnecke), Lake Torrens (Prof. Tate), Comet-River (P. O'Shanesy).

G. pinnatifidæ: Canoe-Creek (C. Hartmann), Upper Macquarie-River (Rev. J. M. Curran), Omeo (J. Stirling), Manero (Baeuerlen), Fowler's Bay (Warburton), Eucla (Oliver), between the Great Bight and Victoria-Spring (Alex. Crawford).

G. glauca: Mount Wood (Baeuerlen), Ballandool (Looker).

G. heteromera: Wimmera and Lachlan-River (F. v. M.), Urana (H. Crouch), Gwydir (C. Moore), Severn (C. Hartmann), Darling-Downs (Lau).

G. gracilis: Wimmera (St. Eloy D'Alton).

G. lamprosperma: Norman's and Gilbert's River (Th. Gulliver).

G. Mueckeana: Rawlinson's Range (E. Giles), Tempe-Downs (Thornton).

SUPPLEMENT

To the Enumeration of Victorian Plants, comprising the Species added since Part II. of the Key to the System of our Native Vegetation was published, with Addition of a few Species inadvertently before omitted.

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

Cabomba peltata, F. v. M. N.E.
Eriostemon capitatus, F. v. M. N.W.
Sida intricata, F. v. M. N.W.
Phyllanthus thesoides, Bentham. N.W.
Casuarina paludosa, Sieber. E.
Dodonaea lobulata, F. v. M. N.W.
Kochia microphylla, F. v. M. N.W.
Muehlenbeckia gracillima, Meissner. E.
Oxylobium trilobatum, F. v. M. E.
Jacksonia Clarkei, F. v. M. E.
Zornia diphylla, Persoon. E.
Desmodium brachypodum, A. Gray. E.
Acacia linifolia, Willdenow. E.
Acacia mollissima, Willdenow. S.W., S., N.E., E.
Haloragis Baeuerleni, F. v. M. E.
Darwinia micropetata, Bentham. N.W.
Kunzea parvifolia, Schauez. S.W., N.E.
Kunzea capitata, Reichenbach. E.
Backhousia myrtifolia, Hooker. E.
Callistemon linearis, De Candolle. E.
Xanthosia Atkinsoniana, F. v. M. E.
Sium erectum, Hudson. S.W.
Notothixos subaureus, Oliver. E.
Persoonia revoluta, Sieber. E.
Hakea saligna, Knight. E.
Hakea Macreana, F. v. M. E.
Pimelea hypericina, Cunningham. S., E.
Opercularia hispida, Sprengel. E.
Aster dentatus, Andrews. E.
Aster lepidophyllus, Persoon. N.W., S.W., S., N.E., E.
Podolepis rutidochlamys, F. v. M. N.W.
Helichrysum adenophorum, F. v. M. S.W.
Ammobium alatum, R. Brown. E.
Glossogyne tenuifolia, Cassini. E.
Goodenia pusilliflora, F. v. M. N.W.
Gentiana quadrifaria, Blume. E.
Anthocercis albicans, Cunningham. N.E.
Glossostigma Drummondi, Bentham. N.W.
Prostanthera saxicola, R. Brown. E.

Newcastlia Dixoni, F. v. M. and Tate. N.W.
Styphelia microphylla, Sprengel. E.
Styphelia esquamata, Sprengel. E.
Styphelia costata, F. v. M. N.W., S.W.
Styphelia appressa, Sprengel. E.
Styphelia attenuata, F. v. M. E.
Epacris crassifolia, R. Brown. E.
Thelymitra epipactoides, F. v. M. S.
Thelymitra fusco-lutea, R. Brown. S.W.
Diuris alba, R. Brown. N.E.
Pterostylis pedaloglossa, Fitzgerald. S.
Dianella coerulea, Sims. E.
Tricoryne simplex, R. Brown. E
Potamogeton lucens, Linné. E.
Philhydrum lanuginosum, Banks. S.W.
Fimbristylis ferruginea, Vahl. E.
Schoenus ericetorum, R. Brown. E.
Andropogon affinis, R. Brown. N.W., N.E.
Psilotum triquetrum, Swartz. S.W.
Adiantum diaphanum, Blume. E.
Aspidium tenerum, Sprengel. E.
Hypolepis tenuifolia, Bernhardi. E.

Thus 60 species and 10 genera have to be added to those recorded before as Victorian, bringing the total of the number of genera up to 556 and that of the species up to 1898. A few others, of which the characteristics have as yet not well been studied, were laid aside for subsequent critical examination. It may however be assumed that in course of time, when the remotest and the most impervious regions of Victoria shall also have become botanically traversed, our flora will offer us yet fully another hundred of species, several genera, and perhaps also some additional orders of plants for phytographic records. The present access to the list we owe to field-work of Messrs. W. Baeuerlen, St. Eloy D'Alton, C. French, T. Jephcott and C. Walter. Future enrichments of our lists of indigenous plants may mainly be expected:

1, From near the junction of the River Darling with the Murray, as doubtless many more of the plants of the Darling-region follow that large water-course to within our territory, than we are yet aware of;—2, from the numerous rocky hills and ranges of the Hume-district, where likely some more of the plants of the Blue Mountains will yet be noticed to re-appear;—3, from the most eastern part of Gippsland, including the elevated Waratah-region, the whole only quite recently opened up for itinerations and settlement. Indeed Mr. Baeuerlen, who, under some slight support from the Phytologic Department of Melbourne, went over extensive grounds not remote from the

Genoa-River, demonstrates through his collections already, that the following plants approach the Victorian boundary almost within a day's good walking distance :—

Hibbertia monogyna, R. Brown.
Philotheca australis, Rudge.
Eriostemon umbellatus, Turczaninow.
Boronia rhomboidea, Hooker.
Boronia Barkeriana, F. v. M.
Monotaxis linifolia, Brogniart.
Elatostemma reticulatum, Weddell.
Oxylobium scandens, Bentham.
Oxylobium cordifolium, Andrews.
Mirbelia pungens, Cunningham.
Mirbelia reticulata, Smith.
Pultenaea pycnocephala, F. v. M.
Bossiaea Kiamensis. Bentham.
Acacia obtusata, Sieber.
Acacia binervata, De Candolle.
Callicoma serratifolia, Andrews.
Melaleuca styphelioides, Smith.
Actinotus minor, De Candolle.
Choretrum Candollei, F. v. M.
Olax stricta, R. Brown.
Symphyonema paludosum, R. Brown.
Banksia ericifolia, Linné filius.
Candollea laricifolia, F. v. M.
Candollea linearis, F. v. M.
Logania pusilla, R. Brown.
Chloanthes parviflora, Walpers.
Woollsia pungens, F. v. M.
Epacris Calvertiana, F. v. M.
Dracophyllum secundum, R. Brown.
Dendrobium teretifolium, R. Brown.
Dendrobium Beckleri, F. v. M.
Blandfordia nobilis, Smith.
Smilax glycyphylla, Smith.

A NATURALIST has recently pointed out in a London scientific paper that when there is a prospect of rain the spider shortens the filaments from which his web is suspended, and leaves them so as long as the weather is variable. If he lengthens the filaments the weather is likely to be fine and calm, and for a period which can be judged of by the length they are let out. If the spider remains inactive it is a sign of rain ; but if he keeps at work during rain it shows the rain will not last long, and will be followed by fine weather. The spider makes changes in his web every 24 hours, but if these changes are made in the evening, just before sunset, the night will probably be clear and beautiful.

Field Naturalists' Club of Victoria.

President :

A. H. S. LUCAS, M.A., B.Sc., F.G.S.

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.; Vol. III. (1886-87), 12 numbers, 6s.; 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 1886-87, with Rules, etc. can be obtained on application to the Hon. Sec.

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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 April, 1888.

In the absence of the president and vice-presidents, Prof. W. Baldwin Spencer, B.A., was voted to the chair, and about fifty-five members and visitors were present.

A letter was read from the Christ's College Natural History Society, Hobart, desiring to open correspondence and make exchanges with the members.

The hon. librarian reported the receipt of the following donations to the library:—"Proceedings of Linnean Society of New South Wales," second series, Vol. II., part 4, from the Society; "Proceedings of the Royal Society of New South Wales," Vol. XXI., part 3, from the Society; "History of New Sperm Whale" (reprint), from trustees of Australian Museum, Sydney; "The Trochidæ of South Australia," part 1, by Jno. Brazier, C.M.Z.S., and other conchological papers from the author; "Report on Liver Fluke," by A. P. Thomas, M.A., 1882, from Dr. Springthorpe; and "Journal of Pharmacy," March, 1888.

The hon. secretary reported that a party of the members had visited the National Museum on Saturday afternoon, 17th March, and had spent an interesting afternoon.

On a ballot being taken, Messrs. T. C. Alston, H. Massey Bindon, T. H. Campbell, and G. Lyell, jun., were duly elected members of the Club.

Attention was drawn to the great destruction of the platypus in various parts of the colony, and it was decided to communicate with the Zoological Society as to the desirability of bringing the matter under the notice of the Government.

PAPERS READ.

1. By Miss F. M. Campbell, entitled "Notes of a Trip to Cabbage-tree Creek, East Gippsland." This was an interesting description of a visit to the only spot in Victoria where the cabbage palm is found, and its most southerly habitat in Australia. The journey was through almost inaccessible country, and the vegetation was almost of a tropical country.

2. By Mr. A. W. Howitt, F.G.S., "Notes on the Geographical Distribution of Eucalypts." The author briefly noted the various species of eucalyptus seen when travelling on the various roads in the district between Morwell and Bairnsdale, and Walhalla and Stockyard Creek.

The chairman strongly recommended members to make similar records when on their excursions, as they would be of great value to botanists and others in making general deductions on the fauna and flora of a district.

3. By Mr. I. Batey, "Notes on Fluke." The author gave his views on the life history of the liver fluke of the sheep, which, in the main, coincided with the most recent opinions of English scientists.

The paper gave opportunity for an interesting discussion, during which Prof. Spencer gave an account of Mr. Thomas' researches in England. Dr. Springthorpe referred to the author's suggestion that the liver fluke and the hydatid were identical creatures, and said that this idea was erroneous.

Prof. Spencer drew the attention of the members to several live specimens of *Amphioxus*, a very low form of fish recently obtained by Mr. J. Bracebridge Wilson, M.A., of Geelong, and now exhibited alive for the first time in Australia.

The following were the principal exhibits of the evening:— By Mr. F. G. A. Barnard, orchid in bloom *(Pterostylis reflexa)*, grown by exhibitor. By Mr. C. C. Brittlebank, water-colour drawings of Victorian lepidoptera *(Heteronympha)*. By Mr. R. C. Chandler, a frontal shrike-tit *(Falcunculus frontatus)*, from Dandenong Ranges; a superb fruit-pigeon *(Ptilenopis superbus)*, from Queensland; fossil shells and fruit from Warburton and Reefton, Upper Yarra; and petrified nest of English hedge-sparrow. By Mr. C. French, F.L.S., lepidoptera from hill country, Ceylon. By Mr. C. French, jun., eggs of Pacific gull, silver gull, sooty oyster-catcher, and white-breasted oyster-catcher, from King Island; Bass' Straits tern, black-backed porphyrio, and great brown kingfisher, from Victoria. By Master G. Hill, New Zealand insects. By Master H. Hill, New Zealand insects, including the rare "snow butterfly," from Mount Cook. By Mr. F. Longmore, the rare longicorn beetle *(Macrotoma heros)*, from Fiji. By Baron F. von Mueller, K.C.M G., a Goodenia, new to Victoria; moving bee, from Mexico; also, letter from Prof. Kuetzing, now over eighty years of age, referring to new Victorian algæ. By Mr. J. Searle, insects collected since last meeting; also, metamorphosis of moth, *Secusio annulata*. By Rev. F. R. M. Wilson, nest and egg of the swallow dicæum *(Dicæum hirundinaceum)*, found near Kew; also three new lichens, collected by exhibitor in Gippsland, *Hamatomina Babbingtonii* (Massalongo), *Glyphis colliculosa* (Knight), and *Trypethelium scoria* (Fée).

After the usual *conversazione* the meeting terminated.

THE monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 14th May, 1888.

In the absence of the president and vice-presidents, the Rev. J. J. Halley was voted to the chair, and about forty-five members and visitors were present.

Circulars were read from the secretaries of the Australasian Association for the Advancement of Science, and the hon. secretary announced that Dr. J. C. Cox, of Sydney, had consented to act as the Club's delegate on the Council of the Association.

The hon. librarian reported the receipt of the following donations to the library:—"Journal of the Geographical Society of Australasia" (Victorian branch), and "Journal of Pharmacy," April, 1888.

The hon. secretary reported that the excursion to Oakleigh on Saturday, 28th April, was fairly attended, but the specimens obtained were not particularly rare. *Persoonia juniperina* was noted in flower. Plants of *Chiloglotlis diphylla* were seen, and a number of cocoons of the moth *Chelopteryx collsii* were obtained.

On a ballot being taken, Miss L. Elder, Mr. H. R. Hogg, and Mr. A. Dendy, M.Sc., were duly elected members of the Club.

It was suggested that a special *conversazione* be held by the Club during the currency of the Centennial Exhibition, so as to afford foreign scientists an opportunity of becoming acquainted with Victorian natural history, but the matter was deferred for further consideration until the next meeting.

PAPERS READ.

1. By Mr C. French, jun., entitled "Notes on a Trip to the Upper Murray." The author gave an interesting account of his collecting experiences in the district around Ournie, about eighty miles up the Murray from Wodonga; also, of a visit to Wheeler's Creek, some twenty-five miles higher up, mentioning the principal birds, plants, etc., noted at each place.

2. By Rev. F. R. M. Wilson, entitled "Descriptions of Two New Lichens, and List of Lichens New to Victoria." The author gave a detailed description of *Amphiloma glaucescens* (Wilson), from Queensland, and of *Gomphillus bœomyceoides* (Wilson), from Bloomfield, Mount Macedon, and Black Spur, Victoria; also, a list of twenty-five additional species of Victorian lichens.

3. By Dr. T. P. Lucas, entitled "Notes on Victorian and Queensland Lepidoptera." The author compared in an interesting manner his experiences as a collector in Victoria and around Brisbane, remarking various species of moths, etc, common to Gippsland, Fernshaw, and Brisbane.

The following were the principal exhibits of the evening:—By Mr. F. G. A. Barnard, twenty-two species of shrubs collected in the mallee scrub at Warracknabeal and Dimboola. By Mr. J. M. Campbell, a walking leaf insect from Mauritius. By Mr. E. A. Dombrain, a white egg of emu, ostrich egg, and egg of white-faced xerophila (length, 2¼ lines). By Mr. C. French, F.L.S., group of Goliath beetles, family Cetonidæ. By Mr. R. Hall,

Australian insects. By Master H. Hill, Victorian moths. By Mr. G. Lyell, jun, W. moths *(Thailina clara)*, from Brighton. By Mr. J. E. Prince, "Key to Genera of Tasmanian Mosses," andhand book by R. A. Bastow, F.L.S. By Mr. J. Searle, three Tasmanian snakes, fungi, etc.

After the usual *conversazione* the meeting terminated.

THE ANNUAL CONVERSAZIONE.

THE eighth annual *conversazione* of the Club was held at the Masonic Hall, Collins street East, Melbourne, on Thursday evening, the 26th April, when there was again a very large attendance of the members and their friends, some 750 ladies and gentlemen being present.

The presidential address, which appeared in full in our last issue, was delivered in the smaller hall on the first floor, which was filled to its utmost capacity.

Baron F. von Mueller, K.C.M.G., patron of the Club, occupied the chair, and, on conclusion of the address, moved a vote of thanks to Mr. A. H. S. Lucas, M.A., for his excellent review of the Club's doings, and remarked that it seemed a pity that the exhibits so skilfully brought together by the members of the Club should only be on view for the one evening.

The motion was seconded by H. K. Rusden, Esq., hon. secretary of the Royal Society, and carried by acclamation.

Mr. D. M'Alpine, F.C.S., then delivered a lecturette, entitled "The Movements of the Edible Mussel and its Various Parts," a *resumé* of which will be found on page 10 of our last number.

The exhibits were displayed in the large hall, and were arranged on a series of tables, occupying altogether nearly 300ft. of space.

The following is a list of the exhibitors, with particulars of their more important exhibits :—

Mr P. H. Anderson, Melbourne—Numerous specimens of insect architecture, also geological specimens, and, under microscopes, a variety of interesting objects.

Mr. F. G. A. Barnard, Kew—Groups of Victorian beetles, orthoptera (phasmidæ, etc.), and hawk-moths; groups of Australian beetles and of Queensland butterflies; also, a number of growing Victorian ferns, including *Gleichenia flabellata*, *Lomaria fluviatilis*, *Davallia dubia*, etc.

Mr. D. Best, Hawthorn—Ten cabinet-drawers of Australian coleoptera.

Mr. C. C. Brittlebank, Springvale—A large series of water-colour drawings of the metamorphoses and perfect forms of Victorian insects.

Mr. A. Coles, Melbourne—Cases of wood-duck, southern

stone plover, and plain plover, each with nest, eggs, and young; a case of Pacific gulls and young from King Island; a group of native animals—native bears with young, opossums, and native cat; a case containing an Australian goshawk, a cygnet, and native cat; a group of regent birds of various ages; a group of Australian birds, an Australian bittern, etc

Mr. A. W. Coles, South Melbourne—A wedge-tailed eagle killing rabbit, a laughing-jackass killing snake, a boobook owl, painted snipe, New Holland snipe, Eyton's ducks, flying phalangers, black snake, river turtle, etc.

Rev. A. W. Cresswell, M.A., Camberwell—Geological specimens.

Mrs. Flatow, Carlton—A collection of Victorian and Australian shells, seaweeds, sponges, etc.

Mr. C. French, F.L.S., South Yarra—A group of goliathus (cetonidæ) beetles, a group of Australian and exotic lepidoptera, photographs of group of Australian longicorn beetles (with pectinated antennæ), photographs of incidents connected with the King Island expedition.

Mr. C. French, jun., South Yarra—A collection of about 100 species of dried plants from King Island.

Mr. J. T. Gillespie, Malvern—A case of Australian birds' eggs.

Mr. R. Hall, Williamstown—A number of zoological specimens.

Master Hellicar, Hawthorn—Mounted Victorian birds, viz., white ibis, curlew sand-piper, pair of wood-ducks, land rail, and pair of cockatoo parrots.

Masters H. and G. Hill, Windsor—Six cases of Victorian and other beetles, butterflies, and moths.

Mr. T. Hyland, Richmond—A case of Australian birds' eggs.

Mr. E. E. Johnson, Northcote—Native animals: Kangaroo, wallaby, platypus, bear with young. Victorian birds, including wedge-tailed eagle, whistling eagle, podargus, heron, pelican, quail (four species), spoon-bill, plover, azure kingfisher, wonga pigeon, robins, finches, bower-bird, lyre-birds, etc. Birds' eggs: Cassowary (New Guinea), lyre-bird, emu, teal, etc. Nests of bell-bird, magpie lark, etc. Victorian snakes. Black fish. Collection of minerals, crystals, corals, etc. Collection of New Zealand woods, polished and in rough.

Mr. T. Judd, Kew—Cabinet-drawers of British lepidoptera, collected by exhibitor over fifty years ago.

Mr. G. A. Keartland, North Carlton—Collection of Australian animals, birds, birds' eggs, reptiles, insects, and shells, from King Island, etc.

Mr. H. Kennon, Hawthorn—A case of fossils, shells, etc.

Mr. W. Kershaw, Windsor—Cabinet-drawers of Australian lepidoptera, foreign lepidoptera, and foreign buprestid beetles.

Mr. D. Le Souëf, Royal Park—A young platypus about four days old (in spirits); carpet and diamond snakes (non-venomous), alive; stump-tailed and blue-tongued lizards, alive; collection of snakes, etc. (in spirits).

Mr. A. H. S. Lucas, M.A., South Yarra—A pin-tailed duck (a rare British specimen, shot in Norfolk); a series of fossil remains, illustrative of British carboniferous flora; dissections of common star fish (asterina calcar), dried Victorian plants.

Mr. D. M'Alpine, F.C.S., Toorak—Living specimen of long-necked river tortoise, from Goulburn River; a unique specimen of an egg within an egg; dried specimens of slugs, water and land leeches; skull of native bear; also, specimens illustrative of lecturette.

Baron F. von Mueller, K.C.M.G., South Yarra—Fruits of Adansonia Gregorii (Baobab tree), North-West Australia; proof plates of late decades of "Acacias of Australasia," drawn and lithographed by R. Graff; drawings of Australian fungi, by Miss Wehl, Mount Gambier.

Mr. R. H. Nancarrow, Neilborough—Nest of *Acanthiza uropygialis*.

Mr. F. Pitcher, South Yarra—Sixty species of Victorian ferns (dried, mounted, and framed).

Mr. J. E. Prince, Windsor—Microscopes with objects.

Mr. F. Reader, Port Melbourne—Dried plants from North-West Victoria (orders: Myrtaceæ and Compositæ); collection of Victorian mosses, book of medicinal plants, book of small New Zealand plants.

Mr. G. W. Robinson, Narre Warren—A bouquet of autumn berries of native and exotic trees and shrubs.

Mr. J. Searle, Collingwood—Cases of Victorian beetles, butterflies, moths, etc.; case of insects, showing their metamorphoses; case of zeolites, from Clifton Hill quarries.

Dr. J. Springthorpe, Melbourne—Case of Victorian shells, collected at Griffith's Point, etc.

Mr. H. T. Tisdall, F.L.S., Albert Park—Victorian ferns (in pots).

Rev. F. R. M. Wilson, Kew—Herbarium specimens of Victorian lichens.

Mr. J. Wing, Collingwood—Specimens of quartz, country rock, and auriferous pyrites, from "Golden Gate" claim, Rushworth; specimens of fossil reef containing gold and encrinoids, from same locality.

Mr. T. Worcester, Frankston—Mounted Australian birds.

Mr. A. Yelland, Fitzroy—Collection of shells, fossils, minerals, and crystals.

Mr. C. Yelland, Fitzroy—A shark's mouth; also, pair of young emus (mounted).

About half-past ten the visitors began to disperse, having spent a very pleasant and instructive evening.

NOTES ON VICTORIAN AND QUEENSLAND LEPIDOPTERA.

By Dr. T. P. Lucas, Brisbane.

(Read before the Field Naturalists' Club of Victoria, 14th May, 1888.)

Thinking that you may care to hear from an old comrade, and especially respecting the gems of scientific beauty to be met with in Brisbane, I have taken the present opportunity of a rainy day to jot down a few notes. The first thing which strikes a collector of wide experience is the great similarity between the collecting grounds of Brisbane proper, the Fernshaw district, and the Gippsland ranges of Victoria. Brisbane is about 25ft. above sea level. It is surrounded by suburbs of hill and dale. Deep gorges and winding gullies extend on every hand. There is evidence, I think, of continued and extended volcanic action in Mesozoic and Neozoic times. As you may surmise, the scenery on such a basis, and with a sub-tropical climate and vegetation, is charming and grand. In the immediate vicinity of Brisbane, the forests are being cut down, and even the after growth copses are giving way to cottage and garden. It is surprising to see new centres of suburban life, as villages among the deep gorges, rising on every side. But as the hills towards the horizon rise higher and higher, no amount of building can destroy the glorious scenery of the ever-varying landscape. Ferns, tree orchids, lilies, and multitudinous flowers reward the searching botanist. It is an easy matter to go for a walk and collect twenty to thirty or more varieties of ferns in a day. New Zealand is noted for ferns, yet I believe we have a larger number of species in Queensland than there are in all New Zealand.

Brisbane appears to me to be a sort of central meeting point, where the various zoological zones converge. As I have hinted, the thousand feet zone of Upper Gippsland and Dandenong zoology crosses here. I noticed, when collecting at Upper Moe, that many Queensland types came down last year, but I attributed the same to the hot season. I was delighted to see the *Agarista agricola*, with its glories of yellow and orange and red and blue on a black velvet basis in a wood at Upper Moe. Surely the design for painting on black satin was carried from this moth. Then the *Papilio stenelaus* tormented collectors by flying high, and ever escaping capture. But here in Brisbane both insects are common, difficult to catch unless

by stealth. Then, again, Mr. Kershaw and myself found many Noctuid moths, special Queensland types; and the little Pyrale *(Zinckenia recurvalis)*, so common everywhere in the South Pacific Islands and in Queensland, swarmed by way of Gippsland and Frankston, even on to Melbourne. Since my arrival here, in the beginning of last September, I have been pleased to find so many of the upper zone (say 600 to 1400 feet) types of South-Eastern Victoria moths. I live a mile and a quarter from the General Post Office—'buses pass by my house every few minutes. We are built in all around. But the house stands up from the road, and is nearly surrounded by a small garden. On particular days in September and October last the fence round was simply swarming with beautiful insects. The Lithosiadæ, a family near the Bombyces, were the most plentiful of the Macro-Lepidoptera. The micros were exceedingly common and varied. Here I may mention that Gippsland and Fernshaw are most prolific in these types in November, Victorian specimens being about six weeks later than Queensland ones on an average all round in time of appearance.

In Gippsland I found a large footman, the *Calamidia Salpinctus*, Meyr.; but sparingly. I caught the same in my garden, quietly feeding at dusk on the honey of the passion-fruit flowers. The *Lithosia bicosta*, *L. spilarcha*, *L. bicolora*, and *Scoliacina orthotoma* all occur in both localities. But, in addition, we get several other species, which may even yet be found in Gippsland. The *Lithosia alterna*, a pretty species, with black scalloped bands on a yellow ground, I found at Kyneton, but have not seen it here. I need not say that the *Deiopeia pulchella* (crimson spotted footman), so scarce in Melbourne, is in certain seasons a very torment here. On walls and fences the pretty little mosodas, and allied genera, offer a prize to the arduous collector. The *Mosoda sejuncta* is a prize in Victoria, but in my garden I got tired of taking it, and preferred to capture the eight or nine other species which played in among, but ever kept distinct from, each other's reserves. One very pretty species, which I have christened Currant Cake, is marked by black dots and bands on a rich saffron ground. I took a dozen one night at light, but have seen none since.

The *Arhodia lasiocamparia*, a showy insect, sometimes with a purple, at others a red, and, again, others with a yellow or buff tinge, is a prize in the higher copses around Melbourne. Here I take it at light. An allied species, *Striglina pyrrhata*, sometimes orange red, at others buff, occurs at Healesville, Moe, and in our woods. The *Rhinodia rostraria*, one of the thorns, occurs at Marysville, and as near Melbourne as Nunawading. It also occurs in Upper Gippsland. It is the type species here. The *Lophodes sinistraria* is rare at Fernshaw and in Gippsland. It is very common here, on trees and fences. The male is

entirely different in pattern to the female, being nearly black; the female brown, marbled with chocolate lines. At Frankston I had the pleasure of finding a new bombyx in April, of an entirely new genus. Mr. Meyrick named it *Scaedora omophones*. It is a minute species, allied to *Asellus* of the British Bombyces. Here I have found three or four more species. *Cœsa viduella*, somewhat allied, but a larger and less delicate insect, is common on your heaths, and also occurs here. So far, I have only found a few new geometers, carpet moth types, etc. But my great success with geometers has been the emeralds. I think Mr. Kershaw and myself got fifteen or sixteen species in Victoria, not forgetting the one *Iodis fugitivaria* Gn., found by the Masters Hill at Mount Macedon, and found previously in Tasmania. In my garden I take *Thalassodes lithocroma*, Meyr.—first of all, I believe, bred by Mr. Spry from native cherry. The *Thalassodes insperata*, the light green species, blotched with white, also found at Brighton feeding with the last-named, was found in New South Wales and elsewhere, but I have not seen it here. We have two types of Thalassodes, the light green and the dark brown, perfectly different in pattern, and reminding one of the two at Brighton. Collectors have considered them the sexes of one *T. pieroides*, Walk., though I believe Butler, of the British Museum, names them as distinct. All I can say is, we collect the caterpillars from rose bushes and almost every other tree, and I cannot discern any difference; and, as far as my experience goes, they are always found together. The light one is allied, if not identical, with the Fernshaw type. Inclusive of my fourteen Victorian species, I have now got thirty species of this beautiful family. One species is very lovely. The inner half of the wings is scalloped out pea green; the other half is blotched with white, and at the junction of front and hind wings has the appearance of three red roses carelessly tossed on. The rich lichen-looking geometer, *Hypochroma muscosaria*, found on fences in the Dandenong Ranges, and from Frankston onwards to Gippsland, occurs here in September and in December. I think we have more broods than occur in Victoria.

I was somewhat interested in finding a new look-out in caterpillar life. Case caterpillars are common here, as in Victoria. But in two instances I have found caterpillars clothing themselves, not in loose cases, but by gumming their garments on to their skins. Walking by a fence last September or October, I was surprised to see a caterpillar reminding me of the Thalassodes type, but coloured like lichen. On picking it up, several of the tuberosities or appendages thrown out on each side came off on to my fingers. I thought I had crushed my specimen, but on finding more I saw that the creature was covered with aggregations of lichen spores, spicules, etc., and that these were fast to the skin. The only

portions not covered were the eyes, feet, and mouth. It was not an emerald at all, but a small brown geometer. Later on I found a second type—a geometer caterpillar clothed by aster florets. These were firmly adherent to the skin, and, except when in motion, perfectly deceptive among the aster heads of florets. This turned out to be an interesting specimen, being the rare buff-green, or emerald, *Eucrostis argocrana*, Meyr.—new to science when I took it at Marysville and at Upper Moe. I only succeeded in getting one specimen here, but the imago is identical with the Victorian specimens.

I fear I shall weary you. I could go on writing all day about the wonders to be seen here, but I must not omit to rouse your ardour by describing my success at the electric light. The success varies on different nights, and, so far, I am baffled to say what regulates moth appearance. Wind and rain offer no criterion, but, as far as I can judge, the meteoric conditions of the atmosphere have most to do in the matter. And I think this is feasible. The condition of the atmosphere, acting on the sensitive nerve ganglia, must arouse or abate energy; and, in response, particular species fly or rest, as the heralder imposes. Such, at least, agrees with my experience. One night a species may appear largely, and not again for a week. But here the whole insect-life economy offers material for wide study. The fences on hot days swarm with lizards, and moths are scarce. When the lizards are lazy, or sluggish, or asleep, the moths appear. At the electric lights all kinds of enemies torment the moths. Bats fly through and through the groups. I believed these creatures caught their prey in their mouths; but it is not always so, at any rate with the larger ones. A large moth dodged a bat as I was watching the struggle in the air, and fell to the ground. I secured the prize, but found that the bat had struck and torn the hind wings with its claws. Frogs here, in swarm and diversity of species, perch on window ledges, logs, stones, posts, or trees, watching for a meal. As they jump you cannot see them seize their prey. They seem to do it in the jump. A gentleman put a pin through a cockroach, and fastened a thread to the pin. Directly the cockroach started to run away a tamed frog jumped and had him. It swallowed its prey too quickly to be seen, but the observer gently drew in the string and fetched the cockroach up again. When the frog swallowed a hard longicorn he felt very uneasy, and, after repeated attempts, brought up his indigestible meal intact and unharmed. I got a couple of neepers, about three inches long, and let them claw a large green frog as he waited for prey under the light. He did not attempt defence or assault, but scampered off squealing until he frightened his riders away. Beetles, mantises, grassho pers, bugs, water neepers, white ants, moths, and sometimes butterflies visit the lights. One night I caught five species of hawk

moth; another night I took ten specimens (five species), including the large *C. Australasiæ* and the new *Sphinx Miskini*. Many good Bombyces, several delicate and rare Pyrales, a number of Noctuids and others come to the electric light. Altogether, in Brisbane since September I have got nearly, or quite, 1000 species of Lepidoptera, many of them certainly new to science.

I spoke of Brisbane as a central meeting point for various zones. I have mentioned the upper line Gippsland zone; then we have the tropical types and the sub-tropical (Sydney) types coming in large numbers. The Melbourne zone proper, with such moths as *Chlorochroma arenaria*, common emerald, pass over Toowoomba, but I cannot define its limit towards Brisbane yet. The heath types are rare here, but, I expect, occur on the sand islands of the river and bay. A new pyrameis, or British type vanessa, which I got from Fernshaw, Mr. Miskin has done me the honour to name *Pyrameis Lucasii*. The new hypochrysops which I found at Upper Moe, and of which I had taken the coppery-brown female at Fernshaw, he has named *Hypochrysops Hecatius*. A new white which I obtained in my journey two and a half years ago, at Port Douglas, he has named *Tachyris asteria*. And I have yet many blues and skippers, which are undescribed and unnamed; thus proving that not nearly all the species of Australian Lepidoptera are yet discovered.

NOTES ON THE DISTRIBUTION OF THE EUCALYPTS.

By A. W. Howitt, F.G.S.

(Read before the Field Naturalists' Club of Victoria, 9th April, 1888.)

Morwell to Yinnar.—Along the ridge followed by the road are E. amygdalina, large, bushy trees, with thick foliage of small-sized leaves; E. viminalis, also of large size; E. Stuartiana, large, massive trees; and, finally, a few E. pauciflora.

Tertiary Sandy Clays, with some Alluvium.

Yinnar to Boolara.—At Yinnar there are E. viminalis scattered about with E. gunii along the watercourse. On leaving Yinnar there are, on the wet, swampy, clayey flats, E. gunii, with a few E. viminalis; then, as the ground rises a little, and becomes poorer and more sandy, the only trees for some little distance are E. pulverulenta. These trees have leaves strongly falcate, and much less pulverulent than those growing, for instance, on the road to Walhalla or at Monkey Creek, on the road to Port Albert. But the lower branches, or the young saplings, here have opposed pulverulent leaves. These trees decrease in number until, when close to Boolara, they are represented by only a few stunted trees. From Twelve-Mile Creek

Tertiary Sands and Clays.

to Boolara the country is sandy and poor, and the forest is composed of mainly E. obliqua and E. amygdalina, the former somewhat stunted in size. Besides these, there are on the rivers some large E. goniocalyx.

Boolara to Mirboo.—Between Boolara and Mirboo there are two tracts of good soil—volcanic (probably older volcanic), separated by wide extents of poor ridges of tertiary beds. On the volcanic tracts grow E. goniocalyx, with some E. amygdalina, regnans, and E. gunii. On the tertiary tracts are E. obliqua and E. capitellata, some of which grow to large size; E. amygdalina, of the narrow-leaved variety; E. goniocalyx, in the creeks; and in some of the ridges rather tall examples of E. Sieberiana. At Mirboo the contrast between the forests in the volcanic and the tertiary tracts respectively is very marked. The former is mainly clothed with gigantic E. amygdalina, regnans (Blackbat), and fewer E. globulus and more rarely E. obliqua. The latter country has mainly E. obliqua of large size, E. amygdalina, with E. goniocalyx in the gullies.

Tertiary Sands and Clays.

Volcanic.

Mirboo North to Mirboo South, Tarwin River.—E. amygdalina, regnans, and E globulus from the forest, to the almost complete exclusion of other trees.

Volcanic.

Mirboo South to Stockyard Creek.—E. amygdalina, regnans all the way. Next in number E. globulus, then E. obliqua, and lastly E. goniocalyx. The E. amyg. reg. specially upon the high summits and in the southern fall of the country. Here and there are scattered examples of E. viminalis.

Mesozoic Coal Measures.

Foster to the Agnes River.—On the heaths about Foster E. amygdalina in a dwarf form, and occurring in a larger size at Ameys on the Franklin River; also forming a forest bordering deepened E. obliqua. In the level country bordering the Franklin River, and extending to near Muddy Creek, E. obliqua and E. goniocalyx forming most of the forests, with a few E. gunii in the gullies.

Upper Silurian, overlaid by poor, swampy deposits, probably post-tertiary and recent.

Mesozoic Coal Measures.

From Muddy Creek to the Agnes River.—E. gunii of large size, E. goniocalyx, E. globulus, and E. capitellata, the latter increasing in amount on nearing the Agnes River.

Agnes River to Alberton West.—The belts of timber, such as at Shady Creek and Nine-Mile Creek, are mainly E. capitellata, E. goniocalyx, E. globulus, E. obliqua, and a few E. gunii in the gullies. About Alberton West E. gunii is the principal Eucalypt.

Yarram Yarram.—After leaving the alluvial flats in the Tarra River the forests in the tertiary sands and clays, before reaching Bodman's Creek, are composed of E. capitellata, E. goniocalyx, and E. globulus.

Tertiary Sands and Clays.

On the ridges between Bodman's Creek and the Bruthen Creek E. obliqua is almost the sole tree, in a somewhat dwarf form. Where the soil is somewhat deeper, and in the gullies, are also E. capitellata and E. goniocalyx. On leaving Bruthen Creek and ascending the hills towards Curyjong, E. obliqua. E. capitellata gradually ceases at this place. E. goniocalyx and E. globulus—these extend in about the proportions relatively to each other across the ranges to the fall northwards to Merriman's Creek, where there are also, in addition, some very large trees of E. Stuartiana. On the falling ground thence to Merriman's Creek E. obliqua, E. amygdalina, and at Merriman's Creek E. gunii on the clayey flats.

Coal Measures.

Merriman's Creek to Rosedale.—On the sandy hills and clayey flats on the north side of Merriman's Creek are E. obliqua, and less numbers of E. amygdalina. In one spot I observed a small colony of E. piperita; in the gullies and in the patches of better soil, E. goniocalyx, E. viminalis, and also E. gunii of small size. Where the sandy and clayey ridges merge into the clayey flats with a thin coat of soil, extending thence to Rosedale, there are E. amygdalina. On the clayey flats and about Rosedale, E. tereticornis. On the Glengary River, at Rosedale, E. viminalis.

Tertiary Beds.

DESCRIPTIONS OF TWO NEW LICHENS AND A LIST OF ADDITIONAL LICHENS NEW TO VICTORIA.

(Read before the Field Naturalists' Club of Victoria, 14th May, 1888.)

By Rev. F. R. M. Wilson.

1. Description of a New Species of Amphiloma.

Amphiloma glaucescens. Wilson (spec. nov.)

Thallus albo-glaucescent, lobato-dilated (3 inches or more in breadth), unequal, lobes confluent or continuous, thin, circumference white or whitish, and somewhat byssaceo-crenate, under surface snowy white. Elementary filaments of thallus without visible articulations, ramose, ·0037m.m. thick. Gonidia irregular in shape and size, ·005 to ·008m.m. in diameter.

Apothecia small (about 1m.m. in diameter), waxy, pallido-testaceo-rufous, with white inflexed thalline border. Spores 8 in the ascus, colourless, ellipsoideo-oblong, uniseptate, ·007 to ·01m.m. long and ·003m.m. broad. Paraphyses indistinct. Hypothecium pale fuscescent. Gelatina hymenea deep blue with iodine.

Found on bark of trees, Tambourine Mountain, Queensland, by Mr. John Shirley.

This species is of some scientific interest, owing to the fact that only two species of the genus Amphiloma have hitherto been known—lanuginosum and gossypinum—and of these two species one has not been analytically examined, so far as the apothecia are concerned. Acharius, at the beginning of this century, described the apothecia of both species, but only by their

external appearance; and subsequent lichenologists have had no opportunity of examining the extremely rare apothecia of A. lanuginosum. On this account, Nylander says, the genus cannot be fully defined with certainty. And hence the definition hitherto received has now to be revised in the light of the present species. In this light I offer a few comments on Dr. Nylander's description of the sub-tribe Amphilomei and its only genus, Amphiloma, as follows:—

He describes the colour of the thallus whitish or cinerascent. To this we must now add - or glaucescent. He describes the thallus as "membranaceous, lobate or monophyllo-lobate, soft and superficially pulverulent or altogether quasi pulverulento-membranaceous." This I would amend by simply calling it superficially quasi pulverulent; for, while the first look of the thallus suggests a thin parmelia, with its surface mouldy or chalky, the use of the lens reveals that this appearance is due to a fine short nap produced by the protrusion of the elementary filaments of which the thallus is composed. Nylander continues:—"It contains true granula gonima, and, being destitute of epithallus and cortical stratum, exhibits a lax texture wholly filamentoso floccose, composed of fine filamentose elements implexed and ramose. In the two species of this sub-tribe the apothecia of the one are unknown, and of the other are lecanorine. Spores six or eight in the ascus, uniseptate, shortly fusiform." We must now add "or ellipsoideo-oblong." He continues:—"Spermogones not yet seen."

Comparing the new plant with the descriptions of the two other species, we find specific differences in the colour of its thallus both above and below, in the shape and size of its gonidia, in the colour of the epithecium and of the hypothecium, in the shape and size of the spores, and in the colour of the hymenea gelatina when treated with iodine—all which are so well marked as to lead to the decision that Amphiloma glaucescens is a new and very distinct species.

2. Description of a New Species of Gomphillus.

Gomphillus bæomyceoides. Wilson (sp. nov.)

Thallus cinereous or virescent, effuse, either as though painted, thin and somewhat shining, or thicker eroso-isidioso-granulate, consisting of variously arranged conglutinated filaments and gelatinous sacs containing gonidia of various form and size (diameter about ·02 or ·01 millimetre.) Apothecia biatorine, occasionally margined with the white hypothecium, scattered or conglomerate, depresso globose, small (diameter up to 1·5 m.m.), smooth, rufo-fulvescent, at first almost white, and at length very dark and somewhat deformed, sessile or stipitate; stipes strong (up to ·5 m.m. in diameter and ·5 m.m. long), crowned sometimes with two or even three apothecia, and formed of the lengthened and constricted hypothecium, white without and pale amber-fuscescent within. Spores—eight in each cylindrical theca, acicular, filiform, very long and attenuated (about ·14 m.m. long), and divided by very many septa. Paraphyses not distinct. Spermatia very minute.

Found by Rev. F. R. M. Wilson, April, 1886, on the trunk of a tree (Pomaderis apetala), on the bark and on moss, in a thick forest at Bloomfield, Victoria; also in April and November, 1887, on the trunk of a tree fern, on the roots and mosses and jungermannias and lichens (stictas) in a thick forest, Mount Macedon, Victoria; and in February, 1888, on the mossy root of a tree, on the earth, dead leaves, etc., in the forest on the Black Spur, Victoria.

The genus Gomphillus belongs to the series Cladodei (shoot-like lichens); but it differs very greatly from the rest of the family, especially in the character of the spores. Dr. Nylander, who named the genus and the only species hitherto known to science, calls it a singular type and a paradoxical exception, and says that it recedes from all others in the anatomical

analysis of its organs. Its apothecia are very hard and tough, and not readily softened by water. Probably it requires thoroughly moist weather to scatter its spores, which are enormously long and exceedingly attenuated. Its thallus, too, is very thin, and is composed simply of gonidia and elementary filaments irregularly stuck together.

Dr. Charles Knight, of Wellington, New Zealand, having examined the specimens forwarded by me as a new species of Gomphillus, sustained my opinion as to the novelty of the species, and suggested the name bæomyceoides. He also kindly sent me specimens of the other species calicioides, which is found in France, Italy, and Ireland, and which is, in many respects, quite diverse. The new species has a thicker thallus, a larger apothecium, a stouter stipes, a much larger and fungoid capitulum; and the gonidia are more irregular in size and shape, and, instead of being scattered singly among the filaments, are enclosed, many together, in gelatinous sacs.

This conglobation of the gonidia of G. bæomyceoides will necessitate an alteration in Nylander's definition of the genus and sub-tribe. In place of saying gonidiis mediocribus parciusculis sphæricis, we must now say gonidiis aut singulatim dispersis aut in globulis gelatinosis conglobatis.

3.—List of Additional Victorian Lichens (25.)

Gomphillus bæomyceoides. Wilson. (Sp. nov.)
Cladonia gracilis. Hoffman.
cariosa. Flarke.
vestita. Acharius.
rangiferina. Hoffman.
Neuropogon melaxanthus. Acharius.
Stictina marginifera. Montague.
Sticta aurata. Acharius.
Pannaria lurida. Montague.
Lecanora subfusca, Lin. var. *allophana.* Acharius.
Heterothecium cinnabarinum.
Blastenia coccinea. Knight. (Sp. nov.)
Buellia saxatilis. Schœrer.
Opegrapha varia. Persoon.
contexta. Stirton.
atra. Persoon.
atra, var. *denigrata.* Acharius f. *abbreviata.*
atra, var. *parallela.* Leighton.
Saxicola. Ach. var. *Persoonii.* Acharius.
Graphis elegans. Smith.
Arthonia astroidea. Acharius. Vars.:—*1, fraxinea; 2, saligna; 3, corylea; 4. juglandis; 5, cerasea.*
Arthonia fusco-rufa. Knight. (Sp. nov.)
Glyphis Kirtoniana. Mull. Arg.
Chiodecton sphærale. Acharius.
Trypethelium fumoso-cincreum. Knight. (Sp. nov.)

It is announced that the first general meeting of the Australasian Association for the Advancement of Science will be held in Sydney in August next, commencing on the 28th of that month instead of 4th September, as at first arranged. The alteration has been made in order to suit the vacations of the various Australian Universities.

CORRESPONDENCE.

SNAKES.

To the Editor of the Victorian Naturalist.

DEAR SIR,—The fact of Victorian snakes biting each other having been disputed, I thought it might interest some of your readers to relate a little incident which came under the notice of two friends and myself whilst in the vicinity of Fern-tree Gully.

We were scouring the district, and on the look-out for whatever might turn up of interest in the natural history line, when, suddenly, my elderly friend, who wore spectacles, exclaimed, in a half-startled manner—"Look there! What on earth is that?" I turned sharply round, and at once saw two fine copper-headed snakes (*Hoplocephalus superbus*). These two, which proved to be male and female, were so close together that it was difficult to determine at the first glance whether there was in reality more than one specimen, but in this we were speedily assured, as the female reared her head and showed fight. We had a gun, and my friend was on the point of firing at them when I begged their lives to be temporarily spared, as I was desirous of preserving the pair in spirits. I had a stick, but one quite unsuitable for the purpose of a "snake-stick," and with this I struck the two sharply across the back, without breaking the vertebræ. This somewhat rude and abrupt attack upon the snakes had the effect of arousing their indignation; but instead of attacking me, the author of their misfortune, the female made a dart at and bit the male very severely about six or eight inches below the back of the neck. The male, by this time, was getting remarkably lively, and, I suppose by way of reciprocity, he (the male) was so ungallant as to make a most savage attack upon his lady-love and bite her in a very determined manner. It is a pity that we had not time to stay and note the effect which these bites would have had upon these animals, some arguing that the poison is harmless if injected into the same class of *reptilia*, whilst others contend that it is, in all cases, a deadly poison. I have taken some considerable interest in snakes, and have killed hundreds, but this was the first occasion on which I had had an opportunity of witnessing what I myself had long doubted, viz., that our snakes do really bite each other; and it would be interesting to have the experience of other members of the Club and others whether there are authenticated instances of snakes killing each other by poison. The two specimens will be at the next meeting of the Club. I may remark that there is not the slightest difference in the length of the two specimens, each being four feet three inches.—Yours truly,

CHARLES FRENCH.

Field Naturalists' Club of Victoria.

President:

A. H. S. LUCAS, M.A., B.Sc., F.G.S.

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.; Vol. III. (1886-87), 12 numbers, 6s.; 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 1886-87, with Rules, etc. can be obtained on application to the Hon. Sec.

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

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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 June, 1888.

The president, Mr. A. H. S. Lucas, M.A., occupied the chair, and about sixty members and visitors were present.

A letter was read from the Zoological Society supporting the Club's suggestion to endeavour to have the platypus protected, and mentioning from 1st August to 31st December as a suitable close season.

A circular was read from the Australasian Association for the Advancement of Science announcing the alteration of the inaugural meeting to 28th August.

The hon. librarian reported the receipt of the following donations to the library:—"Bees," by Bagster; "The Microscope," by Hon. Mrs. Ward; "Taxidermists' Manual," by Captain Brown; "British Birds' Eggs," by Atkinson; "Taxidermy," by Mrs. Lee; and "Natural History of Birds, etc.," by Tiler, from Mr. Hugh Kennon; "Proceedings of Linnean Society of New South Wales" second series, Vol. III., part 1, from the Society; "Journal of New York Microscopical Society," April, 1888, from the Society; "Melbourne University Review," Vol. IV., No. 1; and "Journal of Pharmacy," May, 1888.

The hon. secretary read an account of the Club excursion to Frankston on Queen's Birthday (24th May.) The outing did not prove so successful as had been anticipated, as the day turned out showery, and made the scrub so wet that a thorough exploration of it was impossible. The party went as far as the Mount Eliza ridge, on the Hastings road; then, turning southward and westward, made across the hills to Frankston again. Though early in the season, some twenty-five species of plants were obtained in bloom, among which may be mentioned *Pimelia octophylla*, *Aster ramulosus*, *Patersonia glauca*, *Melaleuca squarrosa*, *Prasophyllum intricatum*, etc. The Epacris was in splendid bloom, of all shades, from pure white to deep crimson.

On a ballot being taken, Messrs. R. A. Bastow, F.L.S., G. F. Chamberlain, T. S. Hall, J. Lynar, A. C. Macdonald, F.R.G.S., Dr. Nicholson, J. S. Robertson, A. Turnbull, Rev. E. I. Watkin, D.D., and A. A. Wood were duly elected members of the Club.

Messrs. P. H. Anderson and D. Best were elected to audit the accounts of the Club for the past year.

PAPERS READ.

1. By Mr. C. French, F.L.S., entitled "Zoological Notes from the Wimmera." The author gave an interesting account of the various mammals, birds, reptiles, insects, etc., noticed during a visit to the Lake Albacutya district, in the mallee scrub, nearly 300 miles north-west of Melbourne. The botanical observations during the trip were recorded some time ago, and published in the *Naturalist* for July, 1887.

2. By Dr. T. S. Ralph, entitled "Some Account of the 'Katipo,' or Poisonous Spider of New Zealand." The author described the haunts and habits of the spider, which greatly resembles one found in Victoria—viz., a deep velvety-black species, with a vermilion stripe down the back; and said it had been known to produce fatal results. He exhibited live specimens, also preparations of parts under the microscope.

The paper gave rise to an interesting discussion relative to the virus of spiders, and Mr. D. M'Alpine drew the attention of the members to a garden spider, which had recently caused him considerable inconvenience, and which he proposed to experiment with as to its poisonous properties.

The following were the principal exhibits of the evening:—By Mr. C. French, F.L.S., a male and a female copper-headed snake (*Hoplocephalus superbus*), in illustration of letter in June *Naturalist*. By Mr. C. Frost, Preiss' blind snake, and a two-hooded Furina from the Murray district. By Mr. R. Hall, Murray turtles (*Chelomys Macquaria*), from Lake Boga; eggs of Murray River crayfish from Swan Hill; hornet's nests from Lake Boga. By Mr. J. E. Prince, sponges from Airey's Inlet, near Cape Otway. By Mrs. J. Simson, *Capparis nobilis* and other plants from New South Wales. By Rev. F. R. M. Wilson, seven new Victorian lichens—viz., *Obryzum myriopus* (sp. nov.) Wilson, *Trachylia concreta* (sp. nov.) Wilson, *Gomphillus bæomyceoides* (sp. nov.) Wilson, *Pilophoron conglomeratum* (sp. nov.) Wilson, *Blastenia coccinea* (sp. nov.) C. Knight, *Arthonia fusco-rufa* (sp. nov.) C. Knight, and *Trypethelium fumosa-cinereum* (sp. nov.) C. Knight; and two from Queensland—viz., *Biatorinopsis versicolor* (sp. nov.) Wilson, and *Amphiloma glaucescens* (sp. nov.) Wilson.

After the usual *conversazione* the meeting terminated.

NOTES ON THE ZOOLOGY OF LAKE ALBACUTYA DISTRICT.

By C. French, F.L.S.

(Read before Field Naturalists' Club of Victoria, 11th June, 1888.)

You will, doubtless, remember my promise to read, when there was a scarcity of papers, a few notes on the fauna of this part of the Wimmera district, and I much regret the circumstance of my having to redeem my promise sooner than I anticipated.

I must here remark that I left Melbourne totally unprepared, and without any appliances whatever for collecting zoological specimens, having determined to do what I could, during the limited time at my disposal, towards the collecting of the plants of the district, and which, as I have previously stated, was the sole object of my visit, and thus it happens that these notes are necessarily very fragmentary and imperfect.

At a casual glance in passing through the mallee on the road up from Dimboola, I could not help noticing the apparent scarcity of birds, particularly the smaller kinds; but on alighting from the buggy, and proceeding on foot but a short distance into the mallee scrub, I soon saw that I was mistaken, as many curious forms were not at all uncommon, though in some cases unknown to those who have been accustomed to collect only in the districts near Melbourne.

The first old favourite noticed was the well-known rose-hill, or rosella parrakeet *(Platycercus eximius)*, which were here in numbers. The gigantic kingfisher (laughing jackass, if you like) *(Dacelo gigas)* were also plentiful enough; whilst the wedge-tailed eagle *(Aquila audax)* was to be seen hovering around, waiting, I suspect, Micawber-like, for anything to turn up. Whilst on the subject of eagles, I may remark that these fine birds are highly spoken of as destroyers of rabbits; but, on the other hand, they have a very great liking for young lambs, and I noticed that they (the eagles) are always considered fair game for a "pot shot" whenever occasion offers, and thus their numbers have been greatly reduced.

Lizards of various sizes and colour seem common about here, and, if time permitted, a very good collection of these animals could be got together in this district.

Regarding ants, this country would be a perfect paradise for an observer of the Sir J. Lubbock type (unfortunately very rare), as there are, I dare say, 50 or 60 species to be found within an easy walk from Dimboola, and I have reason to believe from what little I saw that many of these little insects are either new, or as yet unpublished, species.

Spiders were, so far as I could see, not so plentiful, several which I noticed being of the commoner kinds found also near Melbourne; still I think other rare, and possibly new, species are to be found if properly looked for.

In and around the station, and on the borders of Lake Albacutya, were several small species of lepidoptera, amongst which I noticed several old acquaintances as being found in the Dandenong and other districts. I have no doubt, however, that later in the season many good finds would reward the diligent searcher. This would seem to be a poor place for the larger diurnal lepidoptera, but the large trees showed traces of being bored by the larvæ of some of our larger moths, and Mr. Kershaw has shown me some very fine specimens of various timber-feeding hepialidæ, etc., which he found in the more western parts of the Wimmera, although some of them probably occur here also.

The common crow *(Corvus Australis ?)* was very plentiful all the way up from Dimboola. I have always disliked these birds, and, although they have many friends, I cannot forgive their "eye-picking-out" and "young-duck-stealing" propensities. Mr. Scott, the day before I left, shot one which had just killed a young duck; and again, was it not a crow who stole our soap whilst we were camped at Chinaman's Flat?

Snakes, so far as I could learn, are almost unknown in these parts, although, as Mr. Le Souëf has told us, specimens of the deaf-adder were "turned up" out of the ground in the neighbourhood of Tullyvea; but, although I travelled a good deal over this district on foot, I did not see any traces of them, although they have been seen occasionally by others; and on rare occasions the non-venomous carpet snake *(Morelia variegata)* has been seen in the back country towards the Murray River.

This news is very gratifying to those good people who are afraid of snakes, also to such as have been accustomed to travel in "snaky" parts of the colony, as the Moe, Upper Murray, and other districts.

The black-faced kangaroo, which our Mr. Le Souëf was so anxious to obtain, were scarce, being probably in fear of any of Mr. Le Souëf's Field Naturalist Club confederates, or (which is more likely) does not, so I was informed, come from the back country until later on in the season.

In driving along the sandy roads we saw, although so early in the season, many specimens of the so-called "wallops," a lazy, sleepy-looking lizard, who, when he looks up, almost seems to implore you to drive over him. We saw many of a smaller kind, also one not unlike our common *Cyclodus*, or blue-tongued lizard, but a somewhat stouter animal.

Hymenoptera and diptera seemed scarce. I noticed very

few, but I should think this would be, in the summer months, a good place for them—that is, when the mallee is well in bloom; and, whilst speaking of hymenoptera, I may just mention that bees are not uncommon about these parts, but whether they were escapes from the neighbouring stations or farms I had no means of ascertaining. Water being scarce, I did not expect to see many of the *Libellulidæ*, or so-called dragon-flies, but a few very pretty species were flying about in open places. I also saw a few of the Myrmeleo family, but no orthoptera to speak of.

On the lake the little dotterel was to be seen scampering about, and a very fine and peculiar shaped brown hawk (which I took to be a buzzard) seemed inclined to hold some dispute with an eagle, but the latter (fortunately, perhaps, for the buzzard) seemed to be peaceably inclined, and soared away nearly out of sight.

What might have proved a very awkward adventure happened near to my camp at this place. I went for a stroll one morning whilst the billy was being boiled, and was "exploring" the branches of a fallen tree for lichens, when I suddenly heard the rattle of a chain close to me, and, turning sharply around, I found that the calf of my leg was not more than a couple of feet or so from a very large eagle, which had been caught in a rabbit trap. I made a remarkably active jump, or I might have been seriously injured. Anyone who has seen an eagle "performing" on the carcase of a dead animal will be able to appreciate the situation. I shot the eagle, which, I was informed, must have flown seven or eight miles with the trap attached to its foot, which was much crushed, and the bird had become so exhausted that it was unable to rise more than a yard or so from the ground. I did not skin the bird, as it was much damaged, probably owing to its struggles to free itself from the trap.

The emu and wild turkey, I was told, are occasionally seen about the lake, but I saw neither. Mr. Scott, however, informed me that emus with a ring of white feathers around their necks have frequently been seen in the district. Not even my old Murray friend, the native companion, was seen.

A few beautiful specimens of Leadbeater's cockatoo (*Cacatua Leadbeateri*) were seen some distance from the lake and inland, and it was not far from this spot where I found the curious Battarea fungus, which, I am now able to inform you, is not new, a single specimen of it having been previously found in the Murchison district of Western Australia, and from the unique specimen has been named *Battarea phalloides*, so I am not the original discoverer.

The handsome rock-pebble parrakeet *(P. melaneura)* is very common in these parts, and makes a splendid pet; and one which the young ladies at the station had used to fly for a long

distance and then alight upon their shoulders, and sometimes upon one's head. They fly very rapidly, and the whirring sound of their wings before they alight is somewhat peculiar. The nests of these pretty birds—often known also as smokers—are made in the hollows of trees, and are somewhat difficult to get at.

The blacks, as a rule, do not seem very willing to collect zoological specimens. In fact, I believe that their good pastor in some way discourages such matters, as it was with some difficulty that I obtained the few eggs which I purchased for my son on my return from Albacutya, although I paid a good price for them, at which they (the blacks) seemed much pleased.

These people can now make fair wages among the selectors, at fencing, clearing, etc., and thus they are to some extent independent of the itinerant naturalist. I purchased a very good stone tomahawk, which had probably belonged to some of their now defunct ancestors.

I had a desire to obtain for a friend in Europe a skeleton of an aboriginal native, and, although there are many to be obtained near the mission station, I could not venture to broach the subject to my worthy friend the superintendent, as I have a vivid recollection of my reception at my own house when I was on a former occasion indiscreet enough to unpack one from Northern Queensland; my wife remarking that, although she was willing to encourage in every reasonable way my love for natural history, I must "draw the line" at human skeletons.

In my former paper, I mentioned the fact of a very large nest of the wedge-tailed eagle which I saw near Mud-brim Spring. I may add that situate about 12 feet or so above the former nest was a nest of some large hawk. I am not aware whether the smaller nest was in use, or whether the birds had quarrelled (?) with the usual result, the survival of the fittest. It seemed strange to me that two birds of prey of different species should have occupied the same tree wherein to build their nests, as there were other large trees in the vicinity. Possibly some of our ornithological friends could give us their experience in such matters, or at least explain the circumstance.

The smaller kinds of mammals seemed very scarce. I saw hardly any, save a large Paddy-melon and a couple of kangaroo-rats (?) or something very like them. Marsupial mice are found in the north-west.

Of the echidna I saw no traces, although I believe they are to be found to the north-east of where I visited, as in similar country on the Murray they are not uncommon.

Opossums are not numerous in this district; but about Pine Plains, some distance to the north-east, they are plentiful, and many handsome rugs of excellent quality are prepared by

the station hands, who dispose of them to squatters and others in the district. The mallee opossum, a yellowish species, is, I believe, not uncommon in these parts. Very fine rugs of dingo skins are likewise prepared, and are both ornamental and useful.

The *Koala*, or native bear, is, I believe, unknown in these parts; at least, so I have been informed.

I was constantly on the look-out for the beautiful red and black cockatoo *(Calyptorrhynchus Leachii)*. but did not see any, although I should think this dry country a good place for them.

The white cockatoo *(Cacatua jalerita)* was plentiful near Dimboola, but I saw very few when further inland. Black cockatoos are not uncommon here.

Our old Murray friend, the iguana *(Hydrosaurus varius)*, was not seen, which surprised me somewhat, as this country, with its numerous rabbits, ought to be a perfect elysium for these graceful saurians.

After rabbits, the principal scourge in this part of Victoria is the wild dog *(Canis dingo)*. This animal is a very formidable enemy to the squatter, free selector, or farmer, particularly to the former, as it destroys vast numbers of sheep, evidently for the sake, tiger-like, of killing them.

These pests are caught by means of large iron traps, with a very powerful spring, and these traps are always laid in the middle of a road or path, so that when the dog comes along, which he generally does in the middle of the road, he is caught in the teeth of the trap, which, by the way, is always covered, or rather buried, out of sight in the sand. This affords fine and profitable sport for the station hands, who generally devote the Sunday afternoon to riding to the various traps and having every dog brought to the homestead, the finder being rewarded with 3os., so that many of these men are thus able to considerably augment their salaries. These traps are very dangerous to persons travelling on foot, because one can never see them, and, unless you happen to know their whereabouts, stand a good chance of being caught and held, dog fashion, until released.

On the journey down to Lake Hindmarsh station we came across the trail of a slut and litter of puppies of these dogs. They were travelling across a sand-hill in an easterly direction, and on our arrival at the station we informed the manager, Mr. Binns, who soon raised a hue and cry after them. These dogs, by cross-hybridisation, are larger and more savage than were the pure dingoes, and when they get amongst a flock of sheep make sad havoc.

In my former paper I gave you a short description of the dog and rabbit-proof fence, which extends from Swan Hill to the Adelaide border, and although this fence seemed to me to be

quite a formidable affair, the one surrounding Mildura must surely be much more imposing, when we learn from the *Mildura Cultivator* that the place is surrounded by a barbed wire fence, and, when completed, it affords a complete barrier against rabbits, dingoes, and all other creeping vermin, including book agents.

The southern stone plover is very common in these parts, as is also the spur-winged plover, and of the former I obtained five eggs on a small mound in a swamp, which I found whilst wading for water-plants.

Black swans *(Cygnus atrata)* are very plentiful, and I was informed that in the laying season at Lake Hindmarsh the eggs are collected in cart-loads and sold for food purposes in Dimboola, Horsham, etc. I saw very few of these fine birds, as the lake was, as I have before stated, obscured by a heavy mist. Pelicans, spoonbills, etc., are here in numbers.

Ducks of many species were somewhat numerous, and on every little flat place where the water had collected the black duck and another kind seemed to be numerous, the young birds being in many cases just able to waddle. I could have procured some for the Royal Park, but I had no means of bringing them down to Dimboola.

A curious bird attracted our attention when driving past a swamp only a few miles from Albacutya station. In appearance it seemed from a distance to be like a bantam hen. It ran very fast, and I suspect that it was some species of the "rail" family. I do not remember having seen it before. I have since learned that it is the Tribonyx.

The well-known and beautiful mallee hen *(Leipoa ocellata)* is plentiful enough in the more dense parts of the mallee, and their mounds were not at all uncommon. I need not describe the latter, because Messrs. Le Souëf, Campbell, and others have already given you most interesting accounts of these most singular structures. It may not be out of place to remark that, to mount skins of this bird well, great care should be taken in the posing as well as in the filling out of the skins. I have seen several stuffed specimens, but very few I thought ever approached the proper and natural position. Specimens of these (and the rule applies to other birds also) should be, if possible, studied whilst in the living state.

Regarding the beetles of these parts, I may say that I saw very few indeed, but then I was too early for them, as I recognised many plants which, when in flower, are frequented by insects of all kinds, and I have no doubt but that it is a good place for collecting beetles during the summer months, as I have had some rare species from the Wimmera, amongst which were *Stigmodera Fortnumi*, *Stigm. vitticollis*, *Stigm. Bakewelli*, *Xypeta grallaria*, *Tryphocharia Mitchelli*, and many others.

On the large trees I noticed many specimens of the common tree-creeper, often called by colonists the wood-pecker and these curious little birds were busily engaged in their usual spiral ascent of the gum-trees, and probably were in search of insects.

Not far from what I may call Paul's camp is a large gum-tree, in the upper fork of which an eagle had built her nest. I got one of the men to climb the tree. and he got one egg of a most singular size, shape, and colour, it being larger, longer, and almost without blotches of any kind. The specimen was too advanced to be cleaned, and although Mr Campbell tried his best to remove the contents, he was unable to do so without breaking the specimen. I have in my time seen a good number of eggs of the wedge-tailed eagle, but none like the specimen alluded to.

A very beautiful green and blue parrakeet, with a collar of darker green around the neck, was not uncommon on the borders of the lake. I think it must be Barnard's parrakeet *(P. Barnardi)*, and it is often found in company with the "rock-pebble" before mentioned.

There seemed to be very few insects on the many beautiful acacias, but on some leptospermum I saw some hymenoptera of large size, probably belonging to the thynnidæ and mutillidæ; also on the wing were two species at least of Neuroptera.

Fish are said to be plentiful in the Wimmera River, but I did not see any; neither did I see any tortoises, which, I believe, are sometimes to be seen in the river and along its banks. Platypus are not uncommon in the river.

I saw whilst wading for plants a few fresh-water shells, genus *Physa*, etc., although I suspect there are representatives of other genera to be found if carefully looked for.

Leeches and water-bugs *(Nepa)* were, as I have occasion to remember, not rare, and the former are, so far as their blood-sucking qualities are concerned, quite up to that of their Murray brethren.

On the flowers of the Murray box *(Eucalyptus largiflorens)* were vast numbers of a small parrot, which. at a distance, looked like either the musky or swift lorikeets, but of this I am not certain, as they were up amongst the highest branches of the trees, abstracting honey, I suppose, from the flowers; and I saw but one pair of the green leek *(P. Barrabandi)*, so common in the Lower Murray country, but these beautiful birds are, perhaps, more plentiful later on in the season.

A few specimens of the long-billed cockatoo *(Licmetis nasica)* were seen, and these were in flats amongst the high sand-hills, and I heard the well-known cry of a flock of "wild geese" as they passed over our camp at night.

One of the "night jars" *(Podargus)* kept up its mournful and peculiar cry of "Morepoke," and as the note seemed somewhat

weaker than I had been accustomed to hear, I turned out of bed to try and interview this nocturnal visitor, but the bird flew away before I got near to it. From what I could see, it seemed a smaller species than our common one. I am not aware whether a smaller species has been found here, but perhaps someone present this evening can enlighten us upon this subject.

Frogs, as a rule, were not plentiful. I saw but one green one, about half the size of the "well-to-do old gentleman" who "does" the musical honours in the swamp near the new Prince's Bridge. A whitish species of the tree frog *(Hylus ?)* and a small, grizzly-coloured and unhappy-looking toad will complete, so far as I saw, the "frog fauna' of Albacutya district.

These parts are rich in centipedes. Some of those seen were quite formidable-looking fellows, of bluish green colour, with very strong mandibles; one of these, which I killed, measuring nearly six inches in length.

I did not see any scorpions, although I should think that in such a dry country they are plentiful enough.

I noticed that many of the *Eucalypti* had their tops very much eaten by insects, and I found that, as in our portion of the colony, this destruction had been the work of the larvæ of a saw-fly, an hymenopterus insect of the genus *Perga*. These larvæ, which are horrible, black, ugly-looking caterpillars, you will have noticed on the gum saplings around Melbourne, and when touched with a stick the whole cluster writhe about, and emit a green juice, which the larvæ has extracted from the tree. There are a good many species of this genus in Victoria, all of which are more or less destructive.

A pair (male and female) of the handsome sheldrake *(Casarca tadornoides)* paid regular visits to the dam, which was close to the homestead. They were very tame, and evidently considered themselves under the protection of Mr. Scott and his people.

I cannot close my remarks on the zoology of this district without mentioning the very novel and pretty team of six sheep which the two little girls of Mr. Scott had yoked up, with proper yokes and bows; and the "team" used to draw logs, etc. It was to me quite a unique "turn-out," and could not fail to cause some considerable amusement to those who visited the station.

I have thus endeavoured to mention a few of the most prominent of the many natural history treasures to be found in this comparatively little-travelled part of Victoria. I hope some day to make a more extended trip to these parts, when I may have something of interest to show you, but should I again revisit the scenes of my former exploits I shall sadly miss the assistance and advice of the former kind and hospitable proprietors of Lake Albacutya Station, who have since left the mallee, its pleasures, and its inconveniences.

ON THE KATIPO, OR POISONOUS SPIDER OF NEW ZEALAND.

By T. S. Ralph, M.R.C.S.E.

(Read before the Field Naturalists' Club of Victoria, 11th June, 1888.)

My first acquaintance with the katipo in New Zealand dates back thirty-five years ago. The Maoris believe it to be poisonous, and for this reason I had considerable difficulty in obtaining a specimen for examination.

Habits.—As far as my experience goes, and the information I have been able to collect, this spider is not met with in other localities than on sandy soil and under plants living on sand-hills, chiefly on the sea coast. And unless one had a practical experience regarding its haunts and habits, it would be difficult to light upon the katipo, as this creature hides itself well away under its protecting bushes. The danger of being bitten by any one of them seems to me to be very remote, so that unless a man makes these sand-inhabiting bushes a resting place for the night, or unless such localities are invaded by children playing about and under them, and the spider is roughly handled or intruded upon, they are not likely to cause any injury. At the date to which I refer, I made some observations, and these reaching England, found their way, through a friend, into the proceedings of the Linnean Society of London; and lately, on visiting New Zealand, I occupied a short space of time in renewing my acquaintance with these creatures. I may here mention that my name has been treasured up in Wellington in relation to these spiders, so that I was spoken to by a man who in his youth had heard of katipos, and with them my name duly enbalmed. Through this meeting I was able to obtain specimens, for we immediately chummed and went together to the hunting-ground—viz., to the sandy ridge separating the harbour of Wellington from the open sea. Tradition states—with what truth I cannot say—that over this isthmus or ridge Captain Cook sailed in his earliest visit to Wellington, the ridge being then fairly under water, but has evidently been raised up by earthquake movement since his day. On this occasion of our exploration we got for our share of plunder some forty or fifty spiders. But the natural ferocity of these creatures must have been greatly excited, as the majority of them were killed in a general *melèe* on their way to my home, and so they were lost to science, though still to memory dear. Since then, lately finding myself again in their habitat in Wellington, I went to my old quarters, and had a good hunt. On this occasion I was much assisted by my wife, who, though at first inimical to my way, soon fell into the line of activity, and beat the bushes, and discovered their quarry for me. I captured them by pick-

ing them out of their hiding places by means of a pair of forceps, and carefully consigned them to safe keeping. Some two of these are to be seen alive in a bottle; others have had their share of methylated alcohol or glycerine, so that I am fairly well prepared to exhibit them to-night.

As I have stated, they are to be found under low-lying shrubs on sand-hills. We went to work by taking hold of the extended branches of the shrub which gave them shelter, and, lifting them up, looked for the web-like galleries which the spider forms, and around which were scattered the remains of beetles and other insects which had been killed for food. The sight of these fragments led at once to a further search, when perhaps a cocoon containing eggs was discovered—a tolerably sure sign this of the living parent being close at hand, and presenting herself, a black spider with a vermilion streak on the back. One sees that nature herself holds out the warning sign of danger, which even men have adopted, in the bright red colour which is now so freely used in the streets of this city as indicating the necessity for caution. Query—Can this adoption of the red colour as a danger signal be due to a remote inheritance? This, *en passant*. I am not an arachnologist—that is, I am not given to spider arranging—yet I have in this particular direction a great interest, which I will endeavour to make plain. For one thing, I myself verified the accounts of the poisonous property of this spider, and I believe the native statement regarding the venomous nature of the bite is true. One case, which happened many years ago, was that of the child of a European, somewhere in the Hawkes Bay district, which terminated fatally. Another case was that of a native infant, who suffered severely, but with what result I do not remember.

Another point of interest is that there is a kind of cousin-german of this katipo in Australia, to which I will refer by and by. The katipo is about the size of a small pea; the body and legs quite black; in fact, velvety black. A bright vermilion stripe passes down the back, and gives the characteristic mark of the creature to the ordinary beholder. The cocoons, or bags, which the katipo weaves for her eggs are fully the size of a pea, and are generally found mixed up with the irregular web constituting a gallery at the lower portion of the shrub which shelters the spider. In the bottle which contains the living specimens I exhibit to-night, there are two of these cocoons which have yielded up their contents in the form of a number of minute baby spiders, which, however, have been perhaps starved out for want of proper infant spider food. On occasions I have fed the small colony with flies, and I have seen these attacked by the older spiders. For the last six weeks, however, there has been no

further supply of fresh food, but these creatures, I know, are able to put up with long fasts.

This reminds me that the lady spiders are apt to devour their mates—the gentlemen spiders—according to the old Latin poet (Horace, I believe), who spoke of these ladies as "Sœva, etiam in amore," which means cruel in their affections. A legal friend has suggested that all this severity may be due to jealousy—that, in fact, it may be the method of spider divorce; if so, it is certainly a somewhat high-handed proceeding

When the young katipos make their appearance they are of a grey colour, with black spots on the body and legs. They moult off three or more times, I believe, and with each moult the vermilion stripe on the back is produced. At first there is a small spot, next a series of red spots down the back, and in the final stage these spots unite into a stripe, which is curiously notched along each edge, thus ||. When I first noticed these katipos I observed that some of them—I suppose the older ones—had a red stripe crossed over the back as well as the vertical one, so it would seem that these spiders not only have their laws of divorce, but also put on the blazonings of a Red Cross Knight. But as it is long since I have met with one of these cross-band spiders, possibly this is a sign of a departed chivalry, the days of the Red Cross Knights having passed away.

I once killed a mouse by the bite of one of these spiders. The mouse died in twenty-four hours, and presented extensive congestion, which affected the limbs and the head of the animal, and gave evidence, also, of an extensive paralysis of the principal nerves regulating the functions of the body. Being somewhat of a greenhorn in those days as regards the examination of the blood under the microscope, I did not determine the existence of any change in it as the result of the poison. When I related the result of the above experiment to the late Mr. Sharpe Maclea, of Sydney, a well-known naturalist, he expressed great surprise at the information. At the same time, he informed me that the katipo was closely related to a reputed poisonous spider of Jamaica, called "mal a pert." This brings me to my experience in Victoria, where there is a similar—if not an identical—spider, whose bite is quite as poisonous as its relation of New Zealand. But it appears to me to follow a somewhat different habit, inasmuch as it is found in out-of-the-way places, such as old out-houses and sheds, and under old verandahs. I have had one patient who suffered from the bite of this creature, and the sufferer—a strong man—was laid up in bed for a couple of days, suffering severe pain. I met another man who told me that he had been severely bitten by a spider, and he brought me a specimen of one which resembled that which had bitten him—it was a red-backed, velvet-black spider. I have made experiments with the Victorian

katipos, and killed a mouse and a powerful rat, which died forty-eight hours after being bitten.

Among all the Victorian specimens I have never seen any appearance of the Red Cross form to which I have alluded.

Since my lecturette, I have been informed that the red-backed Victorian spider's thread is made use of for micrometer threads at the Observatory, as being most serviceable for that purpose. But the creature is rather indisposed to promote scientific inquiry, being shy in spinning her yarn in order to measure the heavenly bodies.

The Katipo.—A venomous insect occasionally found among the tufts of grass on the sandy beaches of New Zealand. Its sting creates a painful swelling. I don't think it is often fatal. It is a very retiring insect, seldom seen unless sought after. The Maories used to describe it as something like a centipede, with a red head. There is a proverb among the Maories respecting it—"Kaua koe e noho ki runga ki te papapa o te onepu: ka katia koe e te katipo." If you will sit on the tufts on the shore you may expect to be stung by the katipo. Moral.—Don't put yourself in the way of temptation. The derivation is from kati, to sting—po, the night.—Rev. S. Ironside, Balaclava.

English Notes.—Letters received by the hon. secretary from Mr. T. A. Forbes-Leith, a former vice-president of the Club, now in England, contain several items of interest to naturalists. He has added to his collection of parrots several very handsome species, among them being a specimen of the rare and beautiful little blue Otaheite parrakeet. He expresses himself in strong terms of admiration at Miss North's gallery of paintings from nature, praising her perseverance, genius, etc., and her execution and exhaustive manipulation of detail in many of the most difficult of foreign trees, flowers, and birds—in fact, to his mind, is far superior to many of the old masters. He mentions being present at a sale of natural history specimens in London, when an egg of the great auk (believed to be extinct) was sold for £160. After some considerable trouble, he procured a photograph of another auk's egg in a private collection, and describes it as being about five inches long, and resembles in shape an Australian native companion's, though much larger. It has somewhat large, dark spots towards the smaller end of the egg, with other fainter and smaller ones on the other portion. India has fixed a close season for birds owing to the great destruction of birds for hat decorations, etc. A golden eagle—a bird rarely met with in England—has been shot in Surrey. In a later letter Mr. Leith mentions having been present at the sale of another auk's egg, which fetched the enormous sum of £225. He has added to his collection three humming birds' nests, with eggs, the nests being not larger than half a walnut.

NOTES ON A TRIP TO THE UPPER MURRAY.

By C. French, Jun.

(Read before Field Naturalists' Club of Victoria, 14th May, 1888.)

I left Melbourne by the 2.55 p.m. train on Cup Day, 1886, in company with a friend, Mr. S. Jephcott, at whose invitation I was visiting the Hume district. We reached Albury about 11.10, and stayed at the Albury Hotel for a day, we having heard that the coach for Ournie had just gone, so we thought it better to cross the river and go down with the coach on the Victorian side. Having to wait in Wodonga for a couple of days, we paid a visit to Mount Huon, a distance of about two miles east from the township. On the way to the mount, we found in the eucalyptus trees numerous nests of the yellow-rumped geobasileus with eggs. On the mount there is a fine view of the Snowy, Buffalo, and Kosciusko Mountains; Kosciusko and Snowy, being covered with snow, presented a very pretty sight. The plants noticed were very much the same as may be found growing around Melbourne—namely, *Helichrysum semipapposum*, *H. scorpioides*, *Leptorrhynchus squamatus*, *Wahlenbergia gracilis*, *Caladenia Patersoni*, *Cheilanthes tenuifolia*, *C. vellea*, *Arthropodium strictum*, etc. The reptilia noticed were the copper-headed and black snakes. Lace lizards were very numerous, but birds were rather scarce, the only ones noticed being magpie-larks (*Grallina picata*), garrulous honey-eater (*Myrzantha garrula*), black fantail (*Sauloprocta motacilloides*), black-backed porphyrio (*Porphyrio melanotus*), little grass-bird (*Sphenaeacus gramineus*), brown tree-creeper (*Climacteris scandens*), yellow-rumped geobasileus (*Geobasileus chrysops*), also several species of honey-eaters. We spent the remainder of the time in Wodonga searching the waterpools, and in them found *Azolla rubra* and a species of *Riccia*.

(*To be continued.*)

CORRESPONDENCE.

SNAKE-BITES.

To the Editor of the Victorian Naturalist.

Sir,—As one who has seen much of the action of snake poison, I have read, with very great interest, the letter of your correspondent, Mr. Charles French. During a long residence in South Africa I have seen several natives, and on one occasion a Madras coolie, while suffering from snake-bite; also, I have known bullocks, a horse, and several dogs to be killed by venomous snakes. Every human patient coming under my

notice has recovered. The remedies used were *eau de luce* and spirits (brandy, hollands, or rum). The *eau de luce* we certainly looked upon, if promptly administered and continued during the crisis, as a specific. I have never myself seen a white man under the influence of snake poison; I was, however, acquainted with men who had been bitten by venomous snakes and recovered under the treatment indicated. A personal friend in South Africa once told me that he had seen black snakes fighting (he spoke of the kind known by the native name *Imamba Mnyama*, and which is, I believe, almost identical with the Cobra Naje of India), but he was unable to say what was the result of the combat, he being on horseback at the time and anxious, I take it, to get a valuable animal out of the way of, probably, the most dangerous and aggressive of the ophidian race. The question as to the effect produced by the bite of a poisonous snake upon one of the same species, or even of the same genus, is of the greatest interest to all practical naturalists, and items of evidence are as rare as they are valuable.—I am, sir, yours obediently, W. H. TORRIANO.

142 Cecil-street, South Melbourne, 16th June, 1888.

FOOD OF PLANARIANS.

To the Editor of the Victorian Naturalist.

Dear Sir,—During one of my night rambles I found one of those banded, leech-like worms. I think they are called Planarian worms, or terrestrial Planariæ. In Darwin's "Voyage of a Naturalist," page 27, he mentions keeping some of these worms and feeding them on rotten wood. If these terrestrial Planariæ are the striped leech-like worms we find here, I think they feed on animal food as well as vegetable. The worm I found had captured one of those *insects* known as wood-lice or slaters. It caught this insect by means of the mucous coating with which these worms are covered, and, after crawling over it a short time, it protruded an organ from the under side of the body, and, after some time, inserted it between the segments on the under side of the slater. In a short time I noticed the worm had increased in size; also that it had become a much darker colour, from the contents of the slater flowing into its body, and it was not long before the empty shell was all that remained of what had once been a slater or wood-louse. I found one of these worms devouring the larva of a ground beetle, but, as I did not see the worm kill the larva, I took no further notice, although the worm had the same organ buried in the larva. I mention this, as Darwin speaks of rotten wood as the food on which he fed those kept by him.—I am, yours truly, CHARLES C. BRITTLEBANK.

Leylands, Spring Vale, 26th May, 1888.

Field Naturalists' Club of Victoria.

President:

A. H. S. LUCAS, M.A., B.Sc., F.G.S.

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.; Vol. III. (1886-87), 12 numbers, 6s.; 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 1886-87, with Rules, etc. can be obtained on application to the Hon. Sec.

Vol. V.—No. 4. August, 1888.

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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 July, 1888.

The president, Mr. A. H. S. Lucas, M.A., occupied the chair, and about seventy members and visitors were present.

A letter was read announcing the formation of the Melbourne University Science Club, which was received with applause.

The hon. librarian reported the receipt of the following donations to the library:—"Quarterly Mining Reports, March, 1888," from the Mining Department; "The Taal Volcano," by Rev. J. E. Tenison-Woods, F.L.S., from the author; *Journal of Pharmacy*, June, 1888, from the Pharmaceutical Society; also eighteen volumes of works, reports, etc., on the Natural History of New Zealand, from Sir James Hector, K.C.M.G. (hon. member F.N.C.).

On the motion of the president and Baron F. von Mueller, K.C.M.G., a hearty vote of thanks was passed to Sir James Hector, K.C.M.G., for his valuable donation, to which he suitably replied.

On a ballot being taken, Mr. J. A. Cohen was duly elected a member of the Club.

Nominations were received for office-bearers for 1888-9, the election to take place at next meeting.

Professor W. Baldwin Spencer, B.A., read an extract from a letter he had received from Professor Alfred Newton, of Cambridge, congratulating the Club on the success of the King Island Expedition, and asking whether any traces had been observed there of the now extinct Tasmanian emu, or whether any information about it could now be obtained.

Sir James Hector, K.C.M.G., exhibited a series of recent and fossil oyster shells from different parts of the New Zealand coast, and made some very interesting remarks on the characteristics and the habits of the several species.

Some little discussion ensued, in which Professor Spencer,

B.A., Mr. D. M'Alpine, F.C.S., Dr. Wigg, Mr. C. French, F.L.S., and the president took part, the first named speaker expressing a desire that a similar series of oyster shells from the Australian coasts might be got together for comparison with Sir James Hector's specimens.

Owing to the lateness of the hour, the papers for the evening —"On the Natural Protection of Lepidopterous Larvæ," by Mr. C. C. Brittlebank; and "Botanical and Geological Notes of a Visit to New South Wales," by Mr. C. A. Topp, F.L.S., were postponed to a future meeting.

Baron F. von Mueller, K.C.M.G., made a few remarks on a new umbelliferous plant, *Actinotus Schwarzii*, from Mount Sonder, Central Australia, and exhibited specimens of it.

Mr. C. Frost contributed some interesting notes of experiments conducted by him with a Victorian poisonous spider, closely resembling the New Zealand "katipo," and exhibited a number of the spiders obtained at Kew, of various ages, in order to show the differences in their appearance.

Professor Spencer, B.A., drew attention to the approaching meeting of the Australasian Association for the Advancement of Science in Sydney in August, and trusted that the movement would be well supported by the members of the Field Naturalists' Club.

On the motion of Mr. A. H. S. Lucas, M.A., and Professor Spencer, B.A., it was determined to organise a party to camp out and collect for two or three weeks in the Cann River District, East Gippsland, leaving town within a day or two of Christmas, 1888, and a sub-committee, consisting of Professor Spencer, B.A., Messrs. C. French, F.L.S., A. J. Campbell, C. Frost, and F. G. A. Barnard, was appointed to make inquiries and arrange the necessary details.

The following were the principal exhibits of the evening:— By Mr. F. G. A. Barnard, some fine specimens of the moth *(Chelepteryx Collesi)*, with cocoons, from Oakleigh. By Mr. A. J. Campbell, case of rare and beautiful Australian birds' eggs, including those of the black-cheeked noddy tern *(Anous melanogenys)*, from North Queensland; a crab, from Cossack, West Australia; and two fine groups of beetles, butterflies, and moths, from the Himalayas, India. By Mr. E. M. Cornwall, specimens of the flying opossum mouse *(Acrobates pygmæus*, Shaw). By Mr. C. French, F.L.S., two specimens of beetle *(Pentaceras Franklinii)*, from Thursday Island. By Mr. C. French, jun., fossils from Muddy Creek, near Hamilton. By Mr. C. Frost, poisonous spiders, from Kew. By Mr. T. S. Hall, B.A., graptolites, from Sandhurst. By Mr. G. A. Keartland, a spine-billed honey-eater, a Wonga pigeon, and four species of quail. By Mr. C. Lane, *Mytilus magellanicus*, with blind crab *(Pinnotheres)* inside, a messmate, from New Zealand. By Mrs. W. Martin,

forty rare Australian mosses. By Mr. J. Searle, nine species of fresh-water shells, from Merri Creek—genera, *Physa*, *Limnea*, *Planorbis*, *Bithynia*, etc.; also, some curious insects' cocoons, By Mr. C. A. Topp, F.L.S., dried plants, from New South Wales.

After the usual *conversazione* the meeting terminated.

NOTES ON A TRIP TO THE UPPER MURRAY.

By C. French, Jun.

(Read before Field Naturalists' Club of Victoria, 14th May, 1888.)

(Concluded.)

Leaving Wodonga for Ournie at 6 a.m., we had a pleasant drive of eighty miles along the Murray. On the road several black snakes were noticed, the road on the Victorian side being very rough compared with the one on the New South Wales side, and very steep in several places. *Dodonaea viscosa* grew everywhere along the banks. We reached Ournie about eight o'clock p.m., having to cross the Murray in the punt to get to Mr. E. Jephcott's house, which was my destination, had tea, and turned in. Next morning we went for a short collecting trip close to the homestead, but got very few plants, amongst which were *Dodonaea viscosa*, *Pterostylis longifolia*, *Pteris falcata*, *Helipterum incanum*, *Helipterum anthemoides*, *Gompholobium Huegeli*. Mr. Jephcott next day took me to see one of the prettiest sights in the way of plants that I have ever seen. It was a very large swamp covered with the beautiful *Limnanthemum crenatum*, a water plant with beautiful, yellow, fringy flowers, which, as they were all in full flower, presented a very pretty sight. Black, and also copper and brown, snakes were very numerous here, and you can hardly go 100 yards without meeting several, especially in the marshy swamps. I heard for a fact that at a station a few miles lower down the river ninety-two black snakes were taken out of an old log. I also heard, with regard to crows, that they have been known to drag a fowl off its nest and take the eggs, and are also very destructive to birds' nests.

We paid a visit to Ike Mount, situate about nine or ten miles from the homestead, on the New South Wales side of the river. We started at daylight in the morning, passing along several small creeks, kangaroos darting from the scrub in all directions. On the way to Ike Mount we found several interesting plants. Green tree-snakes are found here, but we could not manage to capture one on this visit. Reaching Ike Mount about one o'clock, we had a bath in a small creek, which was very refreshing after our rough walk, after which we boiled the billy

and had lunch. After dinner, we proceeded down the creek some distance and found *Pterostylis cucullata* and *Pterostylis pedunculata*, then we went up the mount and collected several nice plants, amongst which was *Gastrodia sesamoides, Comesperma ericinum, Helipterum corymbiflorum, Cyperus Pseudo-Cyperus, Grevillea alpina, Stackhousia linarifolia, Diuris maculata, Caladenia carnea, Pterostylis longifolia*, etc. We came down the creek again and followed it for a few miles, and found several nests of the white-eared honey-eater, but they contained no eggs. We then went to a fern gully on our way home. This gully is very fine indeed. *Dicksonia Antarctica* is the only species of tree-fern we noticed. On a large eucalypt was situated the nest of the wedge-tailed eagle, but out of all reach. Ike Mount is composed of huge granite rocks. On the way home, and growing amongst the grass-tree (*Xanthorrhœa Australis*), was found the rather rare orchid, *Caladenia suaveolens*. We also went to several small hills on our way back, and collected *Grammitis rutifolia, Gastrodia sesamoides, Styphelia* sp. *Cheilanthes vellea, Lindsaya linearis, Thelymitra aristata, Helichrysum semipapposum*. We reached home about eight o'clock, much pleased with the day's outing. The Murray turtle, also the platypus, is very common at Ournie.

Our next trip was to Pine Mountain, situate about six miles from Mr. Jephcott's, on the Victorian side of the river. We left home at daylight, crossed the Murray in the punt, and walked along the road till we came to within about a mile from the mount; then we followed up several small creeks till we reached the foot of the mount. The echidna or porcupine may be seen burrowing in the ground, and it is very hard to dig them out, for they burrow very rapidly. On the way up the mount we collected *Dampiera Australis, Callitris verrucosa, Clematis aristata, Exocarpus cupressiformis, Acacia lanigera, Cynoglossum suaveolens, Patersonia sericea, Pterostylis longifolia, Kunzea parviflora, Caladenia carnea, Pultenaea styphelioides*, etc. On the top of Pine Mountain the rock wallaby is very common, and may be seen jumping about in all directions. Birds seemed rather scarce, the only ones noticed being wedged-tailed eagle, white cockatoo, satin bird, black magpies, native hen, plovers, garrulous honey-eater, zosterops, friar-bird, white-plumed honey-eater, Gang Gang cockatoo, bee-eater, kingfisher, fire-tailed finch, Rose Hill parakeet, etc. From the top of this mount a fine view of Mount Kosciusko can be obtained. We had a bath in a hole formed in a large piece of granite at the very top, which was very refreshing after our climb.

Descending the mount, we found *Thryptomene Mitchelliana, Pultenaea styphelioides, Patersonia sericea, Acacia lanigera, Tetratheca ericifolia, Dodonaea* sp. *Pultenaea retusa, Loranthus celastroides,*

and *Pterostylis rufa* var. *Mitchelli*. Lace lizards were very common everywhere on Pine Mountain. We reached home about 6 p.m., much pleased with the outing, but very tired after the long day's tramp. I remained close to the house collecting for a day or two, but did not get anything of much interest. I made several trips to a small rise called Bull Hill, about three miles from the homestead, on the Victorian side of the Murray, and collected a few plants, amongst which were *Cheilanthes vellea*, *Pterostylis rufa* var. *Mitchelli*, *Ophioglossum vulgatum*, *Grammitis rutifolia*, *Calochilus Robertsoni*, *Prasophyllum patens*, *Diuris sulphurea*, *D. punctata*, *Helipterum corymbiflorum*, and *Helichrysum scorpioides*. We also saw several blue-tongued lizards on the mount, or hill, as it is called. Bee-eaters (*Merops ornatus*) were found near the house. We also found several nests in course of building in the bank of the river, but it was too early for eggs. We also found nests and eggs of rufous-breasted thickhead near the house. Our next trip was to a place called Corryong, about twenty-five miles further up the river. Crossed the punt at Tintaldria, made for Corryong, and followed up the Wheeler Creek for some miles further, having on our right the Mittitate and Wornatongri Hills, along which flows the Cudgewa Creek, which falls into the Murray at Tintaldra. We had to go through many swamps, in which grew the pretty little *Utricularia dichotoma*. Several snakes were noticed swimming the swamps. On the eucalypti and in the sweet-briar bushes were noticed the nests of the fire-tailed finch, and eggs; also in the same nests was an egg of the bronze cuckoo (*Lamprococcyx plagosus*).

We reached our destination, Corryong, at about five o'clock —just in time for tea, which was very acceptable after our ride on horseback. The next morning we started for Wheeler's Creek, a few miles further on, to several small hills, and collected *Pterostylis mutica*, *Diuris pedunculata*, *Helipterum anthemoides*, *Gastrodia sesamoides*, *Clematis aristata*, etc., etc. We returned to Corryong in the evening, and packed up our traps for the return to Ournie next morning, which we reached at about 2 p.m., much pleased with our trip. The remainder of my time was spent in collecting in the vicinity of the homestead, and I then had to say good-bye to my kind entertainers, and left by the same route as I came, and reached home again by the midday train from Albury. This being my first real collecting trip, and having now a pretty fair idea of the country on this part of the Upper Murray, I have come to the conclusion that there is a great deal to be done both in plants and animals, and can only regret that I had not more time for a longer stay. Baron von Müeller has been kind enough to name my plants for me. The remaining portion of the names I have obtained from various authenticated sources.

NOTE ON THE CENTRAL-AUSTRALIAN ACTINOTUS SCHWARZII,

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

Two years ago the Rev. W. F. Schwarz of the Mission-Station on the Finke-River ascended Mount Sonder in the Macdonnell-Ranges for the purpose of gathering plants, particularly at its lofty and rocky summit. Thus the leaves and peduncles of a plant were obtained, which—though devoid of flowers and fruits—was referred to the genus Actinotus, and recorded preliminarily in the transactions of the Royal Society of South Australia 1886 as *A. Schwarzii*. Recently the rev. gentleman reiterated this toilsome and rather perilous tour, and succeeded in carrying away from almost inacessible declivities further material for the elucidation of this and some other peculiar plants; thus it is now possible to confirm the temporary position of this Actinotus, and to contrast it with allied species. It has the habit of *A. Helianthi*, the tufts attaining a height and expansion of about 2 feet. Foliage and vestiture are also like those of *A. Helianthi;* the peduncles are solitary, from few to several inches long; the umbels resemble in size and indument those of *A. leucocephalus*, but the involucral bracts are worn away already on the few specimens obtained, and must therefore be compared on some future occasion; the numerous pedicels are $\frac{1}{4}$ inch or less long; the flowers, still remaining unshed in the aged umbels before me, are all staminate only, the filaments hardly reaching beyond the calyx; the latter is densely beset with soft whitish almost appressed hairlets; the anthers are also similar to those of *A. leucocephalus;* the fruit remains unknown. Phyto-geographically also the plant is quite noteworthy; it is the only one of this—to us endemic—genus, which reaches the tropic of capricorn, and is also the only one which extends to Central Australia.

DESCRIPTION OF A NEW ATHRIXIA FROM WESTERN AUSTRALIA.

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

Dwarf, ascendent, much beset with very soft rather long spreading hairlets; leaves crowded at and towards the base of the stems, lanceolar or broad-linear, their margin closely and broadly recurved, the edges thus almost contiguous; upper portion of stem peduncular, bearing numerous spreading lanceolar or oftener setular-linear villous bracts; headlet of flowers small; involucral bracts linear or capillary-setular, long-ciliolated; corollas all conformous; pappus-bristlets capillary, slightly thickened and minutely ciliolated upwards.

about as long as the corolla; fruit glabrous, hardly narrowed at the upper end.

Near the eastern sources of the Blackwood-River; Miss Crouin.

It differs from A. tenella in the longer and softer vestiture, in the stronger copiously bracteated peduncle and in the more elongated but not plumous pappus-bristlets.

A. tenella occurs at Fowler's Bay (Mrs. Richards), Eucla (Oliver), Point Culver (Carey).

A. stricta attains a height of 3 feet; it is now known also from near Stirling's Range (F. v. M.).

A. australis grows at the Serpentine-River (F. v. M.) and the Blackwood-River (Miss Hester).

A. gracilis extends from Swan-River (F. v. M.) to Mount Ridley and the vicinity of Esperance-Bay (Dempster).

A. multiceps can now also be recorded from the Greenough-River (F. v. M.), the Tone-River (Muir) and Israelite-Bay (Miss Brookes).

A SAGACIOUS OPOSSUM.

THE opossum is not usually credited with the possession of a wonderful amount of sagacity, and the subjoined account of the experiences with regard to a pet animal will, no doubt, be read with interest. The authority is Mr. Joseph Mack, J.P., the genial president of the Hampdenshire Council. Mr. Mack relates that several years ago his sisters were disturbed one night by the sound of soft scratching on the window, as if some animal were trying to enter. Upon opening the window they saw an opossum, an animal that was rarely seen in those days on the plains. They fed the animal with sugar, and continued to do so night after night until it became quite domesticated. Some time after a clergyman, the Rev. Mr. Smith, was visiting the station, who expressed a desire to get a tame opossum to take home with him. He was made a present of the one that had taken up its abode in such a peculiar manner at the station. Mr. Smith took the opossum with him when he resumed his homeward journey to Bellarine, about 65 miles distant. About nine nights after the Misses Mack were again disturbed by the sound of something scratching at the window, and, on lifting up the sash, to their great surprise they saw the pet opossum which had been given to the clergyman. Some months afterwards Mr. Smith was again at the station, and he then informed the family that he had taken the opossum home to Bellarine, and placed it in a presumably secure place for the night. It effected its escape, however, and the ninth night later it returned, as already stated, to the station, 65 miles distant, and resumed its scratching at the window, with the object, no doubt, of attracting attention.—*Camperdown Chronicle.*

EXPERIMENTS WITH THE VICTORIAN "KATIPO."

Whilst listening to Dr. Ralph's interesting paper on the "Katipo" of New Zealand, at our last meeting, I was much surprised on learning that the red-backed spider so common around Melbourne is the veritable "katipo," and, as I believe, (from the little I saw of the specimen exhibited by Dr. Ralph) identical with the New Zealand species.

Having frequently picked up this spider with my bare fingers, quite unconscious of any danger, I became anxious—after learning the nature of its bite—to know what amount of risk I had run, and if it possessed to the same extent the dangerous qualities attributed to the New Zealand representative.

As I found no difficulty in obtaining specimens of the "katipo," I determined to make some experiments, and believing a mouse to be an uncertain test—it being well known that a mouse, if confined in a trap, will die in from 20 to 30 hours without the aid of poison or any other deadly agent—I decided to try the experiment on a brood of chickens, about six weeks old, the whole of which I was prepared to sacrifice in the event of my finding spiders poisonous enough to be the executioners. Taking one of the hardiest—that it might not be said "the standard of vitality had been lowered"—I placed the spider on its comb, and, after a good deal of squeezing, succeeded in making it bite. On removing the spider, there appeared two small specks of blood, a short distance apart, at the spot where the spider's head was placed. After cutting the feathers of the chick's tail, to mark it from its mates, I let it go, so that its condition was in no way altered, except from the effects of the bite. I am glad to say the bite was not fatal, although I believe the chick was affected by it. It moped about for four or five hours, with its head almost buried in its neck, and its eyes closed, declining all food, although I tried to tempt it with a few choice morsels. On the following day, however, it appeared as lively and as hearty as the rest of the brood. I have since tried three others, allowing two spiders to bite each, one on the comb, and another under the wing; but in neither case was the chick affected to anything like the extent of the first.

The "katipo" having shown itself unequal to the task in regard to the chicken, I decided to try on smaller game, and a few days after succeeded in capturing a large mole-cricket, which, judging from the length of time it will resist the effects of spirits, I counted a fair test. The difficulty now arose how to make the "katipo" bite the cricket without risking my finger. It takes a good squeeze at any time to induce the "katipo"

to bite, even when the victim remains still, but in this case the cricket refused most determinedly to keep quiet.

However, the deed was accomplished at last, and with a fatal result. After being bitten I placed the cricket in a box with a handful of earth, under which it immediately burrowed, but on turning it out about ten minutes later it was quite dead.

Judging from the result of these trials I am convinced that the bite of the Victorian "katipo," although more poisonous than most spiders, would not be fatal to a healthy child, nor even to a mouse.

That the bite of this spider is more venomous than most spiders of the same size is, I think, shown by the nature of its prey, which consists chiefly of wasps, ants, earwigs, the larger kinds of beetles, and spiders sometimes twice its own size.

Kew, July, 1888. CHAS. FROST.

NOTES ON THE HABITS OF *PERGA LEWISII*.

THE insect which forms the subject of these notes belongs to the order Hymenoptera, family Tenthredinidæ, more commonly known by the name of saw flies, from the ovipositors of the females being divided into a pair of horny saws.

The way in which *Perga Lewisii* deposits her eggs is worthy of notice. I find that, in the cold weather, the eggs are always placed on the north side of the bush or plant so that they can feel the sun's warmth nearly all day.

This insect, after trying a great many leaves of the peppermint, at last finds one to her satisfaction, and, after a careful survey, prepares to deposit her eggs, which is accomplished as follows:—On the upper surface, and a little below where the leaf stalk joins the leaf, the insect inserts the point of her ovipositor, and moves the saws gently backwards and forwards until they are buried in the substance of the leaf. The saws are then expanded and withdrawn. On examination an egg is found in the wound, and this is repeated until as many as thirty or forty are deposited.

It is also worthy of notice that the insect cuts through the midrib of the leaf. This may be only because the rib is above the general surface of the leaf, and therefore keeps the saws from slipping on the smooth surface, or perhaps the insect uses the midrib as a guide to keep the eggs in line. But I think the real purpose for cutting the midrib is to keep down the flow of sap, so that the injured vegetable substance shall not recover too soon, and thus crush the newly laid eggs. The eggs are about the one-twentieth of an inch in length, but they appear to absorb moisture, and increase to nearly double their original size. These under notice were deposited

on 1st April. I found that the head of the embryo larva was visible through the egg skin on 22nd April. By 3rd May the eggs were all hatched with the exception of three or four that were deposited last; and these were, I think, unfertile, as they were still soft, and full of liquid, but showed no sign of containing larvæ.

A curious habit of this insect is that of watching over her eggs from the day they are deposited until the larvæ are able to protect themselves. It will be seen that this insect watched over her eggs and brood from the 1st April to the 18th May; and during this time I think the parent insect has taken no nourishment, that is, for 48 days. She has kept watch over the eggs and brood, following the latter about as they devour the leaves. It is well known that social Hymenoptera watch over their eggs after they are laid, but I do not know of single insects outside bees and wasps doing so. I have seen mason flies return, after three or four days, to the cells they have constructed, and, after examining them with their antennæ and finding all right, fly away to return in a few days for another inspection.

The larvæ of this saw fly (*P. Lewisii*) are social. Now, a question worthy of discussion is—Do these larvæ remain together for protection, under the idea that "union is strength," or is it the remains of a habit which goes to prove that some time in the past the larvæ of this sp. saw fly lived in companies, and were watched and fed by the parent fly, as is common with our bees and wasps. The manner in which this insect looks after her brood points, I think, to a different manner of rearing to that now adopted by these insects. I find brief mention of *Perga Lewisii* in Packard's "Study of Insects," page 215, to be seen in Melbourne Public Library.

CHARLES C. BRITTLEBANK.

Springvale, June, 1888.

MIMICRY.

By far the most wonderful examples of protective adjustments are found where the further disguise of form is added to that of colour, and to this only is the term mimicry strictly applicable. The pitch of intricate perfection to which mimicry has attained in an undisturbed and unglaciated country like Central Africa is so marvellous and incredible that one almost hesitates to utter what his eyes have seen. Before going to Africa I was, of course, familiar with the accounts of mimetic insects to be found in the works of Bates, Belt, Wallace, and other naturalists; but no description prepares one in the least for the surprise which awaits him when first he encounters these

species in nature. My introduction to them occurred on the borders of Lake Shirwa—one of the smaller and less known of the great African lakes—and I shall record the incident exactly as I find it in my notes. I had stopped one day among some tall dry grass to mark a reading of the aneroid, when one of my men suddenly shouted "Chirombo!" "Chirombo" means an inedible beast of any kind, and I turned round to see where the animal was. The native pointed straight at myself. I could see nothing, but he approached, and pointing close to a wisp of hay which had fallen upon my coat, repeated "Chirombo!" Believing that it must be some insect among the hay, I took it in my fingers, looked over it, and told him pointedly there was no "Chirombo" there. He smiled, and, pointing again to the hay, exclaimed "Moio!"—"It's alive!" The hay itself was the Chirombo. I do not exaggerate when I say that that wisp of hay was no more like an insect than my aneroid barometer. I had mentally resolved never to be taken in by any of these mimetic frauds; I was incredulous enough to suspect that the descriptions of Wallace and the others were somewhat highly coloured; but I confess to have been completely stultified and beaten by the very first mimetic form I met. It was one of that very remarkable family the *Phasmidæ*, but surely nowhere else in nature could there be such another creature. Take two inches of dried yellow grass-stalk, such as one might pluck to run through the stem of a pipe; then take six other pieces nearly as long and a quarter as thick; bend each in the middle at any angle you like, stick them in three opposite pairs, and again at any angle you like, upon the first grass-stalk, and you have my Chirombo. When you catch him his limbs are twisted about at every angle, as if the whole were made of one long stalk of the most delicate grass, hinged in a dozen places, and then gently crushed up into a dishevelled heap. Having once assumed a position, by a wonderful instinct he never moves or varies one of his many angles by half a degree. The way this insect keeps up the delusion is, indeed, almost as wonderful as the mimicry itself; you may turn him about and over and over, but he is mere dried grass, and nothing will induce him to acknowledge the animal kingdom by the faintest suspicion of spontaneous movement. All the members of this family have this power of shamming death; but how such emaciated and juiceless skeletons should ever presume to be alive is the real mystery. These Phasmidæ look more like ghosts than living creatures, and so slim are they that, in trying to kill them for the collecting-box, the strongest squeeze between finger and thumb makes no more impression upon them than it would upon fine steel wire, and one has to half guillotine them against some hard substance before any little life they have is sacrificed to science.—*Tropical Africa.*

THE CENTENNIAL EXHIBITION.

The prize schedules of the horticultural shows to be held in connection with the above exhibition have just been issued, and contain the following items, which may be of interest to members of the Field Naturalists' Club :—

Class A. Open to all comers. Pot grown plants.—1. Collection of indigenous plants named. 2. Twelve indigenous plants named. 3. Collection of terrestrial indigenous orchids, distinct species. 4. Six terrestrial indigenous orchids. 6. Collection of native grasses most suitable for forage. 18. Collection of ferns indigenous to Victoria.

Class B. Open to all comers. Cut flowers.—61. Collection of wild flowers. 98. Bouquet of native Victorian flowers.

The dates of the shows are 15th and 16th November, 1888, and in January, 1889 (dates to be fixed). Full particulars can be obtained on application to the secretary.

CORRESPONDENCE.

To the Editor of the Victorian Naturalist.

Dear Sir,—I believe I can corroborate the letter in your last issue as to the food of "Planarians." I first observed one with the empty shell of a slater clasped in its folds; and again, on lifting a cabbage leaf, I saw a cluster of young leeches round and on a dead slug. They were only about a third of an inch long, and dark coloured, and I could not be sure how they fed. Three or four were fastened to the slug, which was partly eaten, and they seemed to be sucking the substance out of it. I have further been told by a gardener that when a dead slug or worm is left on the walk at night these leeches will be round it in the morning, sucking the juice out of it. He does not think they kill for themselves. Another thing about slugs has been noticed here—that is, that in the early morning they may be seen eating or sucking the common earthworm, leaving only a skin. Perhaps some other observer may throw light on the subject.

Yours truly,

J. A. H.

Merrang, 30th July.

EXCHANGE.

Mr. F. A. A. Skuse, the Linnean Hall, Elizabeth Bay, Sydney, is working up the Australian Diptera, and will be glad to send insects of other orders, or, if preferred, *named* species of Diptera, in exchange for Victorian Diptera.

Field Naturalists' Club of Victoria.

President:

A. H. S. LUCAS, M.A., B.Sc., F.G.S.

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.; Vol. III. (1886-87), 12 numbers, 6s.; 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 1886-87, with Rules, etc. can be obtained on application to the Hon. Sec.

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

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THE FIELD NATURALISTS' CLUB OF VICTORIA.

The eighth annual meeting of the Club was held at the Royal Society's Hall on Monday evening, 13th August, 1888.

Mr. C. A. Topp, M.A., LL.B., F.L.S., one of the vice-presidents, occupied the chair, and about fifty-five members and visitors were present.

The hon. librarian acknowledged the receipt of the following donations to the library :—"Iconography of Acacias of Australasia," Decades 9, 10, and 11, from the Victorian Government; "Light," No. 1, from the editor, Sydney; "Christ's College Magazine," Nos. 1, 2, 3, and 4, from the Christ's College Natural History Society, Hobart; and "Journal of Pharmacy," July, 1888, from the Pharmaceutical Society.

The hon. secretary read a short account of the Club excursion to Sandringham on Saturday, 14th July, when the afternoon was devoted principally to a search for fungi under the ti-tree fringing the coast. The party was fairly successful, the following species being among those obtained :—*Agaricus (Flammula) crociphyllus*, C. and M.; *A. (Naucoria) pusiolus*, Fr.; *A. (Psilocybe) comptus*, B. and Br.; *Amanita gemmatus*, Fr.; and *Stereum*, sp.

On a ballot being taken, Miss Leake, Mrs. B. Glass, Mr. G. S. Perrin, F.L.S., and Mr. V. Tonneau were duly elected members of the Club.

ANNUAL REPORT.

The hon. secretary read the eighth annual report, which will be printed and distributed to the members as soon as possible. It congratulated the members on the continued prosperity of the Club. During the year 1887-8 about sixty ladies and gentlemen had been elected members of the Club, the total number of members now amounting to nearly 210. Twenty-three papers dealing with the various branches of natural history had been read. The exhibition of wild flowers had been very successful, some 250 species being shown. The annual *conversazione* was again a great success, and was attended by over 750 persons. The excursions had been fairly successful and very enjoyable, and a lengthy expedition had been made to King Island, with

good results. The financial position of the Club had improved, notwithstanding the heavy expenditure incurred in printing and publishing the Club's journal, the fourth volume of which had been completed. Regret was expressed that the Government had not placed a small annual grant at the Club's disposal so as to warrant the expenditure of money in illustrating the magazine. Reference was made to the effort to have Wilson's Promontory reserved as a national park, and to the success of the Club's request for the protection of the platypus and more of the native birds. The establishment of the Australasian Association for the Advancement of Science was mentioned as likely to greatly foster scientific work in the Australian colonies, and, in conclusion, the members were urged to do their utmost to maintain the Club in its present prosperous condition.

The balance-sheet showed that the receipts for the year had amounted to £189 10s. 6d, and the expenditure £179 1s., thus adding £10 9s. 6d. to the credit balance of the Club, which now amounts to £50 9s. 6d.

The Rev. J. J. Halley moved the adoption of the report and balance-sheet, and in doing so referred to the prosperous condition of the Club, and expressed a hope that the incoming committee would not lose sight of the question of the reservation of Wilson's Promontory, and also would again urge the Government to place a small annual grant at the Club's disposal for publication purposes.

Mr. F. R. Godfrey suggested something might be done towards organising a system of local correspondents in the various country districts for the purpose of forwarding to the Club local natural history notes.

The motion for the adoption of the report was seconded by Mr. J. N. M'Kibbin, and carried unanimously.

OFFICE-BEARERS, 1888-9.

The following office-bearers for 1888-9 were duly elected, there being no opposition, viz.:—President, Mr. A. H. S. Lucas, M.A., B.Sc., F.G.S.; vice-presidents, Mr. C. A. Topp, M.A., LL.B., F.L.S., and Professor W. Baldwin Spencer, B.A.; hon. treasurer, Mr. D. Best; hon. librarian, Mr. R. Hall; hon. secretary, Mr. F. G. A. Barnard; and hon assistant secretary, Mr. G. Coghill.

A ballot was taken for five members of committee, which resulted in Mr C. French, F.L.S., Rev. J. J. Halley, Messrs. G. R. Hill, O. A. Sayce, and H. T. Tisdall, F.L.S., being elected.

Votes of thanks were unanimously accorded to the retiring office-bearers for their services during the past year, and to Mr A. H. S. Lucas, M.A., for his services as editor of the *Naturalist*.

PAPER READ.

Mr. C. A. Topp, M.A., F.L.S., read a paper entitled "Botanical and Geological Notes of a Trip to New South Wales." The author described, in an interesting manner, the characteristic flora and geology of the vicinity of Sydney, and compared the vegetation there with that found around Melbourne, illustrating his remarks with a fine series of dried specimens.

The following were the principal exhibits of the evening :— By Mr. F. G. A. Barnard, skull found in a blackfellow's oven at Mortlake, supposed to be a wombat's. By Mr. C. French, jun., eggs of long-legged tern, straw-necked ibis, spotted ground thrush, friar bird, and satin bird, from Victoria; southern tern and Caspian tern, from Tasmania; and common heron, from New South Wales. By Mr. J. T. Gillespie, eggs of wedge-tailed eagle *(Aquila audax)*, from Riverina. By Mr. R. Hall, crustaceans and fish, from Malden Island, Pacific Ocean. By Master H. Hill, case of Victorian butterflies and moths. By Mr. G. Sweet, fossil nautilus shells; also, a large fossil shark's tooth, five inches by four *(Carcharadon megaladon)*, M'Coy, from the miocene deposit, Muddy Creek, Hamilton; trilobites, *Homolanotus delphinocephalus*, *Phacops (Dalmannia)*, etc., from upper silurian (Wenlock shales), Dry Creek, Wandong; also, *Pleurodictyum megastomum* (M'Coy), from Broadhurst's Creek, near Kilmore. By Mr. J. Searle, egg of dog-fish, five species of Victorian land shells, lichens, etc.

After the usual *conversazione* the meeting terminated.

BOTANICAL AND GEOLOGICAL NOTES ON A VISIT TO NEW SOUTH WALES.

By C. A. Topp, M.A., F.L.S.

I PROPOSE in this paper to give a short account of some of the localities near Sydney which will be found of interest to the botanist or geologist, and which are easily accessible from the metropolis of the mother colony, as well as to make a few remarks on the relations of the flora of Victoria and New South Wales. Though the first part of my paper may not come strictly within the province of our Society, since its special function is to investigate the natural history of our own colony, the recent expedition to King Island furnishes a precedent for an occasional incursion into our neighbours' territory; while the experience gained, and the wider knowledge won, by collecting, and by studying nature under conditions of soil and climate somewhat different to our own, are likely to enable us to prosecute our researches in our own colony with more effect.

Although a good deal of the scrub land round Sydney has been cut up into building allotments, though roads have been cleared and the beautiful flowering shrubs burnt, there yet remain, fortunately, large areas on the shores of the harbour and the adjacent outer coast where the native flora may be seen in all its beauty. In this respect the botanists and entomologists of Sydney are decidedly better off than we are in Melbourne, who are restricted for an afternoon's excursion to the rapidly diminishing moors of Brighton and Cheltenham, and to a narrow strip on the banks of the Yarra.

My remarks on the scrub flowers round Sydney are based on afternoons spent at Manly Beach, Bondi, and Botany Bay, all within an hour's tram or boat journey of Sydney. The general aspect of the country is the same at all these places. The soil is of a light, sandy character, with outcrops of the Hawkesbury sandstone, frequently forming little rocky plateaus, with perpendicular sides, four to ten or twelve feet high, varied occasionally by gullies having steep, rocky banks. My visits were made in April and May, perhaps the most barren months for flowers, and exceptionally so this year, owing to a drought of three or four months, which had retarded the springing up of the winter herbaceous plants. I had expected very little, and was most pleasantly surprised to find, notwithstanding these unfavourable circumstances, sufficient shrubs in flower to enable me to picture to myself the character of the scene in the spring, and to form a comparison between the vegetation clothing the shores of Sydney Harbour and that of Port Phillip. At first sight the appearance of the two is not very dissimilar, but the flowering scrub round Sydney is somewhat higher than that we find about Mordialloc and Oakleigh, and of a rather deeper green. It is formed chiefly of shrubby banksias, acacias, hakeas, and other proteaceous bushes, not mainly, as with us, of Leptospermum and Ricinocarpus. My attention was soon caught by a bushy banksia (*B. ericifolia*) with linear leaves, presenting, in this respect, a striking contrast to those familiar to us on the shores of Port Phillip, by also a dwarf acacia in full flower, with bipinnate leaves (*A. discolor*), the only common species of this genus in Victoria with leaves of this character being our well-known wattles. Another bush largely prevalent which excited my curiosity was *Petrophila pulchella*, belonging to the same tribe as *Isopogon*, with divided rigid leaves of the same character as those frequent in that genus, and whitish, downy flower spikes, these and the fruit cones being terminal or in the forks of the branches. A much more showy bush of the same family, also of a genus unknown to Victoria, was *Lambertia formosa*, with terminal clusters of beautiful crimson flowers, differing from those of the allied genus *Grevillia* in being straight tubes, and resembling the South African genus *Protea* in the involucre of coloured bracts. It is remarkable that the

two genera, *Petrophila* and *Lambertia*, are confined to the west and the east of the colony, and are not found in South Australia or in Victoria.

Of genera familiar to me, I noticed *Hakea pugioniformis* in fruit and *Hakea gibbosa* or *acicularis*. The only Grevilleas in bloom were an erect shrub with clusters of dull, red flowers, covered with a white down (*G. buxifolia*), and a handsome crimson-flowered bush (*G. punicea*), both unknown in Victoria. The pea-flowered plants were *Pultenœa elliptica*, with terminal orange-coloured clusters, and *Bossiœa heterophylla*, with axillary orange and brown flowers; the latter was very abundant, and gave a gay appearance to the coast near Botany Bay. Straggling over the sand, I noticed a plant with twisted stem, and large, glossy green obovate or lanceolate leaves; for a long time I could not find any flowers, but at last perseverance was rewarded, and I found two or three large, pale yellow flowers, an inch and a half or two inches across, of the familiar Hibbertia character; the plant was, in fact, *Hibbertia volubilis*, the largest flowered species of the genus, and it must give a very bright appearance to the ground in the spring time. *Kennedia rubicunda* (not in flower) was also noticed trailing over the ground and climbing up the bushes. Coming to the Epacrids, I was struck by the absence of our familiar native heath (*E. impressa*); its place was, however, occupied by *Woolsia pungens*, a plant of similar gregarious habits, of about the same height, and with dense terminal racemes of white flowers, but not of the same waxy texture, and more open. The genus *Lyeinema*, with which this plant is classed by Bentham, is another of those almost peculiar to Western Australia, and not found in the southern colonies. *Epacris longiflora* is a large, straggling bush, with racemes of tubular red flowers, with greenish tips, which present a lovely appearance against a background of grey sandstone. The most beautiful of the Epacrid family was, however, *S. tubiflora*, which I saw in bud. It has tubular flowers an inch and a half long of a rich crimson hue. Another plant of the same genus, *S. viridis*, presented a striking appearance from its clusters of tubular, pale green flowers, with corolla lobes rolled back, and projecting orange brown anthers. At my feet I recognised an old friend in *S. humifusa*, while a closely allied species, *S. pinifolia*, was new to me. Of other orders, I noticed at the Manly Beach large bushes closely resembling in growth and colouring the common rosemary of our gardens; these were *Westringia rosmarifolia*. Another small, shrubby plant of this order, with pretty lilac flowers, was *Hemigenia purpurea*. A queer-looking little plant, with rugose leaves and green flowers, *Chloanthes stoechadis*, represented the indigenous *Verbenaceœ*, while the introduced *Lantana* gave a gay appearance to many of the rocky banks with its clusters of red and yellow flowers and black berries.

The large order of *Rutaceæ* was poorly represented at this time of year by flowering plants, though in the spring time much of the beauty of the bush is due to the great variety and abundance of the large flowered *Boronias and Eriostemons*. One handsome representative of this order, however, occurred in shady spots, *E. Crowei*, a shrubby, erect plant, bearing pretty pink flowers about an inch across.

In damp spots two members of the sedge family—*Caustis flexuosa* and *C. recurvata*—the one with curiously curved branchlets, the other with most delicate green ones, resembling in appearance one of the ornamental asparagus plants, contrasted favourably with the duller greens of the adjacent bushes. The ferns were neither novel nor very abundant, and comprised *Gleichenias*, *Lomarias*, *Pteris*, and *Blechnum*.

I had an opportunity of seeing vegetation between Sydney and Newcastle of an entirely different character to that of the coast. About ten miles north of the Hawkesbury, near the Oarimba railway station, are the remains of some cedar brush. Here for some miles you may walk or ride along roads cut through a dense forest of semi-tropical character, the like of which is not to be found in any part of Victoria, except, perhaps, in the far east. Magnificent specimens of both the feather and the fan palm *(Ptychospermum Cunninghami* and *Livistona Australis)* stand on either side the track, or bend over the water-courses. I estimated the height of some of the former at from 60 to 80 feet. Nearly every broken branch or angle in the trunk of the larger trees is festooned with the stag-horn fern *(Platycerium alcicorne)* and the birds' nest *(Asplenium)* may be seen encircling the trunks of the trees in shady spots. A great variety of creepers, some furnished with sharp spines and recurved prickles, stretch from tree to tree, and render it difficult to penetrate far into the recesses of the forest. This striking and interesting bit of woodland scenery is within three or four hours by rail from Sydney, and will well repay a visit.

Of the wooded districts of New South Wales I may say generally that there is a greater variety of timber trees than occurs in Victoria, and the forests, are not, therefore, as monotonous, though, no doubt, where the soil and aspect are for many miles of a uniform character, you may meet with as few species of trees as in our stringy bark or box forests.

The great family of the Myrtaceæ is represented among the forest trees by Angophora, Metrosideros, Backhousia, and Rhodomyrtus, as well as by Eucalyptus.

M. (Syncarpia) laurifolia, as a young tree, with its large, deep green leaves and its conical crown of foliage, affords a pleasing contrast to the duller green and more straggling and irregular growth of the eucalypts. One of the large Angophoras, with a smooth, reddish bark, has a peculiar aspect standing out against a dull green background.

On the Blue Mountains the forest timber is stunted, but a large number of Banksias, Persoonias, Acacias, and other small trees and shrubs occur, which possess interest to the botanist, and I was glad to meet with many Waratah plants, not, of course, in bloom. I may mention also that even within the railway fences between Ourimba and Newcastle I saw many plants of *Doryanthes excelsa*, the beautiful spear lily, or more correctly amaryllis; these had already shot up the long flower stalk six or eight feet high. Near the Hawkesbury, also, I saw fine specimens of an order (Cycadæ) quite unfamiliar to a Victorian, these were probably *Encephalartos* (Macrozamia) *spiralis*. It may be of interest to notice that the coast plants which I have spoken of as in bloom, such as *Petrophila*, *Bossiœa heterophylla*, *E. longiflora*, etc., were probably the first Australian flowers which gladdened the eyes of Sir J. Banks and Dr. Solander when they landed with Cook on the shores of Botany Bay on the 20th April, 1770; were also the first specimens of the flora of Eastern Australia sent to Europe, and (with the exception of a few collected on the western shores a century earlier by Dampier) the first to make European botanists acquainted with the varied and characteristic vegetation of the great south land.

Before making a few remarks on some of the differences between the Victorian flora and that of New South Wales I may say a few words on one or two of the geological features of the district surrounding Sydney, or easily accessible from it.

I believe the most remarkable geological feature close to Sydney is a basaltic dyke intruded in the Hawkesbury sandstone, which forms the precipitous cliffs near Bondi, on the Pacific coast. A pleasant drive of less than an hour on the top of a 'bus brings one to Rose Bay, on the road to the South Head. Leaving the 'bus here one may strike across the bush for the outer coast, botanising on the way. On reaching the cliffs a mile or so north of Bondi, and looking seaward, one may observe a reef against which the Pacific rollers beat some 100 yards beyond the cliff on which we stand. This is part of the basaltic dyke, the harder stone of which has withstood the action of sea and air better than the softer sandstone, and therefore remains projecting beyond the cliff, whose rock has been gradually undermined and weatherworn, and has fallen in and been swept away. On examining the cliff itself the strip of basalt may be readily made out, though on the surface it has weathered to nearly the same colour as the sandstone. It is interesting to observe, too, that the adjacent sandstone has been metamorphosed into quartzite.

I am indebted to Mr. Fletcher, the learned and courteous secretary of the Linnean Society, for introducing me to this interesting spot.

My other geological excursion was on the shore below the

cliffs on which the fortress of Newcastle stands. On the face of the cliff several thin seams of coal are visible, with intervening layers of shale. The main seam is just exposed at low water, and on the beach are boulders of the shale which have fallen from the cliff and been more or less rounded by the action of the waves.

On splitting these open the prints of several interesting fossil plants of the coal measures are exposed. The number of species is not perhaps great, but the number of individuals is very large, and the pictures of the plant life of this remote age are beautifully preserved. The fossils I saw were, I believe, species of *Phyllotheca*, *Calamites*, *Annularia*, *Sphenopteris*, and *Glossopteris*. I was fortunate in meeting on my ramble with Mr. Waterhouse, of West Maitland, an accomplished geologist, who kindly showed me where to find the fossils, gave me much interesting information, and afterwards showed me his large and admirably arranged collection. Though Newcastle is 60 miles by sea and 100 by rail from Sydney, it can be very conveniently visited, as a steamer leaves Sydney in the evening and arrives at Newcastle next morning, giving a whole day for geologising, visiting the mines, etc., and the tourist can return next night by steamer or rail.

In concluding this paper I will mention two or three facts which must strike a Victorian botanist in visiting the mother colony. The first is the occurrence of many tropical and Asiatic forms, exemplified in the palm trees, cycads, and fig trees, in close juxtaposition with plants of strictly Australian types and of families confined to the temperate zones. Another is one of which I have already given an example—the occurrence of species belonging to genera mainly represented in South-Western Australia and absent in the southern part of the continent. These facts have, of course, been duly noted by Sir Joseph Hooker in his masterly introductory essay to the flora of Tasmania; by the late George Bentham; and by Baron von Mueller in his admirable essay in connection with the Melbourne Exhibition of 1866; but it is interesting to be able to verify them in a short visit to a very small part of New South Wales, and in a journey of an hour or two to pass from tropical vegetation to a flora of so entirely different a character as that of Western Australia. Another fact which I have not seen recorded, and which I think is of some interest, and might be worth verifying by more extended observations, is that in the coast flora of New South Wales there is a greater prevalence of the higher forms of the genera common to that colony and to Victoria than with us—that is, of plants with more richly-coloured and deeper corollas, and adapted, therefore, for cross fertilisation by the higher orders of insects. I will give a few examples. Our only coloured epacrids round the shores of Port Phillip are the pink variety of *E. impressa* (and that is rare),

S. humifusa, and *Sprengelia incarnata*. On the other hand, round Sydney Harbour the pink and red species are commoner than the white; besides *S. humifusa* and *Sprengelia incarnata*, both common there, the following species, with long, crimson, tubular corollas, occur abundantly:—*E. longiflora*, *S. triflora*, *purpurescens*, *tubiflora*, and *pinifolia*. Again, of the *Rutaceæ*, the only species found in the vicinity of Port Phillip are the *Correas*, which are white or greenish yellow, the red variety of *C. speciosa* being absent or very rare near the coast. In the neighbourhood of Sydney, on the other hand, pink or blue-flowered species of this order are the most frequent, *e.g.*, *Boronia capitata, pinnata, serrulata, ledifolia, cœrulescens, Eriostemon Crowei, exalata*, and *lanceolata*. I have mentioned among the *Proteaceæ Lambertia formosa*, with long, tubular, crimson flowers. No similar shrub is found in Victoria, and though we have some red or pink *Grevilleas*, I think there are more deep red species, such as *G. punicea*, in New South Wales. Then, again, while we have only one species of Telopea in Victoria, and that occurring only in a district which botanically is an appange of New South Wales, in the latter colony there are two species, and one with rich crimson flowers is widely spread around Port Jackson and on the Blue Mountains. Not to be wearisome with tedious details, I will merely mention the superb Doryanthes, with its head of crimson flowers, as another conspicuous example of a plant with richly coloured corolla not represented in our colony. There can, I suppose, be little doubt that the fact of the greater prevalence of red and purple flowers in New South Wales is due to the lepidoptera and hymenoptera of the colony being larger, more abundant, and furnished with longer tongues than those of the southern districts of Australia, and I should be glad to know whether any of our entomologists can confirm this supposition in regard to these families of insects which occur round the shores of Port Jackson. The somewhat greater number of days of bright and strong sunlight in the more northern colony may also favour the deeper colouration of flowers in species which are able to grow in dry, unshaded situations, though the rather longer days of a Victorian summer should be in favour of our flora.

MIMICRY.

I SHALL refer to another mimetic form, which for cool Pharisaism takes the palm from every creeping or flying thing. I first saw this *menteur à triple étage* on the Tanganyika plateau. I had lain for a whole week without stirring from one spot—a boulder in the dried-up bed

of a stream, for this is the only way to find out what really goes on in nature. A canopy of leaves arched overhead, the home of many birds, and the granite boulders of the dry stream-bed, and all along the banks, were marked with their white droppings. One day I was startled to see one of these droppings move. It was a mere white splash upon the stone, and when I approached I saw I must be mistaken; the thing was impossible; and now it was perfectly motionless. But I certainly saw it move, so I bent down and touched it. It was an animal. Of course it was as dead as a stone the moment I touched it, but one soon knows these impostures, and I gave it a minute or two to become alive —hastily sketching it meantime in case it should vanish through the stone, for in that land of wonders one really never knows what will happen next. Here was a bird-dropping suddenly become alive and moving over a rock; and now it was a bird-dropping again; and yet, like Galileo, I protest that it moved. It would not come to, and I almost feared I might be mistaken after all, so I turned it over on its other side. Now, should any sceptic persist that this was a bird-dropping, I leave him to account for a bird-dropping with six legs, a head, and a segmented body. Righting the creature, which showed no sign of life through all this ordeal, I withdrew a few paces, and watched developments. It lay motionless on the stone, no legs, no head, no feelers, nothing to be seen but a flat patch of white—just such a patch as you could make on the stone in a second with a piece of chalk. Presently it stirred, and the spot slowly sidled across the boulder until I caught the impostor and imprisoned him for my cabinet. I saw in all about a dozen of these insects after this. They are about half the size of a four-penny-piece, slightly more oval than round, and as white as a snowflake. This whiteness is due to a number of little tufts of delicate down growing out from minute protuberances all over the back. It is a fringe of similar tufts round the side that gives the irregular margin so suggestive of a splash; and the under surface of the body has no protection at all. The limbs are mere threads, and the motion of the insect is slow and monotonous, with frequent pauses to impress surrounding nature with its moribund condition. Now, unless this insect, with this colour and habit, were protectively coloured, it simply would not have a chance to exist. It lies fearlessly exposed on the bare stones during the brightest hours of the tropical day, a time when almost every other animal is skulking out of sight. Lying upon all the stones round about are the genuine droppings of birds; and when one sees the two together it is difficult to say whether one is most struck with the originality of the idea, or the extraordinary audacity with which the *rôle* is carried out.—*Drummond's Tropical Africa.*

THE DISPERSION OF SEEDS AND PLANTS.

In a letter to *Nature*, Consul Layard, of Noumea, writes as follows :—

"Thousands of acres of pasturage have been destroyed in this island by the distribution by birds of the *Lantana*, which was, unfortunately, introduced here by the first Roman Catholic missionaries, to form a hedge for their property at St. Louis or Conception. The '*Gendarme* plant' (an *Asclepiad*) was brought here in a pillow by a *gendarme* from Tahiti. It was a seed attached to a wing of silk cotton. The *gendarme* shook out his pillow; the wind carried the seed to a suitable spot, and now it vies with the *Lantana* in destroying our pastures.

"I have shot the great fruit pigeons of Fiji and this island with several seeds of the *Canarium (?)* in their crops, as Mr. Morris says, as big as hen's eggs. The seeds of water-plants are conveyed, with the eggs of fresh-water mollusca, to vast distances, adhering to the hairs and feathers of the legs of water birds—ducks, herons, and waders of all sorts. In London the basins of the fountains in Trafalgar Square were peopled by *Lymnea* brought thither from the Serpentine, attached to the feathers of the sparrows who bathed first in one and then in the other.

"Another plant which occurs to me as being largely indebted to man for its distribution is that known as the 'Cape gooseberry,' which is a native of South America. I forget its botanical name. The Kaffirs call it the 'white man's plant,' and say it follows the white man everywhere. I know it is found in India, Ceylon, Africa, Fiji, New Caledonia, and New Hebrides. I really believe boiling it into jam does not destroy the vitality of the seeds. We have just got a plant here, bearing a lovely flower, but whence it comes no one knows. It has hard wooden seed capsules, each furnished with two hooks as hard as steel and as sharp as needles. These, hooking into the hide of any animal, would be carried for days until forcibly dislodged.

"The 'Bathurst burr' *(Xanthium spinosum)* was introduced into the Cape in a cargo of wool wrecked at Cape Lagulhas, and spread out to dry, first there and then at Simon's Town, at both of which places the 'burr' sprang up. I believe and hope I destroyed the first and last plant of it that sprang up in New Zealand some twenty-five years ago. The seed had been brought in the living fleece of a fine merino ram. The owner of the pasture was cherishing the 'wonderful new plant,' and was not a little horrified when I took out my knife and carefully cut it down. He was more horrified when I told him what it was.

"The seeds of some of the Indian banians, I believe, require to pass through the bodies of birds to enable them to germinate. A minute bird *(Diceum)* feeds on them, and is so small that its droppings cannot fall clear of the branch on which it sits, consequently it is glued to the bark, and takes root. Sometimes this takes place on a palm tree; the roots then run down the trunk, and finally smother their host.

"E. L. LAYARD.

"British Consulate, Noumea, 15th May."

BENDIGO SCIENCE SOCIETY.—We are glad to notice that this society has recently been advancing with rapid strides, and now numbers over one hundred members. At the June meeting papers on "The Integumentary System," by Mr. J. B. Lillie Mackay, A.K.C.L., F.C.S., and "The Necessity of a More Extended Knowledge of Geography," by Mr. D. Hickie, F.R.G.S., were read; whilst Mr. G. W. Knight made a good display of rare orchids, other objects of interest being contributed by members. At the July meeting Dr. Colquhoun read a paper on "Evolution," which was received with much satisfaction.

BLACK-CHEEKED NODDY TERN *(Anous melanogenys)*.—Locality, coast of North Queensland, and throughout Polynesia. Egg, of a soft, warm, white colour, sparingly smudged and spotted with rusty brown, the markings being generally confined to the larger end of the shell. A few clouded markings also appear underlying the shell's surface. Dimensions fairly regular; average of six examples is 1 inch 9½ lines by 1 inch 3¼ lines. Rev. F. M. Nobbs, who kindly forwarded me specimens, informs me that this tern breeds on Norfolk Island during December. It breeds in colonies. One egg only is deposited, in nests of seaweed very firmly secured to branches of trees. Some nests are placed on large trees half a mile inland, others on dwarf scrub close to the seashore.—A. J. CAMPBELL, Armadale, July, 1888.

WE deeply regret to announce that Mr. Thomas Henry Potts, an old resident of Canterbury, N.Z., and well known as a naturalist, died suddenly in Christchurch. Mr. Potts, who was 62 years of age, was a man of considerable means when he arrived in the colony, and was therefore able to pursue his hobby at a time when the leisured class were few. His papers, "Out in the Open," made his name known outside the colony.

Field Naturalists' Club of Victoria.

President:

A. H. S. LUCAS, M.A., B.Sc., F.G.S.

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.; Vol. III. (1886-87), 12 numbers, 6s.; 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 1886-87, with Rules, etc. can be obtained on application to the Hon. Sec.

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

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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, 10th September, 1888.

The Rev. J. J. Halley was voted to the chair, and about fifty members and visitors were present, among the latter being Professor R. Tate, F.G.S., Adelaide; Mr. F. M. Bailey, F.L.S., Government botanist of Queensland; and Mr. E. Swan, of Tasmania.

The hon. librarian acknowledged the receipt of the following donations to the library:—"Voyage of Governor Phillip to Botany Bay," from Dr. Cox, F.L.S., Sydney; "Transactions Royal Society of South Australia," vol X., 1886-7, from the Society; "Transactions of Royal Society of Queensland," vol. V., part 1, from the Society; catalogues, etc., from Australian Museum, Sydney; "Annual Report of Minister of Mines and Water Supply, Victoria," from department; "Light," No. 2; "University Review," vol. IV., No. 2; and "Journal of Pharmacy," August, 1888.

The hon. secretary reported that the excursion to Box Hill on 18th August had been fairly attended, and the results in the departments of fungi and lichens had been very good.

On a ballot being taken, Messrs. A. Crawford, C. Duncan, J. Foulk, and A. Shaw were duly elected members of the Club.

The attention of members was called to the annual exhibition of wild flowers, which is to take place on Tuesday evening, 16th October.

The chairman stated that Baron F. von Mueller, K.C.M.G., expected to have the first part of the "Key to the Victorian Plants" ready before next meeting.

Papers for ensuing meetings were promised by Professor Tate, F.G.S., and Mr. H. S. Tisdall, F.L.S.

PAPERS READ.

1. Mr. C. C. Brittlebank read a paper, entitled "Notes on the Natural Protection of Lepidopterous Larvæ." The author gave some interesting details of the habits, and means for protection of several of the larvæ of familiar butterflies and moths, and illustrated his remarks with some excellent drawings of the different insects.

2. Mr. A. J. Campbell read a paper, "Notes on Dr. Ramsay's List of Australian Birds" in which he pointed out a number of inaccuracies in this list, and brought forward evidence of new localities for several species mentioned. The paper gave rise to considerable discussion, which in the main supported the author.

3. Mr. D. Best read a paper entitled "Some Recollections of my Residence in North-West Australia, by a Non-naturalist." The notes referred principally to the habits and customs of the aborigines, with some remarks on the fauna of the district, and excited considerable interest.

The principal exhibits of the evening were:—By Mr. F. G. A. Barnard, shale containing fossil portions of fern fronds, from the Hawkesbury sandstones at Wooloomooloo Bay, N.S.W. By Mr. A. J. Campbell, the grass owl (*Strix candida*), new to Victoria; *Platycercus pennantii* var. *nigrescens*, Ramsay, from Rockingham Bay, and other birds in illustration of his paper. By Mr. H. B. Coles, birds from Cape York. By Mr. A. Coles, a pair of young emus and a pair of young Australian coots. By Mr. E. M. Cornwall, mounted specimens of the delicate owl (*Strix delicatula*), the musk lorikeet (*Trichoglossus concinnus*), and the spur-winged plover (*Lobivanellus lobatus*). By Mr. C. French, jun., a delicate owl. By Mr. J. T. Gillespie, eggs of the little chthonicola (*Chthonicola sagittata*), and scarlet-breasted robin (*Petræca multicolor*). By Mr. G. A. Keartland, a pair of avocets and a white-winged chough. By Baron F. von Mueller, a new plant (*Candollea Merrallii*) from Western Australia. By Mr. J. Searle, fungi, lichens, etc., collected at Box Hill excursion. By Mr. A. Yelland, various cocoons and nests of insects, crystals from basalt, etc.

After the usual *conversazioue* the meeting terminated.

DESCRIPTIONS OF NEW WEST-AUSTRALIAN PLANTS;

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

Ptilotus Carlsoni.

Diffuse or prostrate; stems leafy throughout, short, laxe, often flexuous, beset with mostly appressed and straight hairlets; radical leaves from spatular-to elliptical-cuneate; stem-leaves smaller, generally lanceolate-linear, much narrowed downward, all flat and nearly glabrous or soon glabrescent; spikes terminal, solitary, capitular, but all the flowers fascicularly verging upwards; bracts lanceolar, dark-coloured, hardly half as long as the sepals, bracteoles of the length and form of the bracts, but colourless, transparent; sepals from the middle upwards glabrous and bright-yellow, at the summit very blunt and minutely denticulated; the hairlets of their basal inside vestiture straight;

stamens all very much shorter than the sepals, partly sterile; perfect anthers roundish-cordate, pale; style about as long as the stamens, glabrous, almost lateral; fruit oblique, very slightly beset with minute hairlets.

Between York and Hampton-Plains; W. Sayer and A. Carlson.

Vestiture from very tender articulated hairlets. Root thin. Radical leaves inclusive of the petiolar base hardly above 1½ inches long or shorter; upper stem-leaves shortened to about half an inch. Capitular spike broader than long, at least in its earlier stage, attaining nearly an inch diameter, very blunt at the base. Bracts almost blackish, externally bearing rather long but delicate hairlets. Sepals tubularly connivent, about half an inch long, connected only near the base; their outer vestiture even below the middle imperfect, the yellow coloration upwards gradually more intense. Ripe fruit as yet unknown. Strange among its congeners as regards the colour of the flowers, thus rather reminding of some Helichrysum or Helipterum at first sight.

What has been seen by the writer hitherto may indicate only a small state of the plant; its habit is that of P. spatulatum and P. holosericeum during their first year's growth. The upwards extensively glabrous sepals bring P. Manglesii into recollection. Some affinity to P. grandiflorus must also be conceded. The reduction of the genus Trichinium by Poiret to Ptilotus was effected nearly a year earlier than the union reversedly made by Sprengel.

Cassia Cuthbertsoni.

Dwarf-shrubby; leaves short-stalked; stipules small, subulate, slightly spinescent, deciduous; leaflets in six or fewer pairs, small, of thick texture, almost sessile, from narrowly elliptic cuneate to obovate or even almost orbicular, slightly recurved at the margin, above dark-green, shining and glabrous, beneath as well as the branchlets, leaf-rhaches, flower-stalks and stalklets, sepals and ovulary beset with a whitish velvet-like vestiture; glandules on the rhachis absent, replaced by tufts of very minute black hairlets; peduncles axillary, rather short, bearing terminally from two to four flowers; stalklets about as long as the largest sepals or somewhat longer, but considerably exceeding the always small bracts; petals glabrous; stamens ten or occasionally less, all much shorter than the petals; anthers almost of equal size, the lowest on short filaments, the others nearly sessile; style very short; ovulary nearly semicircular-curved.

On the Upper Ashburton-River; W. Cuthbertson.

Where found only one foot high. Leaflets mostly from ¼ to ½ inch long. Petals roundish, deep-yellow, about ⅓ inch long. Anthers dull-brownish. Fruit unknown

In same respects allied to C. pruinosa, but with very different stipules, less flat and blunter leaflets, shorter pedicels and peculiar but imperfect indument, by which latter characteristic this species also differs from all other Australian congeners, even those of the group of C. artemisioides

CANDOLLEA MERRALLII. (Stylidium Merrallii, F. v. M. coll.)

Erect or diffusa, rather dwarf, beset with very short spreading partly glandule-bearing hairlets; leaves small, flat, of rather firm consistence, those at the root or at any nodes rosette-like crowded, from linear-to obovate-cuneate, glabrescent, thickly white-margined, minutely apiculated; stem-leaves spreading, from elliptic-lanceolar to broad-linear, scattered but approximated, unmargined; floral leaves smaller, opposite, all of them sessile; racemes few-or several-flowered, without any separate stalk, solitary or two together; stalklets much shorter than the calyx; tube of the latter nearly narrow-ellipsoid; lobes very short, almost elliptical; corolla quite small, nearly glabrous; gynostemium about twice as long as the corolla, quite glabrous; fruit cylindric-ellipsoid, slightly compressed, bursting in its whole length; seeds minute, brown, turgidly ovate, almost smooth.

Near Lake Brown; Edwin Merrall.

Stems weak, often somewhat leafy throughout, proliferous, occasionally branched; the outer of the rosette-leaves attaining half an inch in length, the inner gradually shorter; scattered stem-leaves from $\frac{1}{8}$ to $\frac{1}{3}$ inch long; calyx-lobes without any scarious margination; corolla nearly pale when dry, but with a slight bluish hue, its paired segments oblique-obovate, the lower two also somewhat cuneate; labellum minute, roundish, turgid, with two subulate basal appendages; fruit about $\frac{1}{3}$ inch long, the two valves inflexed along their margin, several times longer than broad. The species is well marked, and is—as far as we are hitherto aware—very local; its systematic position might best be near C. breviscapa.

By an oversight the omission of the name *Athrixia Croniniana* occurred in the August issue of the "Victorian Naturalist," where a description of that lately discovered plant was given.

A CURIOUS PHENOMENON.

THE palolo is a very curious, thread-like sea-worm, appearing in the reef openings once a year only for the single hour immediately before sunrise. On their arrival the natives assemble in their canoes and scoop them up in balers of all sorts, esteeming them immensely as an edible delicacy.

The Samoans can calculate to a moment when their arrival is due by observing the juxtaposition of the moon with a certain

star. However, should they not appear upon that day they can be safely calculated upon to arrive that same day four weeks.

This fishing, one of the romps of the season, is looked forward to by both young and old. When collected, the natives send the palolo all over the island post-haste, as complimentary presents to one another, in the same way that presents of game are made in the old country.

Before daylight this morning we were aroused, and soon in the boat *en route* for the passage in the reef where the palolo were expected to assemble in their millions for their annual single hour's outing either that morning or in four weeks' time.

After an hour's slow rowing in the dark we arrived somewhere—at what particular spot it was impossible to tell, but, judging from the heaving of the boat, we knew that we must be where the sea had an uninterrupted passage through the reef, whose immediate presence was announced by the deafening boom of the breakers dashing on it.

As soon as there was sufficient light we found that we were in the company of quite fifty canoes, of all sorts and sizes, prettily and lightly balancing themselves for a moment at a time on the summits of the swells as they sullenly rolled in through the now visible passage, guarded on both sides by an expanse of seething water, where the interrupting coral bars the onward course of the ever-persistent billows.

As the light grew apace, everyone there, scoop in hand, prepared alike for business and for a practical joke—which here consists in upsetting one another's canoes—and each determined, with light heart, devoid of all care, to make the best of the most cherished, though shortest, annual festival.

The canoes now scattered about in all directions, the occupants anxiously scanning the water as they flitted here, there, and everywhere in search of the game, but with no result. The little animals had evidently determined upon availing themselves of the four weeks' grace that Nature, in obedience to some inexplicable law, or in some freak, had granted them.

(A month later)—Spread all about the passage, this time quite smooth, we anxiously examined the water on all sides, in which to some depth nothing at all could be discerned; but suddenly, as if let loose at the one exact time, were to be seen wriggling and writhing up from the nethermost depths millions upon millions of long, thread-like worms of many colours, all seeming to be racing at their topmost speed to arrive at the surface and make the most of the short time permitted them for their annual exhibition. Up they came in myriads until the surface was thickly covered with one solid vermiculating mass of living animals.

Shouting and laughing, everyone now plied his or her scoop as busily as possible, baling up the writhing delicacies at top speed, to make as good use of the short time available as could be.

No sooner had the sun thrown his first ray on the water than as if by magic, with the same common accord with which they had risen to the surface, they all disappeared, sinking lower and lower to the depths below, until not a single sign of their presence was to be observed in the very spot where, a moment before, the water was perfectly muddy with animal life.

Our share of these doubtful delicacies was three great pailsful of an almost solid mass of repulsive, coloured worms, writhing and twisting about in slimy embrace, in anything but an inviting manner for creating an appetite.

Although I tried to harden myself to tackle this forbidding-looking tit-bit *au naturel* with a piece of stick, I could not manage it, and our hosts, seeing the failure, had some cooked. In that state they were, in appearance, like balls of dark-green spinach, and by no means unpalatable, tasting somewhat like a mixture of oysters and sea-weed.—*From "My Consulate in Samoa," by William B. Churchward.*

NOTES ON DR. E. P. RAMSAY'S "LIST OF AUSTRALIAN BIRDS."

By A. J. Campbell.

(Read before the Field Naturalists' Club of Victoria, 10th September, 1888.)

Much interest is centred at the present time in the Geographical Distribution of Species.

We owe a debt to Dr. Ramsay for his tabular list of all the Australian birds at present known, showing the distribution of the species over the Continent of Australia as well as adjacent islands. The list is full of interest to naturalists generally, but to the working ornithologist and oologist it is to be highly prized as a useful and valuable reference. I should recommend those who have it not to purchase a copy, which may be ordered through George Robertson and Co., Limited, Melbourne; and if the author has not already presented one, the committee would do well to secure a copy for the Club's library.

Dr. Ramsay states the present edition is merely a forerunner of a great work he is preparing for the Press on the birds of Australia.

In view of this fact, and in order that Dr. Ramsay's Geographical Distribution may be as complete as possible, I shall now endeavour to treat the list under consideration in a generous but critical spirit, which, I trust, will be accepted as

such by the talented author, by pointing out a few slight inaccuracies and by extending localities of many of the species.

Also for so doing, I perceive I have a precedent in "Notes by Captain Hutton on Dr. Buller's 'Birds of New Zealand'" in Vol. VI. of the "Proceedings of the New Zealand Institute."

Dr. Ramsay has divided his list into fifteen districts. Of course, birds do not recognise the geographical boundaries of man, yet we are all more or less interested in the avifauna of our respective colonies; therefore I think it is a pity that Dr. Ramsay has clubbed Victoria with South Australia. Besides, many birds are found in the one province which are not found in the other, and *vice versa*. For instance, Leadbeater's honeyeater *(Ptilotis cassidix)* and the lyre-bird *(Menura Victoriæ)* are found in Victoria, but not in South Australia, and the Adelaide parrakeet *(Platycercus Adelaidensis)*, western ground parrakeet *(Pezoporus occidentalis)*, Mortier's tribonyx *(Tribonyx Mortieri)*, and others are found in South Australia, while there is no data of their appearance in Victoria. To proceed—

4. *Astur novæ-hollandiæ*. The white hawk has been noted in the Rockingham Bay district.

7. *Astur cruentus*. I am pleased Dr. Ramsay considers this "a good and distinct species," for undoubted examples have been taken in Victoria and South Australia, in addition to the localities indicated by him.

12. *Haliaetus leucogaster*. It is commonly known that the white-bellied sea-eagle is found in Tasmania, including the intermediate islands, yet Dr. Ramsay has not informed us of the fact. Examples were taken on King Island during the Club's expedition last year.

20. *Baza subcristata* should have been filled in in the Interior column.

22. *Falco hypoleucus* should be indicated in the Victoria and South Australia column. Excellent specimens of this beautiful falcon have been in the National Museum, Melbourne, for years.

27, *Tinnunculus cenchroides* is omitted from the Tasmanian list. I noticed one or two examples in the Hobart Museum, and have also received a clutch of kestrel's eggs taken from a deserted crow's nest on the island.

32. *Strix candida*. The grass owl is now recorded a Victorian bird for the first time. Dr. Ramsay will, no doubt, be pleased to note this occurrence. I have seen several examples taken lately in Victoria, one of which I exhibit here to-night.

[It is difficult to suggest a reason for the number of owls of many species seen in Victoria this season except that the wonderful migration of mice that has been taking place in the interior is attributive.]

38. *Ninox connivens* may be recorded for the Dawson River. During my visit to that district one of the winking owls was flushed from a nest in a hollow tree which contained fledglings.

42. *Ninox rufa*. A skin of this owl is in the Queensland Museum from the Rockingham Bay District.

56. *Caprimulgus macrurus*. I have never heard of this species having been taken in Victoria, nor yet in South Australia.

62. *Lagenoplastes ariel*. Mr. Wintle, F.L.S., found this species breeding at Bridport, Tasmania, in 1883. Gould says :—"In Western Australia it (the fairy martin) is common between Northam and York." Yet Dr. Ramsay has omitted to show its existence in either of these colonies.

67. *Dacelo gigas* should have been shown for the Rockingham Bay District, since its presence was recorded there in the *Naturalist*, February 1886 (page 126). I saw several of the birds in that locality, and felt somewhat of a murderer for having shot a laughing jackass from a tree overhead our camp to make sure of its identity so far north.

72. *Halcyon pyrrhopygius*. Referring to the red-backed kingfisher, Gould says :—"I have received specimens from the interior of Swan River." Yet again Dr. Ramsay has not debited the bird to West Australia.

124. *Edoliisoma tenuirostre*. I shot a male Jardine's campephaga in East Gippsland, 1881. Examples from other parts of Victoria are also in the National Museum.

126. *Lalage tricolor*. Dr. Ramsay does not credit West Australia with this migratory bird, notwithstanding it is quoted in Gould to be a summer visitant to that part of the continent.

141 and 146. *Collyriocincla parvula* and *C. rufigaster*. I took particular notice of the smaller shrike-thrush in the Dawson district. It appears, undoubtedly, to be *rufigaster*, and not *parvula*. Dr. Ramsay has probably in error transposed the species.

145. *Collyriocincla rufiventris* is found in South as well as West Australia.

154. *Chibia bracteata*. An example from Victoria is in the National Museum, and the species has been recorded in Tasmania. Both places are blanks on Dr. Ramsay's list.

158. *Rhipidura rufifrons*. Dr. Ramsay may remove the "query" standing against this fantail for the Rockingham Bay district, since undoubted examples were taken there and on the adjacent Barnard Islands. See *Naturalist*, February, 1886, page 126.

167. *Myiagra concinna*. I think by some inadvertence Dr. Ramsay has omitted this flycatcher from the Dawson River district, because he had previously described the eggs from that locality.

174. *Monarcha melanopsis.* I shot examples of this flycatcher in the Rockingham Bay district, and an example from Victoria is in the National Museum. Both localities are wanting in the doctor's schedule.

200. *Amaurodryas vittata.* It is very questionable whether the dusky robin is found in South Australia. It certainly has not been taken in Victoria.

218. *Psophodes crepitans.* I heard the unmistakable whip-crack-like note of this bird among the tropical jungle of Dalrymple's Gap, Rockingham Bay. It has also been recorded as far north as Herberton by another member of this club.

222. *Malurus lamberti* may be recorded for the Dawson River. A nest, containing eggs of this species, was taken there during my visit, 1885.

251-2. Dr. Ramsay shows *Cisticola lineocapilla* for Tasmania. The species we obtained on King Island was *ruficeps.* Dr. Ramsay appears to have adopted all (4) Gould's species of *Cisticolæ,* while Mr. R. B. Sharpe, of the British Museum, considers them all identical with *C. exilis* of Vigors and Horsfield. This would be an interesting point for the ornithologists of the club to determine, as various of the so-called varieties are found breeding together convenient to Melbourne at Caulfield, Dandenong, Heidelberg, etc.

257. *Sericornis lævigaster.* I think Dr. Ramsay will find that this Sericornis should have been recorded for the Dawson River district.

274. *Ephthianua albifrons.* This species is met with in Tasmania. See "Nests and Eggs of Australian Birds," page 25.

280. *Calamanthus fuliginosus.* Although not indicated by Dr. Ramsay, this field lark is common to both Victoria and South Australia.

284. *Cincloramphus cruralis* has been noted in the Dawson River district.

289. *Calamoherpe Australis.* During a visit to Tasmania, 1883, I heard the merry song of these warblers in the reed beds bordering the Tamar River. See my manual "Nests and Eggs of Australian Birds," page xxix. The reed warbler is also in Colonel W. V. Legge's list, but not on Dr. Ramsay's for Tasmania.

296. *Estrilda temporalis.* It is well known to almost every member of the Club that this little finch abounds in many parts of Victoria. The fact must have escaped the doctor's memory.

297. *Estrilda ruficanda.* I noticed this finch in Rockingham Bay district.

306. *Pöephila cincta.* Dr. Ramsay credits us with the banded grass finch. I am not aware of it having been taken in Victoria except it has been an escaped cage bird.

308 and 310. *Pöephila atropygialis* has been noted in the Rockingham Bay district, and I have handled skins of the lovely grass finch *(P. gouldiæ)* from the same quarter.

326. *Sericulus melinus.* I once saw a skin of the regent-bird (an immature male) taken in the Dawson district.

328. *Ailurædus viridis.* To my knowledge the cat-bird has not been seen in Victoria; certainly not in South Australia. To save Dr. Ramsay, it is to be hoped the Club's expedition may find it in the Croajingolong Mountains at Christmas.

354. *Pomatostomus rubeculus.* Dr. Ramsay has evidently recorded this bird for the Dawson River instead of *P. temporalis.* In justice to myself I may state I have described eggs of *P. rubeculus* purported to have been taken at the Dawson River, and birds identified at the Australian Museum. But when I visited the district I could detect no difference in the so-called *P. rubeculus* from the southern variety *(P. temporalis).* Therefore, I had skins submitted to Professor Alfred Newton, of Cambridge, who pronounced them to be *P. temporalis.* With this opinion Dr. Gadow concurred.

356A. *Meliornis longirostris.* Specimens of the long-billed honey-eater have been taken at Encounter Bay, S.A.

370. *Ptilotis flavicollis.* Gould recorded this species for New South Wales, Victoria, and South Australia, as well as Tasmania. Dr. Ramsay has raised a query (?) against the species for his colony (N.S.W.). But I think he should have been bolder and have expunged it altogether, as well as from Victoria and South Australia. I have sought carefully for this lively and attractive bird in all parts of Victoria, and have failed to detect its presence, and have come to the conclusion that the yellow-throated honey-eater is confined to Tasmania and the intermediate islands only where I have seen it.

388. *Stomiopera uincolor.* Dr. Ramsay may possibly recollect I produced a skin of this bird to him when returning from Queensland. He was kind enough to turn up Gould's figure and identify it for me. One would have thought the doctor would have seized such an opportunity for extending the locality of the honey-eater to Rockingham Bay district, especially when I informed him I took it at Townsville, together with its nest and eggs.

390. *Meliphaga phrygia.* I beg to remind Dr. Ramsay that this species is found both in Victoria and South Australia, notwithstanding he has left these localities vacant. I took numbers of their nests in the Caulfield district, 1869, and in the Sandhurst district, 1880. My last note of the beautiful honey-eater is recorded on 2nd November, 1886, when I saw an extraordinary flock of about 40 warty-faced honey-eaters at Doncaster Creek, 10 miles from Melbourne,

397. *Acanthochœra carunculata.* This wattle bird is not found in Tasmania.

403 and 423. *Philemon citreogularis* and *Myzantha garrula.* Both have been taken in the Dawson district, where they breed.

422. *Melithreptus lætior.* In a former list Dr. Ramsay gave Lake Eyre as a habitat of this species, yet it is not shown for the interior on his new list.

428. *Dicœum hirundinaceum.* The Swallow Dicæum has not been taken in Tasmania, but has been recorded for West Australia. Dr. Ramsay has reversed localities.

430. *Zosterops cœrulescens* is common to Tasmania. I noted numbers on the north part of the island. See manual "Nest and Eggs of Australian Birds," pages 40 and 29.

440. *Climacteris erythrops.* There are mounted in the National Museum skins of this tree-creeper taken in Victoria.

467. *Cacatua galerita.* This familiar cockatoo has been taken in the Dawson district, also its eggs.

474. *Calyptorhynehus banksii* may be recorded for Victoria and South Australia.

490 and 760. *Platycercus pennantii,* etc. In 1885 I showed Dr. Ramsay a *Platycercus* I took at Cardwell (Rockingham Bay.) On account of its smaller proportions and other details, and the different vocality of the flock of birds out, of which I shot a pair, I took it to be different to the well-known *pennantii,* and remarked so to the doctor at the time. With this he did not agree. Since, however, he has described a precisely similar bird from the same district as *Platycercus pennantii* (variety) *nigrescens.* If it be really a sub-species then *P. pennantii* does not exist in the Rockingham Bay district as shown by Dr. Ramsay.

492. *Platycercus flaviventris,* to my knowledge, has not been taken in Victoria nor in South Australia.

511. *Euphema petrophila.* Many rock parrakeets have been taken near Adelaide, and Gould says:—"I have received specimens of this bird from Port Lincoln, in South Australia." Yet Dr. Ramsay only debits the bird to West Australia.

514. *Melopsittacus undulatus.* I noted this species on the Fitzroy River, Queensland.

516. *Pezoporus occidentalis.* This parrot was taken by the late Mr. F. W. Andrews in the interior, and shown before the Royal Society of South Australia.

520. *Trichoglossus chlorolepidotus.* I do not think this lorikeet has ever been observed south of the Murray.

533. *Lopholaimus antarcticus.* The top-knot pigeon is Victorian. January, 1887, Mr. W. Kershaw, a member of this Club saw one of these large birds shot from a number that were about the scrub near the Lakes' entrance, Gippsland.

550. *Macropygia phasianella* has not been taken in Victoria.

558. *Turnix melanotus* has been secured both in Victoria and South Australia, Dr. Ramsay notwithstanding.

563. *Coturnix pectoralis*. All of us are liable to error, but we do not doubt that eminent authority Gould, when he says he obtained specimens of this well-known quail from West Australia. Dr. Ramsay has overlooked the fact.

575. *Hæmatopus longirostris* may be recorded for North-West Australia, since I have received eggs of this oyster-catcher from King Sound.

578 and 580. *Lobivanellus lobatus* and *Sarciophorus pectoralis*. Both these plover are well known to Tasmania; nevertheless, Dr. Ramsay has omitted such prominent objects.

583. *Eudromias Australis*. Eggs of this dottrel have been received from West Australia by me.

598. *Actiturus longicaudus*. Bartram's sandpiper several times has been taken lately in South Australia; also (602) *Tringa cinerea*.

606. *Glareola grallaria*. This pratincole may be recorded for Rockingham Bay district, Victoria, and South Australia, since it has been observed in all these localities.

609 and 610. *Cladorhynchus pectoralis* and *Himantopus leucocephalus*. These interesting waders are undoubtedly amongst the avi-fauna of Tasmania, although evidently not to the knowledge of Dr. Ramsay.

611. *Limosa melanuroides*. The black-tailed godwit has been taken in Victoria and South Australia.

624. *Xenorhynchus asiaticus*. Examples of the jabiru have been received at the Adelaide Museum from the interior.

634. *Demiegretta sacra*. Both the blue variety and the white of the reef herons I have seen on Phillip Island, Victoria, and possess their eggs from the north-west coast of Tasmania. The birds were reported for the first as Tasmanian in the *Naturalist*, the journal of this Club, April, 1885.

636. *Nycticorax caledonicus*. If we are to believe Gould, the night heron is found in West Australia, for he says the aborigines of the lowland districts of that colony call the bird "gnal-ganning."

650. *Hypotænidia philippensis*. The omission of the common pictoral rail from the Tasmanian column by Dr. Ramsay must surely be a clerical error, for I cannot believe it was omitted ignorantly, seeing it is such a familiar bird on the island, and possessing, as it does, such a vast range, not only over the whole continent of Australia, but also over New Zealand and many other islands of the Pacific.

659, 660, 666, 667. *Anseranas melanoleuca*, *Branta jubata*, *Dendrocygna eytoni*, and *Stictonetta nævosa*. All these swimmers have been noted in Tasmania. The last three appear on

Colonel Legge's list. It is true that some may be only stragglers, yet Dr. Ramsay must admit them on the same grounds as he has done *Ptilopus superbus* and *Lopholaimus antarcticus*.

665. *Dendrocygna vagans* is a Victorian duck. There are splendid examples mounted in the National Museum since 1884.

678. *Podiceps novæ-hollandiæ* is found in the Dawson district, where its eggs have also been taken.

682. *Eudyptula undina*. Since the National Museum possesses specimens taken in Port Phillip, the fairy penguin should undoubtedly have been debited to Victoria on Dr. Ramsay's list.

688. *Stercorarius crepidatus*. In passing, I should like to state it has been published that, amongst other birds not mentioned in any previous lists to Dr. Ramsay's, is the above species. I beg to remind members that it duly appeared in the Club's printed list of Victorian birds in the *Naturalist*, August, 1884, and that the presence of a second skua in Australia was first recorded by me in the *Southern Science Record*, vol. III. (1883), page 256.

690. *Sterna caspia* should be added to West Australia. I have seen eggs of this tern from that part recently, and Gould records it for the same locality.

691. *Sterna anglica* is undoubtedly Victorian. Specimens have appeared mounted in the National Museum for a length of time; also, it will be remembered, I exhibited, last year, eggs of the long-legged tern, taken in Victoria. Therefore, it is hoped that on Dr. Ramsay's next list he will restore to us this interesting tern.

731. *Puffinus nugax*. This petrel may be included in the Tasmanian list if Dr. Ramsay thinks the fact of the Club's expedition having identified it off King Island is sufficient evidence. Besides, as the allied petrel frequents the Victorian coast, it is reasonable to suppose it is also found on the other side of the Strait.

84. *Artamus cinereus;* 108. *Cracticus torquatus;* 146. *Collyriocincla rufigaster;* 294. *Estrilda bichenovii;* 536. *Phaps chalcoptera;* 596. *Totanus canescens;* 619. *Geronticus spinicollis;* 678. *Podiceps nestor;* 746. *Plotus novæ-hollandiæ;* 754. *Graculus melanoleucus;* and 755. *G. stictocephalus*. All these species were enumerated on a "List of Birds collected at Derby (N.W.A.) by the late T. H. Boyer-Bower, Esq., with Notes," by Dr. Ramsay. See P.L.S. of New South Wales, vol. II. (1887). It would, indeed, be interesting to learn why the eleven species were omitted from the doctor's present list without given reasons. The absence of any explanation greatly embarrasses those who, like myself, are studying a subject so full of fascinating interest and of instruction as the geographical distribution of Australian birds.

CORRESPONDENCE.

KING ISLAND.

To the Editor of the Victorian Naturalist.

SIR,—Reading in your journal the interesting account of the exploration of King Island by the Victorian Naturalists' Club, I have wondered whether it could not be utilised as a zoological reserve for the famous Tasmanian hyena and *Ursine dasyure* (native devil). These animals, the most remarkable living carnivorous representatives of an ancient race, are found in no other place in the world except the fastnesses of our sister island and colony, Tasmania, and will in time go the way of all wild beast flesh, before the advancing tide of civilisation.

In the beginning of 1867 I was six weeks collecting plants in the Ringarooma district of north-east Tasmania. I heard much of these animals, and bore away skulls, which are at present in my cabinet. The skull of the hyena *(Thylacinus)* far exceeds in beauty and complexity that of the dog, and in size equals the deerhound. I was on settlements in mountainous districts, where I was told they had completely cleared off large flocks (some hundreds) of sheep.

King Island is, no doubt, a bit severed from Tasmania, but entirely resembles it in fauna and flora. In it the animals would live on the wallabies, and as a poisonous plant prevents the stocking of the island with sheep and cattle, they could not do much harm.

But it may be said, granting they do no harm, why preserve them? They would be interesting objects to show our visitors in return for so much that they can and do show us when we go "home" to Europe, America, or India. We cannot show much yet in the way of art—or, when I think of the estimable efforts of our Melbourne young ladies, I will say, at least, not of ancient art; but we have unique wonders of nature. Some have already, and even recently, passed away from New Zealand, which is our Alps and Iceland combined. We have lost the moa, an ostrich seventeen feet high, which could have given a long start to an express railway train, as Mr. Kingston has so humorously pictured for us.

Our own great diprotodon is dead. Notice his head in the University Museum; three feet long, with lower incisor teeth six inches long. Had we to choose shoulders for this gigantic fellow, it is to the elephant we should have to go among living animals; and he was common here. At a glance you see his relationship to kangaroo and opossum. Well, almost alone in the earth, we possess living representatives of this wonderful order, the vanguard of the mammal race. Nowhere are there such large carnivorous members as those in Tasmania.

They are not only early in time, but in organisation—a link between lizards and the mammals of Europe.

They carry what may be called portable nests, with food supplies laid on, being born almost as undeveloped as eggs, and remaining unconscious in the nest (pouch) for weeks.

Might not the larger of these—the hyena—be allowed a home in an island which is almost useless, except to naturalists; and for the other zoological oddities a sacred asylum be found at Wilson's Promontory?

WALTER K. BISSILL.

Belvoir Park, Ravenswood, 23rd August, 1888.

RATS AND PLANTS.

To the Editor of the Victorian Naturalist.

DEAR SIR,—I have been extremely annoyed at, and for some time surprised as to the cause of, the destruction of several orchids I have been cultivating. During last season I collected several orchids, and have been looking eagerly for their re-appearance this season. Imagine my feelings when I find that as soon as a green shoot shows above the earth it is eaten off. At first I attributed the cause to slugs, and spent many an hour in searching for the supposed enemy under the flower-pots, stones, etc. Last week not only was the young shoot of *Spiranthes Australis* eaten off, but the earth was scraped out of the pot and the tubers eaten. This put all idea of slugs out of the question. I then set several snares round the flower-pots. These solved the mystery, and showed the depredators to be *rats*. They have also eaten off the young fronds of several small ferns.

This vegetarian taste in rats is something new to me, though I know they have a decided penchant for lead piping.

Since writing the above they have completely destroyed several ferns and fuchsias, leaving nothing but bare stalks.

J. SEARLE.

18th July, 1888.

THE MONKEY AS A SCIENTIFIC INVESTIGATOR.—Under the heading of "Psychology" the *American Naturalist* for May has a curious paragraph on "The Monkey as a Scientific Investigator." In the interesting little "Zoo" connected with the National Museum at Washington there is a fine male grivet monkey *(Cercopithecus erythræus)*, who shares a large cage with four opossums. To human beings he shows himself anything but amiable, but "he takes kindly to his strange companions, and they have been the best friends from the first." The

attention of the attendant was lately drawn to the cage by the excitement of a crowd in front of it, and on going to ascertain the cause he was surprised to see the monkey seated in the middle of the cage, with one of the opossums lying quietly on her back on his lap, and her head under his arm. "The monkey had just discovered the marsupial pouch of the opossum, and was diligently investigating it. Had he not been a close observer, it certainly would have remained unseen, for it was so tightly closed as to be perfectly invisible in its normal condition. The monkey carefully lifted the outer wall of the pouch, and peered into the cavity. Then he reached in with his hand, felt about for a moment, and, to the astonishment of everybody, took out a tiny young opossum, about two inches long, hairless, blind, and very helpless, but alive and kicking. Jock held it up to the light, where he could get a good view of it, scrutinised it with the air of a *savant*, and presently returned it to the pouch very carefully. After replacing it he looked into the pouch again, and presently drew out another for examination, which he looked at with solemn interest, smelt it, and then carefully put it back. It was thus it became known to the attendants that the old female opossum had the young ones, which had previously been looked for in vain."—*Nature.*

Humming-bird and Mantis.—In a letter lately submitted to the Elliott Society, and printed in its Proceedings, Mr. G. W. Alexander, of Charleston, S.C., tells a strange tale of a humming-bird. Mr. Alexander heard in his garden what he knew must be a cry of pain, and going to a vine, from which the cry seemed to proceed, he found a humming-bird "struggling violently, but unable to extricate itself." He took it in his hands, and, to his astonishment, saw that it was in the clutches of an insect, which he identified as a mantis, popularly known in those parts as "Johnny-cock-horse." "The bird," says Mr. Alexander, "was wounded under the wing, upon one side of the breast, which had evidently been lacerated with the powerful mandibles of its captor. The wound looked ugly enough to lead me to fear that it would prove fatal; nevertheless, my children and I cared for it as tenderly as we knew how, but we found it difficult to administer nourishment to a humming-bird, so at night I placed it among the leaves of the vine, for it was a warm night, and in the morning the little sufferer lay dead on the ground beneath." —*Nature.*

ERRATUM.

Vol. IV., page 120 (December, 1887), read Tachyglossus for Trachyglossum.

Field Naturalists' Club of Victoria.

President :

A. H. S. LUCAS, M.A., B.Sc.

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.; Vol. III. (1886-87), 12 numbers, 6s.; Vol. IV. (1887-88), 12 numbers, 6s.; 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 1886-87, with Rules, etc., can be obtained on application to the Hon. Sec.

Vol. V.—No. 7. November, 1888.

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

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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 October, 1888.

Mr. C. A. Topp, M.A., F.L.S., one of the vice-presidents, occupied the chair, and about fifty-five members and visitors were present, among the latter being Dr. Murray Gibbes, of New Zealand.

A letter was read from Mr. W. B. Waterfall, of Bristol, England, desiring to correspond and exchange specimens of mosses with Victorian bryologists.

The hon. librarian acknowledged the receipt of the following donations to the library:—"Synopsis of Queensland Flora," with first and second supplements; "Classified Index of Indigenous and Naturalised Plants of Queensland," with first and second supplement; "Plants reputed Poisonous and Injurious to Stock," "The Fern World," "Queensland Fungi," "Catalogue of Plants in Metropolitan Gardens, Brisbane;" and "Catalogues of Economic Plants, Grasses, and Woods in Queensland Court, Melbourne Exhibition, 1888," by F. M. Bailey, F.L.S., Colonial Botanist, Queensland, from the author; "New and Rare Hydroida," by W. M. Bale, F.R.M.S., from the author; "London Catalogue of British Mosses and Hepatics," from Mr. W. B. Waterfall; "Quarterly Mining Reports," June, 1888, from Mining department; "Transactions of Geographical Society of Australasia (Victorian Branch)," Vol. 6, part I, from the Society; "Proceedings of Royal Society of New South Wales," Vols. 14, 15, 16, 17, and 22, part I., from the Society; "Proceedings of the Linnean Society of New South Wales," second series, Vol. 3, part II., from the Society; "Proceedings of the Royal Society of Queensland," Vol. 5, part II., from the Society; "Proceedings of F. N. Section, Royal Society of South Australia," 1886-7, from the Society; "Journal of the Bombay Natural History Society," Vol. III., No. 3, from the Society; and "Journal of Pharmacy," September, 1888.

The hon. secretary read a short account of the excursion to Croydon on 15th September, which was well attended, and an interesting afternoon spent, though plants in flower were somewhat scarce. The excursion to Cheltenham, on 29th September,

was more successful, about twelve specimens of orchids being found in bloom.

On a ballot being taken, Miss Waltham, Mr. H. Easterby, and Dr. J. A. Reid were duly elected members of the Club.

Mr. C. A. Topp, M.A., spoke of the valuable services of Dr. J. C. Cox, F.L.S., of Sydney, as the Club's delegate on the Council of Australasian Association for the Advancement of Science, Sydney, 1888, and moved that a vote of thanks be accorded to him, which was seconded by Mr. F. G. A. Barnard, and carried unanimously.

Particulars of the proposed excursion to East Gippsland at Christmas time were furnished by the sub-committe appointed to inquire into the proposal, and intending excursionists were asked to send in their names without delay.

PAPERS READ.

1. By Mr. F. R. Godfrey, entitled "Surface Shells." The author described and exhibited specimens of minute mollusca, which are only to be obtained when floating on the surface of the ocean in the warmer parts of the world at about sunset. The shells were extremely delicate and beautiful, and excited considerable interest.

2. By Mr. F. G. A. Barnard, entitled, "Notes of a Visit to the Jenolan Caves, New South Wales." The author gave a graphic description of the situation and surroundings of these wonderful sights, and gave some idea of the beautiful forms assumed by the limestone. The paper was well illustrated with specimens, photographs, and a sketch of the locality.

The Rev. F. R M. Wilson mentioned that during a recent visit to the neighbourhood of Sydney he had been much struck with the great similarity of its lichen flora to that of East Gippsland.

The principal exhibits of the evening were:—By Mr. F. G. A. Barnard, limestone and photographs from Jenolan Caves, N.S.W., in illustration of paper. By Mr. A. J. Campbell, eggs of speckled quail *(Turnix scintillans)*, azure-breasted porphyrio *(Porphyrio bellus)*, and long-billed gull *(Larus longirostris)*, all from Western Australia, hitherto unrecorded. By Mr. A. Coles, a pair of gallinaceous para, and Nankeen night heron. By Mr. C. French, F.L.S., two plants from West Wimmera, new to Victoria, also photographs of East Gippsland scenery. By Mr. C. French, jun., a copper-headed snake from Oakleigh. By Mr. F. R. Godfrey, shells in illustration of his paper. By Mr. R. Hall, the four Australian gannets—viz., the masked gannet *(Sula cyanops)*, the brown gannet *(S. leucogastra)*, with eggs; the red-legged gannet *(S. piscator)*, and the Australian gannet *(S. serrator)*; and the little penguin *(Eridyptula minor)*, with eggs. By Master G. Hill, case of buprestid beetles. By Mr. W. B.

Jennings, fossil shells from Hamilton, fossil whale's ear-bones from Waurn Ponds. By Mr. J. Kershaw, bird, nest, and eggs of *Pycnoptilus floccosus* from Trafalgar, Gippsland. By Baron F. von Mueller, K.C.M.G., four new plants from West Australia, and one from New South Wales. By Mr. F. Spry, larva and moth of *Thalassodes lithocroma* (Meyrick) from Brighton. By Mr. Searle, embryo kangaroo, snake from Yarrawonga, insects collected during month. By Mr. M. Waterstrom, orchid, *Caladenia Patersoni*, in bloom.

After the usual *conversazione*, the meeting terminated.

SURFACE SHELLS.

By F. R. Godfrey.

(Read before the Field Naturalists' Club of Victoria, 8th October, 1888.)

When offering to read a paper on "Surface Shells" to the Field Naturalists' Club, I had to encounter two objections which presented themselves to my mind as barriers to the proposal. First, that the subject of "Ocean Shells" was, perhaps, outside the scope of a body which styles itself the "Field Naturalists' Club;" and second, that I might be thought too bold and venturesome in dealing with a subject of which I confess to be more fitted to listen as a scholar than to appear to act as a teacher.

The first objection was not hard to remove, when I considered that the object of this Club is to encourage the pursuit of a knowledge of natural history in all its branches, and that the portals of the Temple of Science are many and various; that in the study of natural history the different forms of animated beings are like the marble steps which approach the temple's fane from opposite and apparently diverse directions, but all leading to one great centre; that whether we study one or other of the four great groups into which all the animal kingdom is divided—the vertebrata, the mollusca, the articulata, or the radiata—we may see some link of connection between them, so that we may trace an ideal progression from the lowest form of infusorial monad upwards to the highest and most perfectly developed being of the vertebrate order. Thus my first objection was satisfactorily disposed of, at least to my own mind.

My second objection presented more serious obstacles, for I could not help recalling to mind the advice given by Horace to all who attempt to write on any subject—

> "Sumite materiêm vestris, qui scribetis, equam
> Viribus; et versate diu quid ferre recusant,
> Quid valeant humeri."

which I may be allowed to give a translation of for the benefit of those who are not classical scholars in the apt and clever language of Lord Byron—

> Dear authors, suit your topics to your strength,
> And ponder well your subject and its length,
> Nor lift your load before you're quite aware
> What weight your shoulders will or will not bear.

Feeling the force of this advice, I feared to undertake a burden which might prove too heavy for me, or to appear to trespass on a domain where I might be found an ignorant intruder, but I got over this objection by the reflection that what I propose is not to give a learned disquisition, but simply a record of my own experience, and a description of some wonderful forms of life caught and preserved by myself some twenty years ago, which, I trust, if not unknown to the members of this Club, may not be found uninteresting, and may, perhaps, be the means of enabling others, if opportunity occur, to obtain valuable and instructive information, and to gain from that knowledge fresh proofs of the wisdom and goodness of the Supreme Being, whose presence and creative power are evidenced by the skill displayed in the structure and maintenance of the lowest and feeblest of His creatures as much as in the highest in the scale of animated beings.

It was while on a trip to England, in the days when there were no ocean steamers by which to make the voyage in thirty-two days, that I was enabled to secure the objects which I shall have to bring under your notice to-night; and here I may mention incidentally that two great advantages were enjoyed by me on this occasion—first, that I went home in a ship commanded by a gentleman who had other tastes and talents besides those usually possessed by the genus skipper, and who entered heartily into the work with the instinct and ardour of a naturalist; and next, that on this particular voyage we were favoured by mild and genial weather, which, though it extended the period of our passage to 136 days, and proved tedious to those who were anxious to get away from the discomforts of board-ship life, was singularly favourable to us who were engaged, whenever opportunity occurred, in searching for specimens of creatures found only in the "vast and fathomless deep," for it must be remembered that when engaged in dredging, or more properly towing a net, for surface shells and curiosities, it is essential that the speed of the ship should not exceed three or four knots, as the delicate and fragile objects which are drawn into the net are smashed up and ruined by the rush of water, and by contact with each other.

I would, before proceeding further, offer an explanation as to the title of my paper, which I describe as "Surface Shells," a title which I chose because, although other forms of life are treated of besides those which may be properly called shells, the general idea of a shell is that it applies to creatures with a hard, heavy shell-covering, usually found on the sea bottom.

only, and unable to indulge in any locomotion beyond crawling on the rocks or weeds of the ocean floor, while all those shells, and other mollusks which I shall describe were captured on the surface ; and an interesting fact may be here noticed—that with the exception of a few varieties, such as the "Physalia," or "Portuguese Man-of-war," the "Porpitæ," and the "Janthina," or blue sea snail, which may be captured at any time of the day or night, all these mollusca only rise to the surface for a period of a few hours after sunset, and as a rule they succeed each other at different times in their ascent to the upper air. Another matter of interest may be noticed—viz., that on no single occasion when it was practicable to tow the net did I fail to secure some specimen during those hours, though it might be towing all day without success.

Let me shortly describe the method and means of capture. The best material for the purpose is a strong mosquito netting, which should be fastened to a semicircular frame of wood, and terminate in two or three pockets about the size of the foot of a sock, rather than in one conical point, as the extreme delicacy of many of the rarer kinds of mollusks renders them liable to injury. It is also necessary to have a long spar or oar projecting from the stern of the ship, and have the net drawn by means of an out-haul from the exremity of the spar, and so avoid towing exactly in the wake of the ship, where the creatures must necessarily be disturbed and driven down by the body of the ship. When the net has been in the water for a short time, the interesting work of hauling it in and emptying its contents into a bucket of salt water is gone through, and then a careful examination is necessary to ascertain the success of the haul. You will observe small shells flitting and jerking themselves about in the water, or timidly sinking to the bottom. These, and anything that is thought worth the capture, must be taken out of the bucket by means of a small hand-net, and placed in a basin of fresh water, where they rapidly die and sink to the bottom. Next morning each shell must be carefully held in one hand while a jet of fresh water is injected from a syringe held in the other, and this generally will bring out every particle of the fish, and leave the shell clear and pellucid. This system of cleaning the shell I may claim as my invention, never having seen in recorded in any work; and it answers admirably.

Foremost amongst the creatures caught—not mentioning the "Medusæ," or jelly fish—I may notice the "Physalia pelagica," or Portuguese man-of-war, which consists of an oblong bladder, with a beak-shaped point at one end, of a deep purple colour, and with a crest or ridge extending along its summit, which can be raised or depressed at will, and has its edge tinted with orange or carmine, with deep blue vein-markings at intervals

running down from it. At the bottom of the bladder are several appendages, of varied size and form ; some short, with suckers attached on each side; while others are like long tentacula, which can be extended to an immense length, or contracted at pleasure. One which I captured had its tentacula extended to a depth of at least twelve feet, which I ascertained by thrusting a very long oar down to its full length, and finding portions of the tentacula attached to the extremity of the blade. Woe to the unfortunate inexperienced fisherman who allows any portion of the tentacula to touch his skin, the sensation being similar to that produced by a powerful stinging nettle, with dull pain in the limb for a considerable time. The physalia lives on small fish, shells, and other victims which happen to come under the influence of its prehensile tentacula, which instantly paralyse and draw up to the mouth and stomach its unhappy prey.

We also find various forms of porpitæ, which are simple disc-shaped mollusks, with no apparent power of locomotion. Their food—seized by small tentacula in the same way as the physalia—consists of small shells which come within their reach. One variety, the "velella," has a sort of membrane placed obliquely across the upper surface, which acts as a sail, and drifts its owner in whatever way the wind is blowing. I have frequently captured "porpitæ" and "velellæ" with janthina and other shells nearly as large as themselves, which they were consuming with avidity.

Another interesting family of shell-less mollusks frequently taken in the net is that of the "Nudibranchiata" species of sea-slug. These have no pulmonary chamber, but have the organs of respiration situated in the branchiæ on their upper surface. Among these I have captured "Doris cornuta," or the horned doris, and "Glaucus Atlanticus," or sea-lizard, which is a very extraordinarily beautiful creature when first caught, the upper surface being marked with deep blue and purple, having black lines running down each side of the body, while the lower side is of a pure silvery white. They float in a quiescent state on the ocean, unless touched, when they fling themselves about in a very excited way. They live on "porpitæ," "velellæ," and similar mollusks, and their appetite appears to be aldermanic.

Of another order, "Nucleobranchiata," which consist of mollusks with large bodies and very small shells, I may mention the Carinaria, of which the body is transparent and dotted with elongated points, the tail being pointed with a sort of fin, which acts as a rudder, and on the top of the animal the foot is situated.

Another peculiar creature is the "Clio borealis," or whale food, on which that huge animal largely subsists.

Before dealing with mollusks which have a shell covering, I

would mention a few peculiar crustaceans, of which large numbers are found in tropical seas and among the gulf weed. They are all vitreous, and not thicker than a sheet of paper. As examples, I may mention "Erychtheus vitreus," "Alima hyalina," and "Phyelosoma commune" or the crystal crab.

We now come to those mollusks which have a regular shell covering, and we will first notice the "Janthina," or common blue sea snail. These are most frequently taken of all the surface shells, and are found floating plentifully in all the warm latitudes at all hours of the day or night. It is supposed that, like all the snail tribe, they subsist upon some weed which floats in the ocean. One remarkable feature in these pretty shells, which vary in size from that of a pea to that of an ordinary garden snail, and in colour from a pale blue or lavender to a rich purple, is the provision they make for the protection of their eggs or young, which are attached to the under surface of a sort of float or raft which the parent keeps attached to it wherever it goes. Then I frequently caught a fine large shell known as "Hyalea tridentata," of which there are several species. These have a large projection like an immense under lip, and the base of the shell terminates in three sharp points. Akin to these are the "Diacria," of which there are also several varieties. They have no projecting lip, but only an oval-shaped orifice, which in some species is fringed with a handsome bright red edge.

"Cleodora lanceolata" is a beautiful crystalline shell with a very large orifice, and is most beautifully marked externally with a number of transverse bands.

The "Atlanta Peronii," a species of paper nautilus, is another species very numerous in some parts of the ocean, many thousands being frequently taken in one haul. Like the preceding shell, they are very vitreous and delicate to handle and clean the fish from.

"Cuvieria columnella," to which I gave the name of the Hyacinth glass, is a pretty shell of a cylindrical shape, perfectly transparent, with a simple aperture. It has two small fins, which are united ventrally by two small lobes.

"Creseis aciculata," which is a sub-genus of Cleodora, has a slender vitreous shell, conical, and running to a sharp point with narrow fins, which have small tentacles projecting from the dorsal edge, most difficult to preserve without injury.

The last shell which I shall mention, whose scientific name I have not been able to discover, and certainly the least of all my specimens, was captured in large numbers one evening when we were almost becalmed off Cape Horn, from which I have called it the "Cape Horn Shell." When showing some of my specimens many years ago to that great and clever naturalist, Professor (now Sir Richard) Owen, he was much surprised to

see this little stranger, of which he informed me he had only seen a few imperfect specimens, which had been dredged up from the bottom during one of the expeditions to the north polar regions, a curious coincidence which suggests that the same form of life may be expected to exist in the south polar regions as is found in the north. These shells are too minute for inspection without the aid of some magnifying power, but amply repay closer observation under a microscope.

Such are some amongst many of the wonders which may be obtained from the ocean, but there are hundreds which it is impossible to describe adequately or to preserve satisfactorily in any way. The only way of seeing them in their beauty and freshness is to make a tour throughout the world and capture them alive, a labour which would be found equally interesting and instructive.

I would conclude my paper by expressing the hope that I have not exhausted the patience of my audience, but have, perchance, excited in some the desire to prosecute a search for the treasures of the ocean.

NOTES ON SOME SALSOLACEOUS PLANTS;

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

Atriplex Quinii.

Slightly shrubby, comparatively dwarf, grey from minute appressed scalelets; leaves from rhomboid- to linear-lanceolate, almost or quite entire; staminate flowers mostly in clusters at the summit of branchlets; pistillate flowers mostly lower down, few or two together or some singly scattered, their stalklets finally conspicuous, hemiellipsoid-cylindric; the two segments of the involucre renate or somewhat verging into a rhomboid form, entire or distantly denticulated, upwards rather membranous, at their base bearing a small but prominent and quite renate appendage; fruit placed at the base of the involucral segments close to the stalklet; radicle ascending.

Near Mount Margaret (Babbage); near the Grey-Range and at Koorningbirri (Baeuerlen).

This Atriplex approaches in its affinity to A. stipitatum, but that species has usually broader leaves, the staminate and pistillate flowers on separate plants, the staminate clusters in interrupted leafless spikes, the pistillate flowers on much more elongating stalklets, and the involucral segments larger and quite unappendiculated.

This salt-bush is doubtless of pastoral value; it is dedicated to Edw. Quin, Esq., J.P., of Tarella, a leading colonist of

Riverina, who most generously aided Mr. Baeuerlen's search for plants in the Wilcannia-District.

The following localities of salsolaceous plants are not yet recorded connectedly:—

Atriplex stipitatum: between Victoria-Spring and Mount Rugged (Miss Brooke); on the Murray-River (Dr. Behr(; between the Lachlan- and Darling-River (H. Andræ). If the homonymous plant, described by Westerlund in the Linnæa of 1876, page 165, has specific value, it might receive the name of that author.

Atriplex paludosum: Eucla (Batt); Fowler's Bay (J. Miller); King's Island (Lieut. Stanley).

Atriplex isatideum: Eucla (Batt).

Atriplex nummularium: Finke-River (Rev. H Kempe); Charlotte-Waters (J. Byrne); Eucla (Oliver); Bowen-Downs (Birch).

Atriplex cinereum: Israelite-Bay (Miss Brooke); Eucla (Batt); Fowler's-Bay (Mrs. Richards); Rivoli-Bay (Miss Wehl); Clyde (Baeuerlen).

Atriplex vesicarium: Between Mount Rugged and Victoria-Spring (Miss Brooke); between Flinders Range and Lake Torrens (Mrs. Richards); Finke-River (Rev. H. Kempe); junction of Murray-and Darling-River (Minchin); Wilcannia (Mrs. Kennedy); Thargomindah (Mrs. Spencer); between the Darling-and Lachlan-River (Brueckner).

Atriplex Muelleri: Between Flinders-Range and Lake Torrens (Mrs. Richards); Barcoo-River (Schneider); Roma (Rev. B. Scortechini); Aramac (Dr. Poulton).

Atriplex prostratum: Fowler's Bay (Mrs. Richards); Yorke's Peninsula (Tepper).

Atriplex velutinellum: Fowler's Bay (Mrs. Richards); Mount Everard (E. Giles); Yantara-Lake (Baeuerlen).

Atriplex halimoides: Yule-River (Hon. J. Forrest); Ularing (Young); Gascoyne-River (Mrs. Gribble); Lake Eyre (E. Giles); junction of the Darling-and Murray-River (Mrs. Holding); Lachlan-River (F. v. M.); Namoi-River (Carson); Wilcannia (Mrs. Kennedy); Thargomindah (Inglis); Barcoo (Schneider); Aramac (Dr. Poulton); Carpentaria (Hann).

Bassia paradoxa: Gascoyne-River (Hon. J. Forrest); between Flinders-Range and Lake Torrens (Miss Richards); Spencer's Gulf (Felstead); Upper Darling-River (A. Wuerffel); Paroo-River (Mrs. Cotter); Mount Lyell (Mrs. Kennedy); Barrier-Range (Charsley); Lachlan-River (Tucker); Charlotte-Waters (Byrne); Finke-River (Rev. H. Kempe); Bowen-Downs (Birch).

Bassia divaricata: Fortescue-River (Hon. J. Forrest); North of Lake Eyre (Hon. Mr. Newland); Beltana (Phillipson); Kerang (Minchin); Lachlan-River (F. v. M.); Namoi

(Carson); Yantara-Lake (Baeuerlen); Darling-River (Mrs. Kennedy); Warrego (Haig); Severn (Hartmann); between the Bulloo and Paroo (Mrs. Spencer).

Bassia bicornis: Charlotte-Waters (Byrne); North of Lake Eyre (Hon. Mr. Newland); Lachlan-River (F. v. M.); Darling-River (Brueckner); Paroo (Mrs. Cotter); Thargomindah (Mrs. Spencer); Warrego (Haig); Herbert-River (Dittrich); Flinders-River (E. Palmer).

Bassia eurotioides has quite recently been sent in a well developed state from the eastern sources of Swan-River by Miss Martha Eaton; the vestiture of Drummond's plant is pale-brown, that of the specimens now secured is shining-white; the fruit-calyx is provided with 3 or 4 bristlets, two of which elongated; this renders a close alliance to the following species very apparent, from which it mainly differs in the longer almost hairlike-setular glabrous calyx-appendages.

Bassia lanicuspis is now also known from the Lachlan-River (F. v. M.), Paroo and Bulloo (Mrs. Spencer), Charlotte-Waters (F. Giles), Finke-River (Rev. H. J. Kempe). This plant is often only $\frac{1}{2}$–1 foot high; it varies with abbreviated spinules; to some extent it reminds of Ceratocarpus arenarius, particularly as regards the fruit. Dr. Ascherson and Dr. Schweinfurth have recently also re-established the genus Bassia among Salsolaceæ, (Illustration de la Flore d' Egypte p. 127), but in a limitation narrower than that assigned to it in the "Systematic Census of Australian plants." To Prof. Baillon also (Histoire des plantes, Chénopodiarées 177, anno 1887). Incidentally it may here be remarked, that Gaertner already in his celebrated work, published nearly 100 years ago, kept all the amyliferous curvembryonatæ closely together, perceiving clearly the affinity, which uninterruptedly connects them all.

RECOLLECTIONS OF MY RESIDENCE IN NORTH-WEST AUSTRALIA.

By a Non-Naturalist.

A member of your Club having asked me to contribute notes of anything relating to the aborigines or to natural history that I can call to mind as having come under my notice during my residence of fifteen years at the north-west, I have endeavoured, to the best of my ability, to comply with his request, but, through being no naturalist, I am afraid the information conveyed in my recollections will be very meagre, and will scarcely be sufficient to satisfy the inquiring minds of so enlightened and practical a body as the Field Naturalists' Club of Victoria, nor do I expect to be able to tell you much, if anything, that is new.

Consequently, I must, as so many others have done, and will continue to do, ask your indulgence for all shortcomings.

The north-west portion of the large colony of Western Australia is that lying about the 20th parallel of latitude, and is immediately south of what is now well known as the Kimberley district. For a long time the north-west was the most valuable portion of the colony, but the long droughts of several years duration, and the great falling off in the pearl-shell fishing industry, have very seriously injured its prosperity, and it must take some years to recover from its present depression.

When I left Melbourne in 1873 I had no experience of bush life, and all my knowledge of Australian aborigines was that obtained by seeing the few from the mission station who occasionally visited the city. These, as most of you know, are many of them only half-castes, and the others are, in the main, very poor specimens of the race, but they prepared me for what I might expect to see on my arrival at my intended destination, where I was told they still roamed almost as free as before the advent of the white man. That destination was Port Walcot, or, as it was then often called, Butcher's Inlet, so named after Butcher, a pilot, who was there several years before in a ship called the *Tien Tsin*, which also gave its name to the settlement on the beach, although the now recognised names of the town and port are Cossack and Port Walcot. By some the port has been confounded with Nickol Bay, from which, however, it is distant some few miles. Cossack is situate about 1200 miles north of Fremantle, and, at the time I speak of, was only to be reached by a tedious voyage in one of the small coasting vessels that supplied the then very uncertain communication. Now, and for some time past, there has been a regular monthly steam service between the two places, occupying about six or seven days, but in the year 1873 you might sometimes have a month's enjoyment of the comfortable quarters and high-class fare to be expected in crafts of from 15 to 50 tons. The sea-sick passenger might look in vain for the assistance of a mythical steward, and think himself fortunate indeed if he were not called upon to lend a hand to navigate, or, at least, do his spell at the pumps, both of which I had to do nearly all the way from Melbourne, our vessel being a very leaky one. On my arrival at Cossack it was plainly evident that the place was not over populated with whites; indeed there were then only about 30,000 in the entire colony, of which nearly the whole were resident in the southern portion. What is known as the north-west comprises, as you will see by referring to the map, a very large area, and as the white population was then only about 150, and even now does not number many hundreds, it is evident there is not much fear of their being "crowded out" for some years to come. Here I may mention

for the benefit of those of your members who are hair collectors, that Cossack is a splendid field for them, as amongst its limited population they will meet with representatives from almost every country, from the coal-black nigger to the pure white, with all the intermediate colours. Cossack stands pretty much in the same position to Roebourne, the capital of the north-west, as Port Melbourne does to Melbourne, but the distance is greater, being about eight miles. The two places are connected by a horse tramway, and although this is not equal to the Victorian cable trams, it is nevertheless very useful for the conveyance of both goods and passengers, and is consequently appreciated by the residents. No sooner had I landed than I made my first acquaintance with the natives, and, as a truthful writer, I am compelled to state that each succeeding year of the fifteen years' experience I had of them has only tended to more and more confirm my belief that for dirt and dirty habits they carry the palm over the natives of any other country, be they black or white. Their habits may be summarised in the one word—filthy; many of them, indeed, will not bear description. They wear no clothing, except occasionally in the town, when they conform to a regulation requiring them to have at least a piece of blanket round the loins; but this absence of clothing is not surprising, as the climate is one of the hottest imaginable, rivalling that celebrated spot to which the gentleman who had departed thence to the regions below returned for his blankets, complaining of them being much colder than what he had been accustomed to. Even with the whites it is more generally the custom to sleep outside than indoors, and the ordinary dress rarely consists of more than hat, shirt, trousers, and boots; and in winter but little additional clothing is required. Overcoats are things almost unknown, and to anyone contemplating settling there I would say, don't lay in a stock of them. The native men are fairly presentable so far as stature is concerned, some few being over six feet high, but the features are of the unmistakeable Australian type. The women are less prepossessing, even when young, and as they become older their appearance changes much for the worse—in fact, they grow extremely ugly, not to say hideous. The hair of both sexes is of the usual stringy black, and they have those flat noses, thick lips, and black, liquid eyes with which you are, no doubt, all familiar, from seeing the photographs in your picture gallery and in many of the photographers' shops in Melbourne. They move about in camps, each camp being what may be considered a different tribe, and intermarriage in any one tribe is not allowed. The latter is, in consequence, as nearly as I can explain it, of all of one tribe being recognised as brothers and sisters, and, no doubt, was originated with the object of preventing any close family

alliance. Hence it is necessary to marry into another of what I have called different tribes—perhaps I should rather say another branch of the tribe. When a girl is born she belongs, by some tribal right which I am unable to explain, to a certain man, be he young or old, and when she arrives at a proper age he claims and takes her away as his wife. The infants are suckled a much longer time than with us; indeed, I have seen children of six or seven years old at the breast, but, notwithstanding this, they have early to learn to look out for food for themselves, which to a great extent consists of roots. On the boys arriving at man's estate circumcision is practised, the process being a very painful one, but they bear it with great fortitude. From whence they have derived the custom I cannot say, but probably it was introduced from the Malay Islands, many of the natives of which must, in gone-by ages, have been driven to and taken up their residence on the mainland.

One of the most beastly customs, apparently general with all Australian aborigines, is that of anointing the body with the heart and kidney fat of anyone slain, or indeed, of any dead man, and to such an extent has this been practised that I have known natives whose skins have become so impregnated with it that you could scent them almost miles off and, needless to say, no white man could or would tolerate them within smelling distance. One old man was notorious for his exceptionally high flavour, and was absolutely unbearable even by the most callous. They also rub the fat upon their heads, making the hair into a hard knot, through which no comb, nor even a garden rake, could possibly make its way.

A native is not at all particular as to what he eats, everything being alike to him, the only notable exception being horseflesh, which, apparently only in imitation of the whites, he will not touch. This objection—it cannot be called dislike, for natives have no likes or dislikes—is difficult to account for, and I can only attribute it to his belief or superstition that as the whites do not eat it there must be something in it not good for the natives. In contradistinction to the white, the native is passionately fond of dog, and will get up early in the morning to look for the poison baits laid over night, and when one is missing follow up the trail until he comes upon the unfortunate animal, and then and there make a square meal of him. In connection with this eating of poisoned dog, I at first used to wonder that none of the natives ever suffered any ill effects after their meal, thinking that some small portion of the poison would be certain to get distributed, but I do not recollect hearing of a single instance of such occurring, and the practice I speak of is so common that no one ever takes the slightest notice of it. Another dirty habit the native possesses is that of covering himself with honey, of which

there is an abundance produced by a very small bee about the size of a common housefly, and as he never by any chance washes himself, you will readily perceive what an agreeable object he presents after a few days', or weeks', accumulation of dirt is added to the sticky substance.

Of vermin, such as fleas, bugs, and lice, the north-west is nearly free, the climate being apparently too hot and dry to suit their constitutions, which is something to be thankful for, for were they as abundant as in some other places life would scarcely be bearable; and what condition the unfortunate natives would be in is almost beyond conjecture. The only exception is a dog-flea, and even this is only found in dogs resident in the town, their bush brothers being entirely free from it. But if there are none of these vermin, their absence is to a great extent supplied by flies and mosquitos, the latter being especially numerous after rain. The mosquitos are not the common Victorian ones, which may be compared to what the Indian coolie is to the Afghan—the former mild, and only occasionally rousing up to energy, whilst the latter is always on the war-path; so with the north-west mosquito, and whilst the white man has to cover his head with a handkerchief or seek the aid of a mosquito net, the native does not even trouble himself about them, being apparently protected by the thick layers of dirt on his body, through which the mosquito cannot force his proboscis, and consequently retires from the contest in disgust. In the Kimberley district, where they are much more fierce and numerous than on the north-west, the natives protect themselves by building a small mud hut with only one aperture, through which as many crawl as the hut will hold, and then the aperture is closed up. In this worse than black hole they will lie and sleep, apparently not at all inconvenienced from the want of fresh air; and what the inside atmosphere must be like with all their dirty bodies, and still dirtier habits, I can only leave to your imagination. I have never yet heard of any white man who had the courage to try the effect of a night's lodgings in one of these huts, and I feel sure if he accepts an anvitation he would never live to relate his experiences, even if he had previously gone through as much as your well-known "Vagabond."

The natives, like all black races, are exceedingly treacherous, and you have to be very careful not to allow them to get behind you, for at the first favourable opportunity they will go for you. One favourite and very cruel way they have of killing a sleeping man is that of filling his ears, nose, and mouth with sand; and they take a special delight in watching the agonies of the wretched victim as he vainly endeavours to free himself, but, needless to say, he rarely, if ever, succeeds. A refinement of their treachery may be instanced in their occasionally meeting

a man overcome with the extreme heat or dying for want of of water. Him they will carry a long distance to water, and when he has fully recovered, amuse themselves by killing him.

The native weapons are, I think, much the same over all Australia. Of spears there are four kinds—viz., hunting, fishing, and fighting. The first has no barb, the second one; whilst of the fighting, one called morkandi, has four rows of double barbs, that is, each barb is so cut that the points are directed both up and down the spear, thus constituting a most dangerous weapon, as it can be neither withdrawn nor pushed through anybody that has unfortunately receceived it. The other has the barbs directed only one way, and, consequently, is not nearly so much to be feared. There are, of course, boomerangs, meros or walburras for throwing spears, also stone knives and tomahawks, but the latter will soon becomes things of the past, as the native easily appreciates the much more easily obtained metal ones. Cooking utensils are conspicuous by their absence, but they use a conch shell for drinking and for occasionally melting fat. The process of hair-cutting would, I feel sure, be greatly appreciated by all your members. It is painful enough to have it done with a very sharp steel knife, a process I have often undergone; but imagine, if you can, what it must be when performed by a flint one. This I have never had tried upon me, and don't intend if I can possibly help it. A curious circumstance came under my notice in connection with the fear which the natives have, or are supposed to have, of the whites—viz., that the first time they come in contact with them neither the men nor the women exhibit the slightest apprehension. On one occasion I was out some considerable distance with a companion, and accidentally came across a camp unacquainted with whites. Of course, the first thing to do was to collect all the spears, a protective act on our part, to which they offered no opposition, and which I performed whilst my companion stood by the horses, holding his firearms ready in case of treachery, but no treachery was evidently contemplated, indeed, on our taking our departure, some of the men, thinking we wanted the spears and had forgotten them, ran after us with them, but, as before stated, our only object had been self-protection. Immediately on our coming across the camp all the women sat down in a circle, and commenced pressing their breasts until the milk came, a custom of which I have never seen or heard any explanation of, and which I am quite unable to account for.

In my early experiences of the north-west I was a good deal engaged in the pearl-shell fishing, in which occupation most of the divers employed were aborigines. Now in a

country possessing no rivers or lakes it does seem strange that the natives, many of them brought from far inland, should be such adepts in diving—for adepts they are, as not only are they good divers, but they are able to remain in the water for a considerable period. The greatest depths to which they could dive was on an average eight fathoms, but they occasionally worked as deep as twelve fathoms, and they have been known to dive, but not for shell, as much as fifteen fathoms. The pearl-shell fishing being now nearly all done by the use of diving dresses, the primitive native is abolished; but in his day he was very useful and valuable, and has earned for his employers many thousands of pounds. Sometimes they would swim ashore from the boats and run away, and then there would be the job of following up and bringing them back, the former occasionally being very difficult; but once accomplished the rest was easy, as the runaways never objected to return—indeed, they had no apparent object in running away, as upon asking for a reason their invariable reply was simply because one of the others suggested they should do so.

On the pearling grounds, in fact on all the north-west coast, sharks are very numerous, but the natives never seemed to have any fear of them, and but few lives have been sacrificed to their attacks. Indeed, I can only recollect seeing one fatality, and it was then that another of the long cherished beliefs of my boyhood vanished; for, contrary to what I had been taught, and until then unquestionably believed, the shark did not turn over in the least to make his attack, but made straight for his victim, who, being unconscious of his approach, was unfortunately sacrificed.

(To be concluded in our next.)

EXCHANGE NOTICE.

Mr. W. B. Waterfall, "Thirlmere," Redland-green, Bristol, England, is desirous of exchanging mosses with Victorian collectors. Genera not occurring in England specially desired.

In an interesting paper presenting a concise history of the acclimatisation of the Salmonidæ in Tasmania, Mr. P. S. Seager claims that success has been secured in the thorough and unquestioned establishment of salmon trout and brown trout, both of which species are now abundant in Tasmania. The establishment of the true salmon is still to some extent a matter of uncertainty. "It must, however, be borne in mind," says Mr. Seager, "that more than one specimen submitted for scientific examination to Dr. Günther and others have been pronounced *S. salar*, and that Sir Thos. Brady has publicly stated his belief that specimens shown to him are of the same species. In speaking of them commercially, Sir Thomas states that such specimens in a salmon-producing country would be accepted as salmon without a doubt." This being so, Mr. Seager is of opinion that the establishment of *S. salar* in Tasmania may almost be regarded as an accomplished fact.—*Nature.*

Field Naturalists' Club of Victoria.

President :

A. H. S. LUCAS, M.A., B.Sc.

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.; Vol. III. (1886-87), 12 numbers, 6s.; Vol. IV. (1887-88), 12 numbers, 6s.; 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 1886-87, with Rules, etc., can be obtained on application to the Hon. Sec.

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

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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, 12th November, 1888.

The president, Mr. A. H. S. Lucas, M.A., B.Sc., occupied the chair, and about forty members and visitors were present.

A letter was read from the Rev. J. E. Tenison-Woods, F.G.S. (hon. member), accompanying a paper on "The Geology of Arnheim's Land," for the Club's Proceedings.

The Hon. Commissioner of Trade and Customs forwarded a number of posters giving details of close seasons for native birds, etc., in Victoria.

The Field Naturalists' section of the Royal Society of South Australia forwarded copies of their progress report on the protection of the native fauna and flora question.

The hon. librarian acknowledged the receipt of the following donations to the library:—"Prodromus of Zoology of Victoria," decade xvi., and "Iconography of Australian Acacias," decade xii., from the Government; "An Account of the New Zealand Scale Insects," by W. M. Maskell, F.R.M.S., and catalogues and reports from Sir Jas. Hector, K.C.M.G.; "Proceedings of Royal Society of Victoria," vol. xxiv., part 2, from the Society; and "Journal of Pharmacy," October, 1888.

The hon. secretary read short accounts of the Club excursion to Box Hill on Saturday, 16th October, when one or two good beetles were obtained, but owing to the hot weather the attendance was small. The excursion to Yarra Flats and Healesville on Friday, 9th November, was fairly attended. Flowering plants were rather scarce, but several good species of beetles and butterflies were obtained. About ten species of ferns were noted.

On a ballot being taken, Mr. J. M'Lellan, of Dimboola, was duly elected a member of the Club.

PAPERS READ.

1. The hon. secretary read a paper by Professor Ralph Tate, F.G.S (hon. member), on "*Voluta undulata* and Allied Species."

The author described how the two species *Voluta undulata* and *V. angasi* had been confused by several writers, and gave several particulars by which the two species may be distinguished.

2. By Mr. J. H. Gatliff, "A List of some of the Shells of the Marine Mollusca found upon the Victorian Coast," Part II., which, being a list of names, was taken as read, and ordered to be printed.

3. By Mr. C. French, F.L.S., entitled "Notes on the Fauna and the Flora of the Western Wimmera." The author gave a most interesting account of a recent collecting trip in the country around Dimboola, Diapur, Serviceton, and Border Town. Some eighty species of plants in flower, peculiar to the district, were collected, of which two were new for Victoria, and several others very rare. He spoke very highly of the neighbourhood of Diapur as a good collecting ground, both for insects and plants. He also gave a list of several handsome species worthy of garden cultivation.

The president mentioned that Mr. J. Bracebridge Wilson, M.A., of Geelong, had added five new species to the list of Victorian molluscs during the past year; and he also drew attention to a very fine series of prepared and mounted fungi, principally of the genus *Agaricus*, exhibited by Baron F. von Mueller, K.C.M.G., recently received from Germany.

The principal exhibits of the evening were:—By Mr. A. Coles' specimens from the Watts River aqueduct tunnel, near Christmas Hills. By Mr. E. M. Cornwall, a porcupine ant-eater, *Echidna hystrix*. By Mr. C. French, F.L.S., mounted specimens of dried plants from Western Wimmera, in illustration of paper. By Mr. C. French, jun., eggs of collared plain wanderer, Australian bittern, white-fronted falcon, brush bronze-wing pigeon, partridge bronze-wing pigeon, and common bronze-wing pigeon, all from Victoria. By Mr. R. Hall, eggs of diving petrel from Cliffy Island, Victoria. By Mr. G. A. Keartland, eggs of sulphur-crested cockatoo, laid by a bird that has been twenty-eight years in captivity; eggs of spotted pardalote, taken from a hole eighteen inches deep at Langwarrin; also skins of snipe, honeyeaters, etc. By Mr. A. H. S. Lucas, M.A., British oolitic fossils, including *Archæoniscus Brodiei* (M. Edw), odontophores of Victorian chitons, with micro-photographs. By Baron F. von Mueller, K.C.M.G., album of fungi prepared in Germany. By Mr. J. E. Prince, specimens of rocks and minerals found in shaft sunk 150 feet deep at corner of Elizabeth-street and Flinders-lane, Melbourne. By Mr. J. Searle, coleoptera, lepidoptera, etc., collected since last meeting. By Mr. C. Yelland, fossils from New Zealand, and tusk of boar.

After the usual *conversazione* the meeting terminated.

THE ANNUAL EXHIBITION OF WILD FLOWERS.

THE fourth annual exhibition of wild flowers by members of the Field Naturalists' Club of Victoria was held at the Royal Society's Hall on Tuesday evening, 16th October, 1888.

On this occasion the upper hall was also utilised for exhibits, thus affording greater facilities for their inspection by the visitors, who were very numerous.

The weather during the day, and also for several days previously, was rather too hot and trying for such delicate objects as the majority of our wild flowers, consequently the exhibits were perhaps not quite so fresh-looking as on previous occasions.

The flowers were arranged in the ordinary show-stands according to the tastes of the several exhibitors, and occupied some 700 tubes. It is estimated that nearly 250 species of Victorian plants were represented by their flowers, besides which there were about 25 species from the other Australian colonies.

The following were the principal exhibitors, with brief notes of their exhibits :—By Mr. D. Best, about 80 species from Phillip Island and the Dandenong Ranges, including a good variety of orchids, leguminaceous flowers, *Tecoma Australis*, *Veronica Derwentia*, etc. By Mr. F. G. A. Barnard, about fifty species from Kew, Red Bluff, and Dandenong Ranges, including many handsome leguminaceous flowers, *Myoporum viscosum* (grown by exhibitor), etc. By Mr. G. Coghill, about 140 species from Echuca, Castlemaine, Tooradin, Croydon, St. Arnaud, Leigh-road, etc.; this exhibit necessarily included several flowers unfamiliar to metropolitan botanists in their rambles, such as Grevilleas, Swainsonias, Eriostemons, etc., and also some New South Wales flowers. By Mr. C. Frost, about 60 species from Kew, Ringwood, Dandenong Creek, etc., including some very fine specimens of *Pterostylis barbata*, *P. cucullata*, and other orchids, *Utricularia dichotoma*, etc. By Mr. J. T. Gillespie, several species from Heywood. By Mr. W. R. Guilfoyle, F.L.S., a fine exhibit of about 35 species of Victorian flowers grown at the Melbourne Botanical Gardens, in order to show the suitability of native plants for garden decoration; also about fifteen species, natives of New South Wales, Western Australia, etc. Among these may be mentioned *Bauera rubioides*, *Calycothrix Sullivani*, *C. tetragona*, *Eriostemon myoporoides*, *Grevillea alpina*, *G. oleoides*, *Indigofera australis*, *Kunzea ericifolia*, *Melaleuca Wilsonii*, *Prostanthera rotundifolia* of Victorian forms, and *Acacia saligna*, *Boronia denticulata*, *B. elatior*, *Epacris longiflora*, *Grevillea acanthifolia*, *G. punicea*, *Telopea speciosissima*, etc. By Mr. G. W. Robinson, Narree Warren, a fine collection of wild and garden-grown Australian flowers; among the former may be mentioned a white variety of *Tetratheca ciliata*,

and among the latter *Acacia saligna*, *Chorizema ilicifolia*, etc. By Messrs. J. Smith and H. T. Tisdall, F.L.S., about 60 species, the result of a collecting trip at Stony Creek, North Beaconsfield, including *Bauera rubioides*, and other mountain shrubs and plants. By Messrs. A. and C. Yelland, about 50 species from Studley Park, Cheltenham, Diamond Creek, Avoca, etc., including some fine specimens of Grevilleas, Eriostemons, orchids, etc.

Baron F. von Mueller, K.C.M.G., again kindly attended in the afternoon, and named those specimens which were unfamiliar to the exhibitors.

It is to be regretted that no exhibit of pot-grown Victorian plants was staged, an omission which, it is hoped, may be filled up on some future occasion, as several of our native plants, with a little perseverance, should do well with pot culture.

The following list, which is as complete as was possible to ascertain, is arranged according to Baron von Mueller's "Key to the Victorian Plants," and will give some idea of the variety of flowers shown :—

Natural Order.	Species.
Ranunculaceæ ..	Clematis aristata.
..	Ranunculus lappaceus; R. rivularis.
Dilleniaceæ ..	Hibbertia stricta; H. fasciculata.
Lauraceæ ..	Cassytha glabella.
Violaceæ ..	Viola betonicifolia; V. hederacea.
Pittosporeæ ..	Pittosporum bicolor.
..	Marianthus procumbens.
..	Billardiera scandens.
Droseraceæ ..	Drosera peltata; D. Menziesii.
Polygaleæ ..	Comesperma volubile; C. ericinum.
Tremandreæ ..	Tetratheca ciliata, and white variety.
Rutaceæ ..	Boronia pinnata.
..	Eriostemon myoporoides; E. obovalis.
..	Phebalium Billardieri.
..	Correa speciosa.
Malvaceæ ..	Lavatera plebeja.
..	Plagianthus pulchellus.
Sterculiaceæ ..	Lasiopetalum Baueri.
Euphorbiaceæ ..	Micrantheum hexandrum.
..	Ricinocarpus pinifolius.
..	Amperea spartioides.
Casuarinæ ..	Casuarina distyla.
Sapindaceæ ..	Dodonea viscosa.
Stackhousieæ ..	Stackhousia linarifolia; S. viminea.
Portulaceæ ..	Claytonia australasica.
Caryophylleæ ..	Stellaria pungens; S. glauca.
Amarantaceæ ..	Ptilotus exaltatus; P. spathulatus.
Salsolaceæ ..	Salicornia arbuscula; S. australis.
Ficoideæ ..	Mesembrianthemum aequilaterale.
Polygonaceæ ..	Muehlenbeckia adpressa.
Leguminosæ ..	Gompholobium Huegelii.
	Spaerolobium vimineum.
	Daviesia latifolia; D. corymbosa; D. ulicina.

Natural Order.	Species.
Leguminosæ ..	Aotus villosa.
	Pultenæa paleacea; P. stricta; P. scabra; P. subumbellata; P. juniperina; P. Gunnii; P. tenuifolia.
	Dillwynia ericifolia; D. floribunda; D. cinerascens.
	Platylobium obtusangulum.
	Bossiæa prostrata.
	Goodia lotifolia.
	Lotus corniculatus; L. australis.
	Indigofera Australis.
	Swainsonia placoides; S. procumbens; S. lessertiifolia.
	Glycine clandestina; G. Latrobeana.
	Kennedya rubicunda; K. prostrata; K. monophylla.
	Acacia acinacea; A. retinodes; A. myrtifolia; A. verticillata; A. decurrens.
Saxifrageæ ..	Bauera rubioides.
Crassulaceæ ..	Tillea grandiflora.
Myrtaceæ ..	Calycothrix tetragona; C. Sullivani.
	Thryptomene ciliata.
	Leptospermum laevigatum; L. scoparium; L. lanigerum; L. myrsinoides.
	Kunzea corifolia.
	Callistemon lanceolatus.
	Melaleuca Wilsonii; M. squarrosa; M. ericifolia.
	Eucalyptus polyanthema.
Rhamnaceæ ..	Pomaderris sp.
	Cryptandea Hookeri.
Santalaceæ ..	Exocarpus cupressiformis (fruit); E. stricta.
Proteaceæ ..	Isopogon ceratophyllus.
	Persoonia juniperina (fruit).
	Grevillea ilicifolia; G. alpina; G. rosmarinifolia; G. oleoides; G. confertifolia.
	Hakea nodosa; H. flexilis.
	Banksia marginata; B. integrifolia.
Thymeleæ ..	Pimelea glauca; P. humilis; P. axiflora; P. octophylla; P. phylicoides.
Rubiaceæ ..	Asperula oligantha.
	Galium umbrosum; G. australe.
Compositæ ..	Brachycome diversifolia.
	Aster argophyllus; A. myrsinoides; A. stellulatus; A. asterotrichus; A. ramulosus.
	Vittadinia australis.
	Gnaphalium luteo-album.
	Podolepis accuminata.
	Leptorrhynchus squamatus.
	Helipterum incanum; H. corymbiflorum.
	Helichrysum scorpioides; H. lucidum; H. apiculatum; H. obcordatum.
	Cassinia longifolia.
	Craspedia Richia; C. globosa
	Senecio sp.
	Microseris Forsteri.
Campanulaceæ ..	Isotoma fluviatilis.
	Wahlenbergia gracilis.
Candolleaceæ ..	Candollea serrulata.
Goodeniaceæ ..	Goodenia ovata; G. geniculata.
	Velleya paradoxa.
Gentianeæ ..	Limnanthemum exaltatum.

Natural Order.	Species.
Solanaceæ ..	Solanum aviculare; S. simile.
	Nicotiana suaveolens.
Scrophularineæ..	Veronica perfoliata; V. Derwentia.
	Euphrasia Brownii.
Lentibularineæ ..	Utricularia dichotoma.
	Polypompholyx tenella.
Bignoniaceæ ..	Tecoma australis.
Asperifoliæ ..	Myosotis suaveolens.
	Cynoglossum suaveolens.
Labiatæ ..	Prostanthera rotundifolia.
	Westringia rosmariniformis.
	Ajuga australis.
Myoporinæ ..	Myoporum viscosum; M. deserti.
Epacrideæ ..	Styphelia Richei; S. virgata.
	Brachyloma daphnoides.
	Epacris impressa.
Orchideæ ..	Thelymitra ixioides; T. aristata; T. longifolia; T. carnea; T. flexusa; T. antennifera.
	Diuris punctata; D. maculata; D. pedunculata; D. sulphurea; D. longifolia.
	Calochilus Robertsoni.
	Prasophyllum elatum; P. patens.
	Microtis atrata; M. porrifolia.
	Pterostylis curta; P. nutans; P. pedunculata; P. cucullata; P. barbata; P. rufa.
	Lyperanthus nigricans.
	Caladenia Patersoni; C. suaveolens; C. carnea.
	Chiloglottis Gunnii.
	Glossodia major.
Irideæ ..	Diplarrhena Moraea.
	Patersonia glauca.
Amaryllideæ ..	Hypoxis glabella.
Liliaceæ ..	Dianella revoluta; D. longifolia.
	Wurmbea dioica.
	Burchardia umbellata.
	Bulbine bulbosa.
	Thysanotus Patersoni.
	Chamaescilla corymbosa.
	Stypandra glauca.
	Arthropodium strictum; A. minus.
	Xerotes longifolia; X. Brownii.
Fluviales ..	Triglochin procera.
Cyperaceæ ..	Cladium Radula.

OTHER AUSTRALIAN FLOWERS.

Rutaceæ ..	Boronia denticulata; B. elatior.
Leguminosæ ..	Brachysema lanceolatum.
	Chorizema cordatum; C. ilicifolium.
	Acacia saligna; A. dentifera.
Myrtaceæ ..	Calothamnus quadrifidus.
	Eucalyptus ficifolia.
Proteaceæ ..	Isopogon anethifolius.
	Grevillea acanthifolia; G. buxifolia; G. punicea; G. Hookeriana.
	Telopea speciosissima.
Compositæ ..	Helichrysum bracteatum.
Scrophularineæ..	Veronica formosa.
Epacrideæ ..	Epacris longiflora.

A LIST OF SOME OF THE SHELLS OF THE MARINE MOLLUSCA

Found upon the Victorian Coast.

Part II.

By J. H. Gatliff.

(Read before the Field Naturalists' Club of Victoria, 12th November, 1888.)

The classification is that set forth in Tryon's "Structural and Systematic Conchology," 1882.

When this sign = is prefixed to a name it signifies that it is a synonym of the one preceding. All the synonyms are not given, but those which have been more generally used.

(See also Part I. in *Victorian Naturalist*, Vol. IV., page 57.)

Order, *Scutibranchiata;* Sub-order, *Podopthalma.*

Genera.	Species.
	Family Neritidæ.
Nerita	
	atrata, *Quoy*
	Family, Liotidæ.
Liotia	
(Arene)	Australis, *Kiener*
	Angasi, *Crosse*
	Lodderæ, *Petterd*
Cyclostrema	
	Sp.?
	Family, Phasianellidæ.
Phasianella	
	bulimoides, *Lam.*
	= tritonis, *Chem.*
	= Australis, *Gmel.*
	perdix, *Gray*
	= venosa, *Rve.*
	solida, *Born*
	zebra, *Gray*
	nivosa, *Rve.*
	pulchra, *Gray.*
	turgida, *Phil.*
	= sanguinea, *Rve.*
	= brevis, *Menke.*
	Family, Turbinidæ.
Turbo	
	undulatus, *Chem.*
	Gruneri, *Phil.*
	= circularis, *Rve.*
Imperator	
{ Uvanilla	
{ = Carinidea	aurea, *Jonas*
	fimbriata, *Sw.*

Genera.	Species.
Trochus	
(Minolia)	vectiliginea, *Menke*
(Gibbula)	Tasmanica, *Petterd*
(Zizyphinus)	Meyerii, *Phil.*
	= armillatus, *Wood*
	fragum, *Phil.*
(Thalotia)	pulcherrimus, *Gray*
,,	= mariæ, *Ten. Wds.*
,,	conica, *Gray*
,,	Ramburi, *Crosse*
(Elenchus)	Badius, *Wood*
	iriodon, *Quoy*
(Cantharidus)	tessellata, *Ten. Wds.*
(Bankivia)	varians, *Gray*
(Trochocochlea)	
	concamerata, *Gray*
,,	= Australis, *Ten. Wds.*
,,	multicarinata, *Chenu*
,,	constricta, *Lam.*
	tæniata, *Quoy & G.*
(Euchelus)	baccatus, *Menke*
,,	scabriusculus, *Ad. & Ang*
(Clanculus)	Aloysii, *Ten. Wds.*
,,	undatus, *Lam.*
,,	nodo-liratus, *A. Ad.*
,,	limbatus, *Quoy*
,,	personatus, *Phil.*
,,	variegatus, *Ad.*
(Diloma)	odontis, *Gray*
	Adelaidæ, *Phil.*
	= Australis, *Ten. Wds.*

Genera.	Species.
Family, Stomatellidæ.	
Stomatella	imbricata, *Lam.*
Stomatia (Gena)	strigosa, *Ad.*
Family, Haliotidæ.	
Haliotis	albicans, *Quoy*
	emmæ, *Gray*
	nævosa, *Mart.*
Family, Fissurellidæ.	
Fissurella (Lucapina)	lineata, *Sby.*
	= Incei, *Rve.*
	= M'Coyi, *Ten. Wds.*
	scutella, *Gray*
	nigrita, *Sby.*
	concatenata, *Crosse*
(Macroschisma)	Tasmanica, *Ten. Wds.*

Genera.	Species.
Emarginula	rugosa, *Sby.*
Parmophorus = Scutus	Anatinus, *Donov.*
	= Australis, *Lam.*
(Tugalia)	intermedia, *Ang.*
Family, Patellidæ.	
Sub Family, Acmæinæ.	
Acmæa	cantharus, *Rve.*
	septiformis, *Quoy*
	marmorata, *Ten. Wds.*
	crucis, *Ten. Wds.*
	costata, *Ten. Wds.*
	alba, *Ten. Wds.*
Sub Family, Patellinæ.	
Patella	tramoserica, *Mart.*
	aculeata, *Rve.*
	ustulata, *Rve.*
	decora, *Phil.*

Order, *Polyplacophora.*

(Sexes united in the same individual.)

Family, Chitonidæ.	
Chiton	Australis, *Sby.*
	petholatus, *Sby.*
Chiton.	
(Ischnochiton)	longicymba
Chitonellus (Cryptoplax)	spinosa, *A. Ad.*

Sub-class, *Opisthobranchiata;* Order, *Tectibranchiata.*

Family, Philinidæ.	
Philine	Angasi
Family, Tornatellidæ.	
Sub Family, Tornatellinæ.	
Tornatina	mariæ, *Ten. Wds.*
	fusiformis, *Ten. Wds.*
Myonia	concinna, *A Ad.*

Family, Cylichnidæ.	
Cylichna	arachis, *Quoy*
	pygmæa
Bulla	Australis, *Gray*
	= oblonga, *A. Ad.*
	cymbalum
Family, Aplysiidæ.	
Aplysia	concava, *Sby.*

Order, *Basommatophora;* Sub-order, *Gehydrophila.*

Family, Auriculidæ.	
Marinula	pellucida, *Cooper*
Ophicardelus	cornea, *Sw.*
Family, Amphibolidæ.	
Amphibola (Ampullarina)	fragilis, *Quoy*

Amphibola (Ampullarina)	*Quoy & Desh.*
Family, Siphonariidæ.	
Siphonaria	denticulata, *Quoy & G.*
	zonata, *Ten. Wds.*
	Diemanensis, *Quoy*
	Baconi, *Rve.*

Class Scaphopoda.

Family, Dentaliidæ.	
Sub Family, Dentaliinæ.	
Dentalium	Sp. ?

Class Pelecypoda.

(Chiefly bivalves, animals headless.)

Order, *Siphonida;* Sub-order, *Sinupalliata.*

Genera.	Species.
Family, Gastrochænidæ.	
Sub Family, Aspergillinæ.	
Aspergillum	
	(Humphreya) Strangei, *A. Ad.*
Family, Teredidæ.	
Teredo	
	navalis, *Lin.*
Family, Pholadidæ.	
Sub Family, Pholadinæ.	
Barnea	
	Australasiæ, *Gray*
	similis, *Gray*
Family, Solenidæ.	
Sub Family, Soleninæ.	
Solen	
	vaginoides, *Lam.*
Family, Saxicavidæ.	
Saxicava	
	Australis, *Lam.*
Family, Corbulidæ.	
Corbula	
	tunicata, *Hinds*
	cuneata, *Gould*
Family, Anatinidæ.	
Myodora	
	brevis, *Stutch*
Myochama	
	anomioides, *Stutch*
	Keppelliana, *A. Ad.*
Anatina	
	anserifera, *Spen.*
	creccina, *Val.*
	Tasmanica, *Rve.*
Family, Mactridæ.	
Sub Family, Mactrinæ.	
Mactra	
	depressa, *Sby.*
	pura, *Desh.*
	rufescens, *Lam.*
Family, Paphidæ.	
	(Mesodesma) erycina, *Lam.*
	nitida, *Desh.*
	(Donacilla) elongata, *Desh.*
Family, Tellinidæ.	
Sub Family, Tellininæ.	
Hiatula = Soletellina	
	epidermia, *Desh.*
	vitrea, *Desh.*
	livida, *Lam.*
	biradiata, *Wood.*
	nymphalis, *Desh.*

Genera.	Species.
Tellina	
	(Tellinella) deltoidalis, *Lam.*
	,, mariæ, *Ten. Wds.*
	(Arcopagia) decussata, *Lam.*
Sub Family, Donacinæ.	
Donax	
	epidermia
	Sp. ?
Family, Petricolidæ.	
Rupellaria = Venerupis	
	crenata, *Lam.*
	reticulata, *Ten. Wds.*
	carditoides, *Lam.*
Family, Veneridæ.	
Sub Family, Venerinæ.	
Venus	
	(Chione) strigosa, *Lam.*
	,, aphrodina, *Lam.*
	,, gallinula, *Lam.*
	,, lævigata, *Sby.*
	,, lamellata, *Lam.*
	,, Australis, *Sby.*
	,, roborata, *Han.*
	,, striatissima, *Sby.*
Cytherea	
	(Callista) Victoriæ, *Ten. Wds.*
	,, Lamarcki,
	,, disrupta, *Sby.*
	,, multistriata, *Sby.*
Tivela	
	undulosa, *Lam.*
Sub Family, Meroeinæ.	
Meroe	
	aliciæ, *Ad. & Ang.*
	Sp. ?
Sub Family, Dosiniinæ.	
Dosinia = Artemis	
	grata, *Desh.*
Sub Family, Tapesinæ.	
Tapes	
	galactites, *Lam.*
Family, Cardiidæ.	
Cardium	
	tenuicostatum, *Lam.*
	pulchellum, *Rve.*
	cygnorum, *Chem.*
Family, Chamidæ.	
Chamostrea	
	albida, *Lam.*

Genera.	Species.
Family, Lucinidæ.	
Lucinæ	
	pecten, *Lam.*
	dentata, *Wood.*
	= divaricata, *Lin.*
Loripes	
	icterica, *Rve.*
Family, Erycinidæ.	
Montacuta	
	Sp.?
Lasæa	
	Australis, *Sby.*
Sub Family, Carditinæ.	
Cardita	
	amabilis, *Desh.*
	Gunni, *Desh.*
Mytilicardia	
	excavata, *Desh.*
Family, Trigoniidæ.	
Trigonia	
	margaritacea, *Lam.*
Family, Nuculidæ.	
Nucula	
	Grayii, *D'Orb.*
Leda	
	crassa, *Hinds.*
Family, Arcidæ.	
Arca	
	trapezia, *Desh.*
	fasciata, *Rve.*
Pectunculus	
	radians, *Lam.*
	flabellata, *Ten. Wds.*
Limopsis	
	Belcheri, *Ad. & Rve.*

Genera.	Species.
Family, Mytilidæ.	
Sub Family, Mytilinæ.	
Mytilus	
	latus, *Lam.*
	rostratus, *Dunk.*
	crassus, *Ten. Wds.*
Modiola	
	albicostata, *Lam.*
	nebulosa
Sub Family, Crenellinæ.	
Modiolaria	
	impacta, *Herm.*
	Cumingiana, *Dunk.*
Family, Aviculidæ.	
Sub Family, Aviculinæ.	
Avicula	
	pulchella, *Rve.*
Sub Family, Vulsellinæ.	
Vulsella	
	Tasmanica, *Rve.*
Family, Pinnidæ.	
Pinna	
	Tasmanica, *Ten. Wds.*
Family, Spondylidæ.	
Spondylus	
	Sp.?
Family, Limidæ.	
Lima = Radula	
(Limatula)	bullata, *Born.*
Family, Pectinidæ.	
Pecten	
	Australis, *Sby.*
	bifrons, *Lam.*
(Vola)	laticostatus, *Gray*
Family, Ostreidæ.	
Ostrea	
	edulis (?), *Lam.*

LEPIDOPTEROUS LARVÆ AND THEIR NATURAL MEANS OF PROTECTION.

By C. C. Brittlebank.

(Read before the Field Naturalists' Club of Victoria, 10th September, 1888.)

There is no stage of an insect's life beset with so many dangers as the second or larval stage, and to guard against the extermination of the insects to which these larvæ belong they have been provided by nature with means of protection.

We will take for our first example of this the stinging larvæ of one of our moths, *Doratifera vulnerans.*

It will be noticed, on examining the larva, that it is bright-coloured and of peculiar shape; also that it is destitute of feet properly so called, their place being supplied by a soft, pliable membrane always covered by a kind of glutinous matter. In

walking this larva moves very slowly, and this, coupled with its conspicuous marking, would render it an easy prey to birds, etc. But to guard against extinction the larva has been provided with eight rays or tufts of fine spines placed on small protuberances—four on the two first segments and four on the two last. These rays lie in small grooves when the larva is at rest, but at the least shake given to the tree on which it feeds they are raised ready for attack, and as they are capable of inflicting a sting quite equal to that of the English nettle, they may be reasonably supposed to be protected from the attacks of birds, ichneumons, etc. I believe this larva is very little troubled by birds, but it has enemies amongst the *Hemiptera*, as I often find one of the wood bugs sucking the juices of the larva.

The ichneumons also kill numbers, but not in the larval stage. They appear to know that they are well protected, and therefore wait until they turn to pupa, in which they deposit their eggs; which, on hatching, find at once food and shelter very much at their host's expense. I may safely state that six out of every twelve are destroyed by ichneumons, and if the larvæ were not protected from the attacks of birds, it would soon become very rare, or perhaps extinct. There appears to be some doubt as to whether the poison is injected into the wound through an opening in the spines. Under the microscope it will be seen that the spines are hollow, and contain a brown fluid, but I could not find any opening to let this fluid enter a wound caused by one of the spines. On the points, and as far as the shoulder of each spine, they are covered by a coating of glutinous substance, which, I think, is the irritant matter. It will be noticed by those naturalists who have made the life histories of our lepidoptera a study that there exists a relation between the ichneumons and the larva on which they deposit their eggs. That is, the perfect ichneumons deposit their eggs in that kind of larva in which they themselves passed the first part of their life.

Some larvæ depend for their protection on their colour and form. Among the larvæ of the *Geometrinæ* it will be seen that they greatly resemble in colour the twigs of the tree or plant on which they feed, and this resemblance is also helped by the peculiar way in which the larvæ hold themselves when alarmed. They grasp the branch with the two last or anal feet and hold themselves in a position so as to resemble a twig, and this deception is also helped by two horn-like projections on the first and fourth segments which some of these larvæ possess. So closely do some of these larvæ match the plants on which they live that it is very difficult to discover them, especially one that lives on the sheoak (*Casuarina* sp.). This larva is green, and each segment is marked like one of the oak needles, having the joints and markings exactly represented. It is also

further protected by having the power to suspend itself by a silken thread.

The larvæ of the *Hypochroma* greatly resemble the *Geometrinæ* in their mode of protection. The moth of the larva described is the common variety found on old fences, etc. On the under side of the hind wings there are red markings, which distinguish it from the other species. The colour of this larva is green, darker above than below; it has also a red or pink stripe down either side, and this, I think, represents the mid-rib of the leaves on which it feeds. The construction of the head is also remarkable, it being formed somewhat like a cone. When the insect is feeding, it has the appearance of wearing a fool's-cap, but on being startled it lowers the head, so that the point of the cone is in line with the body, and by folding the pectoral legs the larva has the appearance of a leaf, and it may thus escape the eyes of its foes.

Other larvæ again protect themselves by ejecting a volatile oily fluid. Amongst these is that of the *Papilio Erectheus*, a Queensland species. This splendid papilio has contracted a habit somewhat like our vine moth, *Agarista glycine*, but not quite in such a marked degree, of depositing its eggs on one of our introduced trees, viz., the orange, to which it does no small amount of damage. The larva, on being touched, thrusts out a pair of glands or horns, from which it pours a volatile oil, covering all the upper surface of the larva, and as this oily fluid flows between the segments it effectually keeps at bay those insects that would deposit their eggs in or on this larva. This oil may also protect the larva from birds, as it has a very powerful odour and a most disgusting taste.

We will call attention to the larvæ belonging to some of our sphinx moths. Some of these larvæ have two eye-like spots on the back. On being alarmed, they assume the position from which they take their name, and by so doing bring the spots into full view from above and in front. This may be a protection from birds, as they might mistake the markings for real eyes, and be afraid of attacking so fierce an insect as this larva appears to be. Birds generally seize a grub or insect by the head, and as the head of the larva is drawn into the folds of the first segments, the birds might take these larvæ for some other animals with which they are not acquainted. I do not say for certain that these eyelike markings are used as a protection against birds, but on looking at the bright colouring and the nakedness of these larvæ, together with their great size, and then at the little protection these larvæ appear to have, one cannot but look on these markings as a means of protection, at least from the attacks of birds. I think these larvæ suffer very little from the attacks of ichneumons. I have not yet found one destroyed by these insects. It would be interesting to know

whether there is an ichneumon found in Victoria which attacks our sphingidæ, either in the larva or pupa stages. It will be noticed that some of these pupa appear to be but poorly protected, as many lie on the surface of the ground at the root of the tree or plant on which they feed. Their covering, being sometimes dead leaves and other rubbish held together by a few silken threads, forms but a slight protection against the ovopositors of ichneumons, since we find hard cocoons, and even those larvæ which live in the interior of trees, pierced by these insects, which, by their constant attacks on lepidopterous and other larvæ, keep in check what might otherwise become a pest.

RECOLLECTIONS OF MY RESIDENCE IN NORTH-WEST AUSTRALIA.

By a Non-Naturalist.

(*Continued from Page* 104.)

The country consists for the most part of plains covered with spinifex *(Triodia irritans)* and desolate ironstone hills, and is consequently of a most uninteresting character. To most of you spinifex is, I expect, known only by name, but if any of you are desirous of having a little practical experience of what it is like in its native state, let me recommend you to try the north-west plains, and I will guarantee you will soon have had enough of it. I have never yet come across the man who could truthfully say he liked travelling through spinifex country. Spinifex, at its best—or, I should rather perhaps say its worst, which is generally in the height of summer—is a natural history object to be most carefully avoided. I think there must be several species of this grass, for some are not so high and strong as others, and on the young shoots of these the north-west sheep have learned at certain seasons to exist, a thing they certainly would not have attempted to do if there was anything of a more inviting nature, thus showing what a poor country it is for pastoral purposes. There is also plenty of small scrub, as well as numerous shrubs, and in the river beds large timber; but by the expression river beds you must not understand there are actual rivers, as sometimes for years there will be no water in them except in the deep holes. In these holes there are always plenty of fish, but I do not know the names of any of them. The cajaput, a paper-bark tree, is plentiful, and comes in very useful to the settlers for building and other purposes. Of ferns I have seen but two species, and even of these only a small quantity, one being the maiden-hair fern so common in Victoria.

Of the animals, birds, reptiles, etc., of the north-west, the second are, of course, the most numerous, but I think they are almost equalled by the reptiles. These abound everywhere,

but fortunately very few of them are venomous, and I have never heard of a white man dying from the effects of a bite, but I believe there are occasional instances amongst the blacks. These vary in size from three or four inches to as long as eighteen feet, and at one place on a flat where I was for a time living I used to dig them out of the rat holes every morning. With the natives snakes form a portion of their regular food, and they generally pound the flesh between two stones after it is cooked. I have often eaten snake, but cannot say I like it. It is white, and rather tough, with no particular flavour that I can liken it to. Perhaps the native method may make it more palatable, but I have never tried it. Iguanas are also plentiful, some being very large, the largest I ever saw being about eighteen feet long. This was on an occasion when I was out sheep-hunting with a companion, and we had hobbled the horses, and whilst I was preparing our meal of damper my companion was giving the horses a drink at a small waterhole, when he suddenly gave a most terrific shriek, and, starting up to see what was the matter, I was confronted by this monster iguana, who raised himself on his legs to his full height, some fifteen or eighteen inches, and commenced making tracks, but not until I had had a shot at him, which, however, took no effect, and as we had at once to give our attention to the horses, which had received a considerable fright, he had time to get into the thick scrub, where, of course, further pursuit was almost impossible.

Kangaroo and wallaby are, of course, very common. The native methods of capture are to gradually work up to them from leeward, and when close enough spear them; and sometimes they will be found asleep, when their fate is quickly sealed. Occasionally they will put up a shade, to which a kangaroo will get into the habit of regularly using, and when he has done this the native will have no trouble in securing him.

Emus are also common enough, and to capture them the natives will sometimes build a yard round a waterhole, with one entrance, and when the birds come to water they are easily speared.

The animal that used to interest me the most was the cat—not the native, but the domestic one. It is an impossibility to keep them long about a place, as they instinctively take to the bush, and become not only very wild, but with each succeeding generation increase greatly in size, and I can assure you they are animals you have to be very careful in tackling. Once when I was out riding after kangaroo one of these monster cats suddenly jumped out of a tree right in front of my horse, and so fierce did he look that I got out of his road as quickly as possible. I was once a spectator of a contest between a

monster cat and an eaglehawk for a spinifex rat, but being in a hurry I could not stop to see how it ended, but should be disposed to think the cat had the best of it. Whether they will continue to increase in size until they become a large and formidable animal I cannot say, but I do know that even at present I would much rather avoid than enter into a contest with one.

Of aquatic birds there are plenty of pelicans and ducks, and a few black swans. Other birds are numerous, such as turkeys, cockatoos, pigeons, etc. Of the cockatoos there are several species, some being white and having no crest, while others are black. Of pigeons there are what are called plain, and which can often be seen in flocks of a thousand, also the bronze wing and a whistling pigeon. There is also a very small and pretty partridge. This is very numerous all over the plains, and, indeed, so common is it that it may frequently be seen in numbers even in the townships.

Turkeys are caught by building a yard round a waterhole. The natives then scoop out a hole just sufficiently large for the turkey to get a drink, and then put sticks in front and a net over them. To hide themselves they build a shelter in the spinifex, from which as soon as the turkey comes to drink they rush out and knock it over with a stick, or wogga burra, as they call it, but you will easily understand they have to be pretty quick about it.

Pigeons are caught much in the same way, but no sticks are used. In the Kimberley the plan adopted is to cut a lane through the scrub to the water. Down this lane the pigeons are sure to come in the evening, and the natives, being concealed in the scrub at the sides, knock them down with sticks, but this plan not only requires a deal of patience, but a quick eye and quick action. I must not omit from my list of birds the common crow, as I have a respect for him, from an eating point of view, which I do not think he possesses in Victoria. They are numerous enough, and I can assure you make a better and sweeter meal than many a bird with a much higher reputation. I, of course, do not refer to the crow after he has become civilised by station life, but whilst he is still an innocent bush bird, living principally on seeds and fruits, of which the nalgo is his favourite, and at the time of the year when these are plentiful the flesh is very delicate, with a most pleasant flavour. The nalgo* is a small bulb, not quite so large as a common pea, and after a rainy season it is very abundant.

Of the many roots eaten by the natives, some are very good indeed, as I know by experience, but unfortunately I know only the native names, which would, of course, convey no information to you. Kanjamurrah is the name of one. It is a root of about nine or ten inches long, and tastes something not unlike a

* *Marsilea.*—Ed.

parsnip. It is eaten raw, or cooked in the ashes, but is very good either way.

I should have much liked if I could have given you more explicit particulars of the natural history of the north-west, but as I cannot do so for want of names, I will endeavour to attend one of your meetings when I may, perhaps, be able to answer questions which will throw a better light on the subject.

CORRESPONDENCE.

To the Editor of the Victorian Naturalist.

SIR,—It may be interesting to many of your readers to hear that in taking the eggs of the blue reef heron *(Demiegretta jugularis)*, I have, I think, had the satisfaction of proving that bird to be identical with the white reef heron, the *Demiegretta Gregi*, of Gould.

The nest was on a small, rocky island, about an acre or so n extent, to which I waded with some difficulty, and after examining a number of nests and eggs of *Bruchavia Jamesonii*, *Larus pacificus*, *Eudyptula minor*, and *Hœmatopus fuliginosus*, I flushed a blue reef heron from a corner of the island, and after a while found the nest, with three eggs, most carefully concealed under over-hanging herbage and a shelving rock.

On looking up I noticed that a white reef heron had joined the blue one; so, taking up a position behind some rocks, I watched the birds.

After a short time I observed the blue bird made towards the nest, but was very undecided in its movements, first advancing, then retreating, the white bird all the while, in a great state of excitement, endeavouring to stop the other from venturing near the nest.

Having watched them for some time, I left my cover and took the eggs, which were "hard set," and of the usual colour and size. The nest was rudely built of dry tussock grass, and flat in shape.

These two were the only herons on the island, and there was no other island within many miles.

I have, ever since first discovering them as new to Tasmania, been inclined to look upon them as distinct species, but now feel convinced that they are identical, the white bird being merely an albino or variety of the blue; and that in this instance they were a pair, the white being the male, the blue the female. My brother, the Rev. H. D. Atkinson, of Circular Head, who was with me, fully concurred in this opinion.—I am, sir, yours faithfully,

E. D. ATKINSON.

Table Cape, Tasmania, 12th November, 1888.

Field Naturalists' Club of Victoria.

President :

A. H. S. LUCAS, M.A., B.Sc.

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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NOTES OF A VISIT TO THE JENOLAN CAVES, NEW SOUTH WALES.

By F. G. A. Barnard.

(*Read 8th October*, 1888.)

The following notes of a recent visit to the Jenolan Caves and district are offered more with the view of giving our members some idea of what they may expect to see should they ever have the opportunity to visit this Australian wonder-land than of attempting to adequately describe the many beautiful and mysterious shapes and forms resulting from the action of moisture on limestone.

These caves, formerly known as the "Fish River Caves," from the usual route taken to reach them, though they are on the other side of the Great Dividing Range to the Fish River watershed, and also as the "Binda Caves," from being situated in a spur of that mountain, are now known as the "Jenolan Caves," from the district in which they are situated. This name is said to have been obtained by leaving out the full stops in the name of Mr. J. E. Nolan, the original surveyor of the district. This adaptation of a name, it seems to me, would be a very happy one to adopt in many cases, and would save our maps from becoming crowded with persons' surnames who have no particular claim to be immortalized—being, by this plan, still recorded, but to a certain extent hidden from view. To my mind the name "Jenolan Caves" is far preferable to "Nolan's Caves," as they might have been called had the usual plan been adopted. But I am wandering from my subject, and before getting our first glimpse of the "Grand Arch" you must permit me to make some remarks on the journey from Sydney, the necessity for which you will see presently.

Besides the business meetings of the Australasian Association for the Advancement of Science recently held in Sydney, a number of excursions to places of interest were arranged. Among these were the Jenolan Caves. Along with some nine or ten others, I put down my name for what I expected would be a very interesting trip, as some good names appeared on the list as

leaders. However, on getting to Redfern (Sydney) Railway Station shortly before nine on the morning of Friday, 31st August, I was much disappointed to find only two other gentlemen intended venturing on the trip, one of them being Mr. S. E. Wills, a fellow-member of our club, our companion being a gentleman from Scotland.

There are three ways of reaching the caves, which are situated, as the crow flies, about 70 miles due west of Sydney. Firstly, by railway to Katoomba, 66 miles, and thence 27 miles on horseback. Secondly, by railway to Mount Victoria, 77 miles, and coach thence 36 miles. Thirdly, by railway to Tarana, formerly called Fish River, 120 miles, and coach *viâ* Oberon, 35 miles.

Our route was planned out for us by the Association to go *viâ* Tarana, and return *viâ* Mount Victoria, which I certainly think is a very interesting one, as it embraces some of the finest scenery in New South Wales.

We left Sydney at 9 a.m. on a very warm morning, and as we passed through Parramatta a regular hot wind was blowing. However, the air became cooler as we ascended the Blue Mountains; but our views of the country, as we travelled along, were greatly spoiled by the dry appearance of the vegetation, owing to the long-continued drought, from which almost every part of New South Wales was suffering. Several pretty wild flowers were growing alongside the line, *Acacia discolor*, *Boronia pinnata*, and several others, being conspicuous by their yellow, pink, and white flowers. Soon after leaving Wentworth Falls, the traveller begins to get glimpses of the great perpendicular sandstone cliffs so characteristic of the Blue Mountains. Passing through the Clarence Tunnel, where the train was travelling at a height above the sea level of 3,600 ft., equal to the top of our Mount Macedon, the great Zigzag at Lithgow Valley, the termination of the Blue Mountains was reached in due course. From here the ordinary tourist usually returns by rail to Mount Victoria; but if the drive *viâ* Bowenfels and Hartley to the mount be taken, some magnificent scenery is passed through. Our destination was Tarana, some twenty-five miles further. Before reaching this we crossed the main dividing range, near Rydal, at about 3,220 ft., and entered the watershed of the rivers flowing into the Darling, and were now on the edge of the famous Bathurst Plains.

On arrival at Tarana, about 4 p.m., we found vehicles waiting to convey our supposed party of nine to Oberon (eighteen miles); but as only three had come up we were not crowded. The road takes a southerly direction, up and down some rather steep hills, passing chiefly through sheep stations. Evan's Crown, some remarkable bosses of granite on the top of a hill away to our left, the crossing of the Fish River near Mutton's Falls, and the Dog Rocks, also of granitic formation—close by which we passed—were almost

the only objects of interest, except the distant views of the mountains before daylight disappeared. The road seemed afterwards to pass through some fair scenery, but it was too dark to make out distinctly. As we neared Oberon the reflections of bush fires were seen in several directions.

We reached the Royal Hotel at about 7.30 p.m, and again found provision made for the mysterious nine; so there was no lack of good things. We spent a very pleasant and comfortable evening here, and heard a good deal about the wonders we were to see on the morrow.

Next morning broke with heavy rain, and as we started from Oberon about 9 a.m. in a four-horse coach it was still raining. Near the township several nice farms were passed; the road takes a south-easterly course, crossing the Fish Creek and Fish River, and winding along the hillsides, till it finally crosses the main dividing range at 4,120 ft. above the sea. Here we passed for some time through a snowstorm, which, to a Melbournite like myself, was at least a novelty. We now began to descend, and as the weather cleared up we were able to get some magnificent views of the country. About two miles further, when on the side of a spur, our driver pointed out the galvanized iron roof of the Cave House, some 1,200 ft. almost straight below us, but to reach it we had to traverse three miles of steep zigzag road down the end of the spur, arriving at our destination just in time for lunch. The views at each turn of this road were very fine, and were well worth all the discomforts of the journey; and should any of our members visit the caves by the Mount Victoria route, which does not touch this road, I would advise them to take a three-mile walk up this hill, as, though the gradient is rather steep (about 1 in 4), they will be amply repaid for their trouble.

Some remarks about the formation of the country will here be necessary, in order to enable you to understand my future details. The Cave House is situated in a deep, narrow valley, running east and west, and when I say the sun sets to the residents some three or four hours before it does to the tops of the surrounding hills, you may perhaps get some idea of the steepness of the sides of the valley, which is only about a quarter of a mile long. The western end would be blocked by a narrow ridge connecting the sides if it were not for the "Grand Arch," an immense cavern running right through the hills, being about 120 yards long, 70 ft. at its highest, and 200 ft. at its widest parts. The eastern entrance is about 50 ft. wide and 30 ft. high, and the western 150 ft. wide and 120 ft. high. As the Mount Victoria road terminates on the hillside, on the other side of this arch to Cave House, travellers by that route make their first acquaintance of the caves by carrying their luggage or leading their horses through this great chamber to the accommodation house or temperance

hotel. As the Government, in reserving the locality, have prohibited the sale of any intoxicating liquors, visitors have therefore to take their own comforts with them. The floor of the "Grand Arch" is strewn with immense blocks of limestone, which have evidently fallen from the roof and sides as their supporting stones have been worn away during long ages by the action of a running stream, which in those times must have been much larger than the one which now finds its way through the cavern. Though apparently dark on entering, the cavern is fairly lighted, being open at each end, and one soon gets accustomed to the subdued light, as also to the hollow sounds caused by striking the stones against one another.

On turning round to the left at the western entrance the visitor enters a similar cavern, but of far larger proportions, called the "Devil's Coach-house." This is said to be 500 ft. long, 400 ft. wide, and 275 ft. high, a cavern which would easily contain such a building as the Scots' Church, in Collins-street, spire and all. Here also are immense blocks of limestone, some whose sides must measure 30 ft. or 40 ft., lying in all sorts of positions, some leaning against others, so that there is a sufficient space for one to walk upright between them. In the roof of this cavern, or, as it is now called, the Eastern Cave, is a large hole, open through to the surface of the hill, and with its fringe of shrubs and grass forms a very pretty sight. In flood time M'Ewan's Creek rushes through this cave, and as it tumbles and twists among the rocks what a clatter it must make; but at ordinary times it disappears some two miles up the valley, and, continuing a subterranean course, reappears about 20 yards below the Coach-house, where the Camp Creek, flowing through the Grand Arch, joins it, and, forming the Jenolan Creek, eventually finds its way into the Nepean and Pacific Ocean.

Perhaps the next point of interest and wonder in the outer sights of the district is the "Carlotta Arch." This is a natural arch situated on the top of the ridge, which, were it not for the two caverns just mentioned, would form a huge stone dam across the Camp and M'Ewan's Creeks. This arch is about 60 ft. high, 40 ft. wide, and 20 ft. through, and the view looking through this down the valley below the "Grand Arch," over which we are now almost standing, is lovely in the extreme, the gray limestone rocks forming a natural picture frame to the wooded landscape.

Close by is the entrance to the Elder and Arch Caves, which latter also opens into the Devil's Coach-house. A path leads up over the top of the Carlotta Arch, where it is only a couple of feet wide, and at least 100 ft. above the hill. Wire-rope handrails have been provided by the Government in order to prevent accidents, and several dangerous openings in the hillside have likewise been protected with railings or gratings. The view from the

top was, as might be expected, very fine, extending over a great expanse of wooded ranges and deep valleys.

Having given you a brief sketch of the sights accessible to any visitor, I will now attempt to briefly describe some of those which cannot be seen without a guide. The original discovery of the large caverns is said to have been made about 1830, but for many years nothing was known of the beautiful sights hidden away in the sombre hillsides. At last one or two venturesome persons explored some of numerous openings, which are everywhere, and their wonders gradually attracted attention. The leader of most of these explorations was Mr. J. Wilson, through whose persistent efforts the Government at last reserved the locality, and in 1868 appointed him to the post of curator, which he still ably fills. The caves have thus been secured from the depredations of sight-seers, before whose hands some of the stalactites were beginning to vanish. It must not be supposed that all the wonders have yet been found, as new openings and caves are continually being made known, and perhaps the famous Imperial and Lucas Caves may yet be excelled.

Visitors are taken into the cave at 10 a.m. and 3 p.m. daily, and new arrivals have to go wherever the senior visitors are going. Thus it fell to our lot at 3 p.m. on the Saturday afternoon to visit the right-hand branch of the Imperial Cave, which is considered the gem of the series. The entrance gate to this is reached by a steep flight of steps, some 20 ft. or 30 ft. above the floor of the Grand Arch, and near its western entrance. This cave is partly lighted by electricity, incandescent lights being used, and to give you some idea of the extent of the galleries, about 2½ miles of double wire were used for the right-hand branch alone. The wire is, of course, insulated, so there is no danger from touching it, and is arranged in sections so that the guide turns it on and off as he proceeds; there are also a number of switches situated near special features, so that he can attach a portable electric lamp, and thus throw additional light on the subjects. This branch of the Imperial Cave reminded me very much of the drives in a mine, but of course was more irregular in shape, being a succession of passages from chamber to chamber, principally about the same level, but twisting and turning in every direction. One of the first sights is the Shawl Cave, so called from a most beautiful form taken by the limestone, which resembles a number of shawls hanging from the roof, some creased in folds, others smooth, some variegated with lines of colour produced by the infiltration of iron. These are only about an inch thick, and, being semi-transparent, when the lamp was shown behind them a very pretty effect was produced. The Coral Grotto appears as if its walls were still in their original coralline structure. Passing on, new beauties unfold at

every turn. The Grand Stalactites comprise a series of stalactites of all sizes, from those only as large as a penholder to others as thick as an ordinary telegraph pole. It is impossible to mention even the names of half the wonders of this underground fairy land. Here "Lot's Wife," one of the finest white stalagmites in the caves, stands in all her purity; but unfortunately, like many other sights, it is partially obscured by wire netting which it has been found necessary to fix near special objects to keep visitors' fingers from picking and stealing. The "Alabaster Column," some 2 ft. in diameter; "Nelly's Grotto," a pretty little cavity guarded by a row of stalactites and stalagmites; the "Mysteries," where small stalactites stand out at right angles; the "Crystal Palace," the "Fairy Bower," and the "Vestry," are more of the wonders of Nature, here seemingly outdoing one another, so that it is hard to say which one prefers. In "The Queen's Diamonds" the limestone has crystallized in most beautiful forms on the wall of a little opening. The "Gem of the West" once seen can never be forgotten—a bunch of the purest needle-shaped stalactites, hanging from a projecting ledge. Another beautiful sight is the "Fairies' Retreat," which can only be visited by one person at a time crawling through a small tunnel in the wall, but it is worth any amount of trouble—roof, sides, floor, all covered with the purest brilliants reflecting the light of the electric lamp from their thousand sides. Having spent over two hours among these crystal palaces and weird scenes we returned to outer air. We found the cave much drier than we expected, though water could be seen dripping in many places—this, I was somewhat surprised to find, had no taste of lime. The guide said that no appreciable change in the size of the stalactites, &c., has been noticed since the caves were first discovered. I ought to mention that the Government have spent a considerable amount of money in making the caves easier for visitors by enlarging passages, building steps, constructing bridges, fixing ladders, &c., so that ladies and children can go through most of them with comparative ease. Of course great care has been taken not to damage any of the sights. The temperature was very even, being about 63°, and there was no oppressive feeling in walking along; this must be due to cracks and rifts in the rocks leading to some of the numerous openings in the hillsides, allowing free circulation of air, though at no point did we feel any draught.

On returning to Cave House we were much exercised as to how to get another glimpse at the caves, as no person is allowed in on Sunday, and we were timed to leave for Mount Victoria at eight on Monday morning. However, on representing to Mr. F. Wilson, who was then in charge, that we were the excursion party from the Australian Association, and that it was through no fault

of ours that we had arrived at midday on Saturday, he kindly allowed the guide to show us over the Lucas Cave after tea.

Accordingly, about 8 p.m. we sallied forth, and having obtained our candles—for this cave is not yet provided with the electric light—we ascended the hill over the Grand Arch, and, turning to the right and continuing along the hillside, where a false step would have sent us hundreds of feet into the valley below, came to the gateway of the Lucas Cave. This cave we at once found was of quite a different character to the one we had explored in the afternoon. Here everything was on a large scale. The first chamber, the "Cathedral," is some 200 ft. high and vast in proportion. Our general route was descending from one chamber to another. Presently we came to the "Broken Column," one of the finest and most awful sights in the whole of the caves. This is an immense white column which has been broken across some 2 ft. from its base, owing to the rock on which it rested giving way, and this tilting a little, the base is now at an angle with the upper part, so that no deposit of lime can ever unite this unique sight. Near by is another but smaller column, which has a space between its upper and lower parts of about an inch, which may in time be repaired, as a thin needle of lime now unites the two portions. Descending still deeper, we at last came to a bridge over a dark pool, said to be 900 ft. below the surface of the hill. This cave extends through the hill at the back of Cave House, and, it is said, an entrance could be made into it by less than twenty yards of driving. Here we were shown the small passage from which the model in the Exhibition was taken, and, as far as I can recollect, it is a very good representation. It is needless to say that it would be quite impossible to model any of the lovely shawls, curtains, &c.; to see these it is necessary to go to Jenolan. We found the Lucas Cave much warmer than the Imperial, which may perhaps be accounted for the extra exertion necessary to see it, owing to the great amount of climbing or descending required to be done. There were also shawls, &c., here, but not nearly so beautiful as the Imperial. In the "Lurline Cave" many of the stalactites point obliquely down, showing that there must have been great subsidences here at some remote period. The "Field of Potatoes" was rather curious—a bank covered with round knobs, like so many potatoes strewn about. Now came one of the longest stalactites yet seen, about 11 ft. from the roof to its tip. Journeying on, we came to a point where our guide asked whether we would return by the way we came or do a stiff climb of a hundred feet or so. We chose the latter, and were surprised in a few minutes to find ourselves at the entrance gate. To see this cave properly, the guide burns magnesium wire in a special apparatus, which, giving a light of a pure white colour, is very much better than electricity, but the

latter is a great improvement on candles for travelling by. Groping our way back along the hill, we were not sorry to turn in, about half-past ten, well satisfied with our day's sight-seeing.

Next morning, Sunday, broke beautifully fine, and as nothing could be done underground, a Government inspector of works at present engaged at the caves kindly offered to conduct us to several of the outside sights. We first of all visited the Carlotta Arch, which I have already described, then made our way up the dry, rocky bed of M'Ewan's Creek for about a mile and a half, past the entrance to the Mammoth Cave, which, as its name implies, is very large, but as it is very rough and contains no particular groups, is little visited. In this the underground course of the creek can be reached with some trouble. On the opposite side of the valley, some 80 ft. or 100 ft. above the flat, our conductor pointed out an opening in the rocks, up to which we climbed. This is known as M'Ewan's Hole, from a bushranger who is said to have lived here for several years, so securely as even to cultivate a little land in the valley below. This is now the resort of numerous wallabies, who seem to have found a paradise in these hills, the stones at the entrances to the various small caves being beautifully polished by the constant hopping over them of these interesting little animals. We spent some time scrambling about in the semi-darkness of the numerous twists and turnings of this undoubtedly formerly inhabited cave. It was owing to the discovery of this place that further explorations were made, and the Jenolan Caves became known as one of the sights of Australia. In the crevices of the rocks here I obtained specimens of a fern new to me, I fancy a *Lindsayea*, which I hope to exhibit at some future meeting when it becomes reconciled to its Victorian location. We returned over the hill, and struck the Oberon-road near the last turn of the zig-zag. After lunch our friend took us through the "Grand Arch" to the spot where the underground river reappears, then to the waterfall, a pretty spot, but very difficult for the pedestrian to pass; however, the Government are now providing steps and a handrail. Growing on the rocks here numerous specimens of *Dendrobium* and *Sarcochilus* (epyphital orchids) were seen. Wandering down this creek, some fifteen varieties of ferns were noticed; here the maiden-hair fern was over two feet in height, and *Adiantum hispidulum* equally fine. After doing a couple of miles of as rough travelling as any tourist could wish for, and gathering a large bunch of splendid watercress for the tea-table, we made our way up the steep hillside to the Mount Victoria-road, and through the Grand Arch home.

Having found that it would be no gain to start so early for Mount Victoria, we determined to put it off till midday, and make a hurried visit to the left-hand branch of the Imperial Cave, which

is perhaps not quite so beautiful or nearly so extensive as the other branch, but still contains many beauties; in fact, the finest shawls are in the "Lucinda Cave." These it was long before we could leave, the formation being apparently so wonderful; then more "mysteries"—how water can crystallize in a horizontal position, or twist and curl, is beyond my powers of thought. Here was a beautifully draped window, the curtains being worked in solid limestone, "brides' veils," "The Madonna and Child," a statuette of pure white, and many other beautiful sights. But I must hurry on, or you will be tired of my paper. We finished our exploration of the caves with a visit to the "underground river," which properly belongs to the right branch. This is reached by descending a well-like opening on a rope ladder some 40 feet long. At the bottom flows a clear stream, reflecting on its unruffled surface the arching roof and hanging stalactites above it. Fish were seen here (these are not sightless, as many cave fish are said to be), though no fish are found in the creek below the caves. Attempts have been made to explore this underground stream, but the roof and floor approach so closely in some places that it is impossible to get along. This morning we had a lady in the party, who was deterred by nothing, and even visited the underground river.

Our time for departure was now at hand, and, packing up our luggage, we made our way for the last time through the Grand Arch, to the buggy waiting for us on the Mount Victoria-road, and soon started on our 36-mile drive, and bade adieu to the Jenolan Caves. The commencement of this road is a splendid piece of siding, and for five miles gradually ascends the side of the range, making many sharp curves, until it reaches the crest of the main divide, where, near Mount Binda, one side of the road drains to the Pacific Ocean, the other to the Murray and Southern Ocean. About here the track to Katoomba branched off to our right. Our road was a good bush track, and our pair of horses made very light work of it. At many places we obtained fine views of the surrounding country, especially as we approached the valley of the River Cox. Crossing this we were soon in the long ago named Vale of Clwydd, and travelled along the old Bathurst-road, through the old town of Hartley, the scene of many a stirring sight in bullock-team days, but now almost deserted. We now came to the Victoria Pass, a famous road made by Sir Thomas Mitchell and his convict gangs over fifty years ago. It will take us long to forget the beautiful effects produced by the setting sun on the rocky sides of Mount York and the Kanimbla Valley—scenes which would require the brush of an artist to do them justice, and even then the colours used might be thought unnatural by a large number of persons. This road should certainly be traversed by every visitor to Mount Victoria, and as it is not two

miles from the township it is easily accomplished. With our arrival at the Imperial Hotel, at Mount Victoria, about half-past six on the Monday evening, ended our trip to the Jenolan Caves.

As I have already occupied your attention, I fear, with too many details, I will not say much about our trip on the following day, one which, however, should be omitted by no visitor to the district, as it gives rise to such bewildering thoughts about these wonderful Blue Mountain gorges. Briefly summarized, it was a flying visit to Mount Paddington and the Kanimbla Pass and cave before breakfast; then the 22-mile drive from Mount Victoria, *viâ* Govett's Leap—a sight the grandeur and immensity of which no description I have yet read does more than partially convey to the reader's mind; and on past the "Explorers' Tree," recording the gallant attempts of Messrs. Blaxland, Lawson, and Wentworth to cross these mountains for the first time in May, 1813; through Katoomba to the Wentworth Falls and Prince Regent's Glen, a truly lovely spot. At Wentworth Falls station you can take the afternoon train, and reach Sydney by six p.m.

LIST OF VICTORIAN HYDROIDA.*

By W. M. Bale, F.R.M.S.

1. Allman.—Report on the "Challenger" Hydroida. First part, Plumulariidæ. London, 1883.
2. Bale.—Catalogue of the Australian Hydroid Zoophytes. Sydney, 1884.
3. Kirchenpauer.—Nordische Gattungen und Arten von Sertulariden. Hamburg, 1884.
4. Von Lendenfeld.—The Australian Hydromedusæ. Proceedings of the Linnean Society of New South Wales, 1885.
5. Allman.—Description of Australian, Cape, and other Hydroida. Linnean Society's Journal, 1885.
6. Bale.—The Genera of the Plumulariidæ, with observations on various Australian Hydroids. Royal Society of Victoria, 1886.
7. Bale.—On some new and rare Hydroida in the Australian Museum collection. Proceedings of the Linnean Society of New South Wales, 1888.

* This list includes all the species of Hydroid Zoophytes hitherto recorded from the coast of Victoria, and from the adjacent waters of Bass Strait. The reference numbers apply to the appended list of recent publications on Australian species, which includes all those of later date than the Catalogue of the Australian Hydroid Zoophytes. All necessary references to earlier works are given in the Catalogue, and I have not thought it desirable or useful to extend this list by inserting them here. Synonyms, also, are only given where they are of recent determination.

ELEUTHEROBLASTEA.

HYDRIDÆ

Hydra oligactis, Pallas (2).—Melbourne.

GYMNOBLASTEA.

TUBULARIIDÆ

Tubularia Ralphii, Halley (2).—Hobson's Bay.

EUDENDRIIDÆ

Eudendrium generale, von Lendenfeld (4).—Port Phillip.

CORYNIDÆ

Sarsia radiata, von Lendenfeld (4).—Port Phillip.

ATRACTYLIDÆ

Dicoryne annulata, von Lendenfeld (4).—Port Phillip; Port Jackson.

CALYPTOBLASTEA.

CAMPANULARIDÆ

Campanularia marginata, Bale (2, 7).—Queenscliff; Portland.
Campanularia tincta, Hincks (2).—Port Phillip; Portland.
Campanularia caliculata, Hincks (7).—Port Phillip.
Obelia geniculata, Lin (2).—Port Phillip.
Monosklera pusilla, von Lendenfeld (4).—Port Phillip.
Eucopella campanularia, Von Lendenfeld (2, 7).—Port Phillip.

LAFOEIDÆ

Lafoëa fruticosa, Sars (2).—Bass Strait.

LINEOLARIDÆ

Lineolaria spinulosa, Hincks (2).—Port Phillip; Portland.
Lineolaria flexuosa, Bale (2, 6).—Williamstown; Port Phillip.

HALECIIDÆ

Halecium (*? tenellum*, Hincks).—Port Phillip

SERTULARIIDÆ

Sertularia operculata, Lin (2).—Southern Coast, common.
Sertularia bispinosa, Gray (2, 6).—Warrnambool.
[*Dyphasia symmetrica*, Von Lendenfeld (4).]
Sertularia trispinosa, Coughtrey (2).—Warrnambool.
Sertularia Maplestonei, Bale (2).—Portland.
Sertularia bidens, Bale (2).—Queenscliff; Williamstown.
Sertularia australis, Kirchenpauer (2, 6).—Williamstown; Sealer's Cove.
Sertularia elongata, Lamouroux (2, 5).—Southern Coast, very common.
Sertularia unguiculata, Busk (2).—Southern Coast, very common.
[*Desmoscyphus unguiculata*, Allman (5).]
Sertularia geminata, Bale (2).—Queenscliff; Portland.
Sertularia flexilis, D'A. W. Thompson (2).—Sealer's Cove.

Sertularia tridentata, Busk (2).—Bass Strait, 45 fathoms.
Sertularia macrocarpa, Bale (2).—Portland; Queenscliff; Williamstown.
Sertularia divergens, Lamouroux (2).—Williamstown; Portland.
Sertularia tenuis, Bale (2).—Williamstown.
Sertularia bicornis, Bale (2).—Queenscliff.
Sertularia acanthostoma, Bale (2) —Belfast.
Sertularia crenata, Bale (2).—Schnapper Point.
Sertularia tuba, Bale (2).—Portland; Queenscliff.
Sertularia minima, D'A. W. Thompson (2, 5, 6).—Portland; Williamstown; Queenscliff.
Sertularia minuta, Bale (2).—Sorrento.
Sertularia loculosa, Busk (2, 6).—Portland; Queenscliff; Bass Strait, 45 fathoms.
Sertularia irregularis, Von Lendenfeld (4).—Port Phillip.
Sertularia orifissa, Allman.—Bass Strait.
[*Desmoscyphus orifissus* (5).]
Synthecium patulum, Busk (2, 7).—Queenscliff; Williamstown; Bass Strait, 45 fathoms.
Diphasia subcarinata, Busk (12).—Queenscliff; Williamstown; Griffiths Point; Portland; Bass Strait, 45 fathoms.
Sertularella polyzonias, Lin (2).—Williamstown.
Sertularella microgona, Von Lendenfeld (4, 7).—Port Phillip.
Sertularella trochocarpa, Allman (5).—Bass Strait.
Sertularella indivisa, Bale (2, 7).—Hobson's Bay; Queenscliff; Portland.
Sertularella solidula, Bale (2, 7) —Queenscliff; Williamstown.
Sertularella macrotheca, Bale (2).—Griffiths Point.
Sertularella lævis, Bale (2).—Williamstown.
Sertularella pygmæa, Bale (2).—Queenscliff; Griffiths Point; Portland.
Sertularella Johnstoni, Gray (2, 6).—Queenscliff; Portland.
Sertularella infracta, Kirchenpauer (3, 6).—Hobson's Bay; Bass Strait.
[*? S. divaricata* or *S. Johnstoni.*]
Sertularella sub-dichotoma, Kirchenpauer (3).—Bass Strait.
[*? S. divaricata, var. sub-dichotoma*, Bale (7).]
Sertularella reticulata, Kirchenpauer (3).—Bass Strait.
Sertularella divaricata, Busk (2).—Bass Strait.
Sertularella neglecta, D'A. W. Thompson (2).—Queenscliff; Portland.
Thuiaria lata, Bale (2).—Griffiths Point; Queenscliff.
Thuiaria fenestrata, Bale (2, 7).—Port Phillip Heads.
Idia pristis, Lamouroux (2).—Griffiths Point.
[*Diphasia rectangularis*, Von Lendenfeld (4).]

PLUMULARIIDÆ

Plumularia campanula, Busk (2, 7).—Portland; Williamstown; Bass Strait.

[*P. laxa*, Allman (1); *P. Torresia*, Von Lendenfeld (4).]

Plumularia Buskii, Bale (2).—Griffiths Point.

Plumularia setaceoides, Bale (2, 7).—Williamstown; Queenscliff; Portland.

Plumularia setacea, Ellis (7).—Port Phillip.

[*P. tripartita*, von Lendenfeld (4).]

Plumularia delicatula, Bale (2).—Portland; Griffiths Point.

Plumularia Wattsii, Bale (6).—Port Phillip.

Plumularia filicaulis, Poeppig (2).—Portland.

Plumularia Goldsteini, Bale (2).—Queenscliff; Portland.

Plumularia pluma, Allman.—Bass Strait.

[*Heteroplon pluma*, Allman (1).]

? Plumularia alata, Bale (7).

Plumularia obliqua, Saunders (2, 6).—Portland; Williamstown.

Plumularia spinulosa, Bale (2, 7).—Queenscliff.

Plumularia pulchella, Bale (2).—Queenscliff.

Plumularia hyalina, Bale (2).—Queenscliff.

Plumularia compressa, Bale (2, 7).—Portland.

Plumularia australis, Bale (2).—Portland; Port Phillip.

Azygoplon productum, Bale (7).—Portland; Queenscliff; Williamstown.

[*Plumularia producta*, Bale (2).]

Diplocheilus mirabilis, Allman (1).—Bass Strait.

Aglaophenia divaricata, Busk (2, 6).—Southern Coast, common.

[*? Plumularia ramosa*, Busk, and *Lytocarpus ramosus*, Allman (5).]

Aglaophenia plumosa, Bale (2).—Williamstown; Queenscliff; Portland.

Aglaophenia parvula, Bale (2, 6, 7).—Queenscliff; Portland.

Pentandra parvula, Von Lendenfeld (4).—Southern Coast.

Halicornaria superba, Bale (2).—Queenscliff; Griffiths Point.

Halicornaria ascidioides, Bale (2).—Queenscliff.

Halicornaria Baileyi, Bale (2).—Schnapper Point.

Halicornaria longirostris, Kirchenpauer (2).—Southern Coast, common.

Halicornaria humilis, Bale (2).—Queenscliff; Schnapper Point.

Halicornaria prolifera, Bale (2).—Queenscliff.

Halicornaria ilicistoma, Bale (2).—Queenscliff.

Halicornopsis avicularis, Kirchenpauer (2).—Southern Coast, common.

[*Azygoplon rostratum*, Allman (1).]

CORRESPONDENCE.

PERIPATUS IN VICTORIA.

To the Editor of the Victorian Naturalist.

DEAR SIR,—It may interest some of the readers of your journal to know that last week, while collecting in a fern-tree gully at Warburton, on the Upper Yarra, Victoria, I had the good fortune to discover two specimens of *Peripatus*, belonging, as I think, to a new and very beautiful species.

I hope to publish a full description, with figures, of the species as soon as possible, but I am now preparing for a visit to Tasmania, and some time must necessarily elapse before I can complete the work. I should, therefore, be greatly obliged if you could find space for this letter in the *Victorian Naturalist.*

In his "Monograph on the Species and Distribution of the Genus Peripatus," recently published in the *Quarterly Journal of Microscopical Science*, Professor Sedgwick makes no mention of the occurrence of the genus in Victoria, though he describes in detail the Queensland and New Zealand species. In a note in the "Proceedings of the Linnean Society of New South Wales" (vol. II., part I., 1887), however, Mr. Fletcher has recorded the discovery of the genus in Victoria. He says:—"The specimen which I exhibit this evening was given to me a fortnight ago by my friend Mr. R. T. Baker, of Newington College, who had obtained it a few days previously either in or under a rotten log at Warragul, Gippsland, Victoria. It has fifteen pairs of claw-bearing appendages, and has nearly the same dimensions as are given in the abstract referred to. It is, therefore, in all probability an example of *P. Leuckartii Sänger.*"

From Mr. Fletcher's account, I am not able to say definitely whether the specimens obtained by me belong to the same species as the single specimen which he mentions; but after carefully studying Professor Sedgwick's full description of *P. Leuckartii*, I am fairly certain that they do not belong to that species, but to a new one, which I for the present refrain from naming.

Both of my specimens were captured under fallen logs, where they were lying quite still. The first appeared to be dead soon after it was caught, and was therefore placed at once in alcohol. The second was found under a damp, rotten log, probably of *Eucalyptus*, in the same gully. It was taken home alive and put to crawl about on a newspaper, when it appeared very active. It elongated considerably when crawling, so that the legs came to be much further apart than when the animal was at rest, and when crawling it measured about 39 millimetres in length, excluding the antennæ. When irritated at the head end it ejected a surprisingly large quantity of an intensely sticky fluid of a whitish colour from the oral papillæ.

The species has, as in the two already described Australasian forms, fifteen pairs of claw-bearing legs, but it differs very strikingly indeed both from *P. Leuckartii* and from *P. Novæ Zealandiæ* in the colour and markings of the body. The general tint is brownish-red, with only traces in one specimen of the bluish colour so characteristic of the two above-mentioned species. The markings on the body are singularly distinct and well defined, and identical in the two specimens. All down the dorsal surface there runs a median, broad, reddish-brown or chestnut-coloured band, divided into a series of diamond-shaped patches by regular lateral indentations, one diamond corresponding to each pair of legs. In the middle of this band there is a thin, median, whitish line. On either side the chestnut-coloured band is edged by a narrow black line which follows the indentations of its margin, and outside this comes a broad band of darker brown, and then at the edge of the dorsal surface a narrow band of light brown. The ventral surface is light yellowish-brown, speckled with spots of very dark pigment, especially abundant at the base of each leg. In the mid-ventral line there is a row of white spots, one between the two legs of each pair except the first (?) and the last (where, of course, the genital opening is situated). The antennæ are light brown, closely ringed all the way up with very dark brown or black.

This species, though small, is to my mind even more beautiful than any of those figured by Professor Sedgwick, and I think there can be little doubt as to its distinctness. The anatomical features I hope to describe at a later date, and perhaps they will throw further light upon its relations to previously-described forms.—Yours truly,

ARTHUR DENDY,

Demonstrator and Assistant Lecturer in Biology in the University of Melbourne.

18th December, 1888.

REVIEW.

At the same time we have two works by Baron Von Mueller issued from the Government press—the seventh edition of "Select Extra-tropical Plants," and the "Key to the System of Victorian Plants," in two parts.

The "Select Plants" has now grown into a goodly volume of over 500 pages, and affords a good instance of natural development, of survival of the fittest. Originally issued unostentatiously in the form of appendices to the Annual Reports of the Victorian Acclimatization Society, in response to demands from the other colonies, from India, Germany, and the United States, the valuable information furnished in the appendices has gradually taken the

form of the present work of reference. Now, "what these writings may perhaps aspire to is to bring together some condensed data, in popular language, on all the principal utilitarian plants hitherto known to prosper in extra-tropical countries." The Baron is to be heartily congratulated upon his success in producing so widely useful a work, and that his book has already been adapted by Professor Naudin for the use of the countries bordering on the Mediterranean. For the volume is full of suggestive and of scrupulously exact information, which, when practically applied, will tend to the revival of agriculture in the countries of the Old World as to its establishment in the New. The Baron's ambitions are noble: To clothe the plains of the interior with herbage for our flocks and herds, to preserve or renew or establish forests of useful timber trees, to introduce varieties of fruits "all over the Australian Alps," to teach selector and squatter and others who have the land in their hands how they may make the best and most varied use of it. These can compare with the highest achievements of pioneer or statesman. These aims have had much direct success already, and the issue of a seventh Victorian edition, much enlarged and with valuable appendices (especially that of *Genera indicating* herbage, culinary roots, cereal grain, &c., &c.), will do much more. Every journalist, and everyone who wants to know what to do with his land, should furnish himself with a copy.

Of the "Key" we have already spoken fully. It has extended to 560 pp., and is a complete Flora of Victoria. The Baron has further defended his position with regard to the use of separate terms in botanical and zoological descriptions, in a paper read before the Australasian Association last year, and published in the proceedings of the Royal Society of New South Wales. We have not space at present to speak of this. No doubt members of the club will make good use of their new Flora.

New Australian Lepidoptera.—Dr. Lucas continues his enthusiastic work amongst the Lepidoptera. He writes that he has now some 3,000 species of Australian moths and butterflies. He has recently (26th September) described nine new species of the genus *Iodis* in the "Proceedings of the Linnean Society of New South Wales." One of these is Victorian, and was obtained at Fernshawe and Moe; the rest are Brisbane moths. The Doctor considers Brisbane a much richer collecting ground than Melbourne. He has been especially fortunate with "the Blues" and "the Emeralds," of both of which he has beautiful collections.

Field Naturalists' Club of Victoria.

President:
A. H. S. LUCAS, M.A., B.Sc.

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 popularizing 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.; Vol. III. (1886-87), 12 numbers. 6s.; Vol. IV. (1887-88), 12 numbers, 6s.; 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 1886-87, with Rules, etc., can be obtained on application to the Hon. Sec.

VOL. V.—NO. 10. FEBRUARY, 1889.

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— 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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THE FIELD NATURALISTS' CLUB OF VICTORIA.

The monthly meeting of the club was held at the Royal Society's Hall, on Monday evening, 10th December, 1888.

The president, Mr. A. H. S. Lucas, M.A., B.Sc., occupied the chair, and about forty-five members and visitors were present.

The hon. librarian acknowledged the receipt of the following donations to the library:—"Iconography of Australian Acacias," decade xiii., and "Mineral Statistics of Victoria," 1887, from the Government; "Transactions of Royal Society of Victoria," vol. i., part 1, from the society; "Proceedings of Royal Society of Queensland," vols. ii., part 1 and 2, iii., iv., and v., part 3, from the society; "Annual Report of School of Mines, Sandhurst," 1887-8, from the school; "Melbourne University Review," vol. iv., No. 3; "Journal of Pharmacy," November, 1888; and "List of Named Insects in South Australian Museum," by J. O. Tepper, F.L.S., from the author.

The hon. secretary reported that the excursion to Dandenong on Saturday, 17th November, was fairly successful. The day was very hot, and insects were somewhat scarcer than anticipated; however, the following were obtained, among others—*Uracanthus triangularis*, *Distrochocera Kirbyi*, *D. par*, *Hesthesis plorata*, *Hebecerus australis*, *H. crocogaster*, and several species of *Stigmodera*. These were principally obtained on the flowers of *Leptospermum lanigerum*. No flowers of any importance were obtained.

On a ballot being taken, Miss A. E. Roberts and Mr. H. K. Jackson were duly elected members of the club.

The president and Mr. J. E. Prince referred to the recent publication of "The Key to the Victorian Plants," part 1, by Baron F. von Mueller, K.C.M.G., which led to a discussion as to the best method of recording times of flowering, &c., of the various plants, and it was determined to make a club record of the various items.

The president also referred to the fact that the gold medal of the Royal Society of England had been awarded to Baron von Mueller, K.C.M.G., patron of the club, for his eminent services in the cause of Australian botany.

PAPERS READ.

1. The hon. secretary read a paper by Rev. J. E. Tenison Woods, F.G.S. (hon. member), entitled "The Geology of

Arnheim's Land, N.A." The writer briefly mentioned the various formations met with, and gave some particulars of their principal characteristics.

The Rev. A. W. Cresswell expressed his pleasure at hearing the paper, but regretted that the cretaceous deposits, with their fossils, were to a great extent absent.

2. By Rev. F. R. M. Wilson, entitled "An Hour on a Coral Island." The author gave an interesting sketch of the various objects of interest met with during a brief visit to the island of Diego Garcia, in the Indian Ocean, and exhibited a number of lichens, corals, shells, &c., he had collected there.

The president also briefly narrated his experiences on the island, which he visited in 1883.

The president mentioned that Mr. G. Sweet, a member of the club, had found in the Devonian rocks at Buchan, Gippsland, a rare fossil, being the shield of a ganoid fish at present undetermined.

The hon. secretary brought before the meeting some peculiar facts in the life history of the butterfly, *Ialmenus evagorus*, Don., as recently noticed by him, which created some discussion.

The principal exhibits of the evening were :—By Mr. F. G. A. Barnard, specimens of butterfly, *Ialmenus evagorus*. By Mr. R. C. Chandler, about 95 specimens of birds, collected during a recent trip to the Clarence and Richmond river districts, New South Wales, including the rifle bird, regent bird, magnificent fruit pigeon, noisy pitta, &c. ; also large iguana, death adder, and land shells, from same locality. By Mr. C. French, jun., eggs of following Tasmanian birds—Black-cheeked falcon, white-fronted falcon, collared sparrow-hawk, southern tern, Australian coot, Tasmanian swamp quail, diving petrel, grey-backed storm petrel, and blue reef heron. By Mr. J. Kershaw, eggs of following Queensland birds—Little eagle, white goshawk, crested hawk, pheasant cuckoo, Australian egret, boobook owl, moth-plumed podargus, dollar bird, spine-tailed orthonyx, and barred-rumped godwit. By Mr. G. Lyell, jun., lepidoptera, collected during the month. Mr. J. E. Prince, specimens of rocks from bore 1,000 ft. deep, at Carlton brewery, Melbourne. By Mr. J. Searle, larva, chrysalis, and imago of butterfly, *Ialmenus evagorus*, Don. By Mr. G. Sweet, various species of *Phragmoceras*, specimens of *Spirifera* and *Murchisonia*, from the Devonian rocks, at Buchan, North Gippsland. By Rev. F. R. M. Wilson, 26 species of lichens, from Diego Garcia, also corals, &c., in illustration of paper.

After the usual *conversazione* the meeting terminated.

The monthly meeting of the club was held at the Royal Society's Hall, on Monday evening, 14th January, 1889.

The president, Mr. A. H. S. Lucas, M.A., B.Sc., occupied the chair, and about forty members and visitors were present.

The hon. librarian acknowledged the receipt of the following donations to the library:—"Prodromus of Zoology of Victoria," decade xvii., "Practical Mining," and "Reports of Mining Registrars," September, 1888, from the Government; "Proceedings of Linnean Society of New South Wales," 2nd series, vol. iii., part 3, from the society; "Proceedings of Royal Society of Queensland," vol. v., part 4, from society; "The Gastropods of the Older Tertiary of Australia," part 1, by Professor Ralph Tate, F.G.S., from the author; "Journal of New York Microscopical Society," vol. iv., parts 3 and 4, June and October, 1888, from the society; "Annals of National Museum, Costa Rica," for 1887, from the Museum; "Bulletin of the Vaud Society of Natural Sciences," vol. 24, part 98, from the society; and "Journal of Pharmacy," December, 1888; also photographs of drawings of the extinct birds, the dodo, and the great auk, presented by Mr. T. A. Forbes-Leith.

The hon. secretary reported that the club excursion to the Plenty River at Bundoora on Saturday, 15th December, had been much interfered with by the showery weather experienced. Of flowering plants noted, *Prostanthera lasiantha*, *Leptospermum myrsinoides*, *L. lanigerum*, *Dipodium punctatum*, and *Convolvolus erubescens* were the most conspicuous. Numerous nests of the fire-tailed finch, *Estrilda* (*Zonœginthus*) *bella*, Lath., were seen, but in only one case were the young not sufficiently grown to be able to leave their birth-place. Two fine specimens of the nest and eggs of a honey-eater were taken. Insects were scarce owing to the wet, a few *Stigmodera* and longicorn beetles, specimens of a wasp, *Polistes* sp., with nests, being almost the only captures. A platypus was seen in the stream, and later on a pair of nankeen cranes. The party reached town *viâ* Greensborough and Heidelberg about 8 p.m.

On a ballot being taken, Mr. L. Grayson was duly elected a member of the club.

In response to the desires of several members of the club, Mr. J. G. Luehmann, of the Government Botanist's Department, gave a practical demonstration of the method of using Baron von Mueller's *Key to the Victorian Plants*, making use of the plants *Acacia implexa* and *Goodenia ovata*, and supplementing his remarks with sketches of the more important parts on the blackboard.

Papers Read.—1. By Mr. A. H. S. Lucas, M.A., B.Sc., entitled "Notes on Victorian Sharks." The author gave brief descriptions of the ten sharks resident in Victorian waters, and of six others which have been found at various times on the Victorian coast. He remarked that 140 species of sharks were recorded for the world, of which Australia claimed 37, and as Tasmania possessed 18 species, probably others would be found in Victorian waters.

Mr. E. M. Cornwall made some remarks on the sharks of Western Port Bay.

2. By Mr. G. A. Keartland, entitled "Notes of a Day among the Birds at Melton." This was a very interesting account of an outing at Melton, about 23 miles N.W. of Melbourne, a district which, the author stated, would well repay the attentions of ornithologists, as, during several visits to the district, he had noted 83 species of birds within a radius of six miles of the station.

3. By Mr. A. J. Campbell, entitled "The Oology of Australian Birds," being the supplement No. 5 for 1888. He described the eggs of the following birds, taken for the first time in 1888, viz.—*Strix tenebricosa*, the sooty owl; *Ninox maculata*, spotted owl; *N. boobook*, boobook owl; *Chibia bracteata*, spangled dronga shrike; *Ardea sumatrana*, great billed heron; *Porzana fluminea*, spotted water crake; *P. tabuensis*, tabuan water crake; *P. palustris*, little water crake, and *Pterodroma gouldii*, great winged petrel.

Natural History Note.—Mr. F. G. A. Barnard read some further notes on the life history of the butterfly *Ialmenus evagorus*, Don.

The principal exhibits of the evening were:—By Mr. D. Best, boxes of longicorn beetles (duplicates). By Mr. F. G. A. Barnard, wasps with nest from Plenty River, butterflies in illustration of notes. By Mr. A. J. Campbell, nine species of Australian birds' eggs in illustration of his paper, those of *Strix tenebricosa*, *Ninox maculata*, *Chibia bracteata*, and *Porzana fluminea*, being exhibited for first time. By Mr. A. Coles, pair tippet grebes (mounted) with young, and egg. By Mr. C. French, jun., eggs of Australian tippet grebe, hoary-headed grebe, black-throated grebe, straw-necked ibis, and little water-crake from Victoria, and red-necked rail from Queensland. By Mr. W. R. Guilfoyle, flowers of three different coloured varieties of *Eucalyptus ficifolia* (F.v.M.), "Scarlet flowering gum-tree" from Broken Inlet, Western Australia, grown at Melbourne Botanical Gardens. By Mr. R. Hall, fresh-water and marine shells. By Master G. Hill, case of coleoptera. By Master H. Hill, case of Victorian house-building lepidoptera, also specimens from the Hot Lakes, New Zealand. By Mr. G. A. Keartland, 32 birds in illustration of paper; large collection of this season's birds' eggs from King Island; also eggs from South Australia. By Mr. A. H. S. Lucas, M.A., sea-urchin *Gonocidaris tubaria*, also two fish (*Chilobranchus rufus* and *Syngnathus margaritifer*) new to Victoria. By Mr. G. Lyell, jun., butterfly *Heteronympha cordace*, from Jindivick, Gippsland. By Baron F. von Mueller, K.C.M.G., rare and partly new Australian plants. By Mr. F. Pitcher, orchids, *Orthoceras strictum*, and *Cryptostylis longifolia*, from Frankston and Langwarrin. By Mr. C. Yelland, specimens of *Strophanthus*, a poisonous plant from Central Africa.

After the usual *conversazione* the meeting terminated.

AN HOUR ON A CORAL ISLAND.—BY A STUDENT OF LICHENOLOGY.

By Rev. R. F. M. Wilson.

(*Read before the Field Naturalists' Club of Victoria, 10th December*, 1888.)

16th October, 1884.—On board one of the Orient line of steamers on the way to Australia. The ship is taking in coals at Diego Garcia, one of the Chagos Islands in the Indian Ocean, $7\frac{1}{2}$ degrees south of the line ; and is lying at anchor inside the coral reef, with islands all around. Alongside the ship is a boat which belongs to one of the white men, an Englishman, living on the island. Some of the passengers wish to get on shore and they are crowding about the gangway. Two of us wish to explore the island botanically. I wish to see what it has in the way of lichens. My companion, a Victorian clergyman and a member of this club, takes a special interest in mosses ; but he does not expect much in that line. We both edge forward through the crowd towards the ladder. At length permission is got to use the boat, and there is a bit of a rush to get in. My companion and I are among the first. I very nearly get a ducking, as a fellow-passenger stumbles into the boat and lays hold of me to steady himself. At that moment I am trying to do the very same thing, and have scarcely got my balance. He makes me lose it altogether, and down we come, but fortunately inside the boat. Well ! after a little confusion we shove off. A motley crew we are : three young Roman Catholic priests, two Presbyterian ministers—no longer young, a rollicking Irishman, who is an innkeeper in Australia ; one or two wild young Englishmen, with a fowling-piece among them ; two Victorian musicians, and a few others, of whose nationalities and occupations I know nothing. The Irishman takes an oar ; but after catching crabs several times and fouling the oars occasionally, he is deposed, and one of the priests is promoted to his place. The priest is a slight improvement—only slight, however. The other oars are in rather better hands ; but the passengers are excited and restless. Fortunately the water is comparatively smooth. When we get about half a a mile from the ship, and see the land so apparently far off, say a mile, and the waves pretty high, I begin to think that, if I had known what an unsailorly and careless lot we were, I would have perhaps—but here we are, and in due course we get safely to land.

The shore is composed of broken and water-worn pieces of coral of various sorts ; and, where we land, it slopes up to about 4 ft. or 5 ft. high. Bushes are growing close to the water's edge, and trees of several kinds rise up beyond them. I leap on shore. As I look round I feel my ignorance very deeply. Not

only the species, but the very families of some of the plants are quite strange to me. It is all as unlike Victorian vegetation as it can be. Instead of the narrow, drooping frondage of Australia, the leaves here are large, broad, and umbrageous. The majority of the trees are cocoanut. I step forward to them, and am soon in a deep shade, which is very pleasant after rowing under the tropical sun. The green tinge which is cast upon everything by the light coming through the cocoanut leaves is remarkable and very refreshing after the glare of the open sea.

Hallo! What can that be? If I were in Australia I would say it was a rabbit that popped down that hole. But, of course, there are no rabbits here. Again! Another has bolted round that tree. I run round, and see two large crabs backing up into a crevice, and threatening me with huge open claws. I leave the poor creatures alone. I believe they live on the cocoanuts, and that they are themselves good eating. I might secure a specimen. But I am in a hurry to study the vegetation, for I have only an hour on the island. I gather a few cocoanuts, and a few flowers, some of them very remarbable and interesting. Among them I gladly recognize the well-known form of the convolvulus; but the leaves are new to me, and the seeds are very large and very hard.

Lichens, however, are what I am after. And here they are! What a beautiful one on that tree—the colour a splendid greenish blue, the shape circular, and about 6 in. in diameter. How regularly the narrow divisions of the thallus are arranged! And the black apothecia scattered round the centre add to the beauty of the plant. It is evidently a *Physcia*. I select one or two smaller specimens, and, taking out my knife, cut off the lichens along with the very thick bark of the tree, and wrap them up in newspaper, with which I came plentifully supplied. I come out of the deep shade and find another, apparently the same *Physcia*, but it is white, doubtless from the action of the sun. However, I cannot stop to examine closely. Hah! what is it that gives such vivid colours to the stems of those cocoanut trees?—yellow and orange, rich brown and snowy white. Lichens, I see; and apparently *Verrucarias*. Here are some *Graphidea;* and there are other forms new to me. I get excited, I collect largely of each kind, pushing on through the grove of cocoanuts, but keeping my eye on the direction I am going; for I have not been a traveller in the Australian bush without learning prudence. My carefulness, however, is very much thrown away; for I soon come to the other side of the island, which seems to be no more than half or three-quarters of a mile across at this part.

I am now on the ocean side of the island. I notice a cocoanut lying on the shore with a young green shoot rising up from it to a height of 18 in. or so. It has thrown a vigorous root

down into the broken and disintegrated coral, which forms the subsoil of the island. How wonderfully suited the cocoanut is for growth on these coral islands! No doubt this nut has fallen from a tree on some island to the east of this, and from some tree overhanging the sea. Its thick husk and hard shell preserved it as it floated on the ocean and was rubbed and bruised on the coral. By the action of the wind and waves it was landed on the shore. And here it has rooted, and here it will grow into a tree, asking no other soil than the rotten coral with its polyp remains, and no other moisture than the salt water. By the by, I am informed that fresh water can be got almost anywhere on the island by sinking a well 8 ft. or 10 ft. deep. This is very remarkable, for the whole island scarcely exceeds 10 ft. high at any part. I am told also that coral islands often have an unpleasant smell. I suppose this must arise from the dead polyps in the coral. I perceive no unpleasant smell here, however. But that may arise from this island not being one of very recent formation; perhaps, also, from the depth of the soil, for, in passing through the grove, I noticed that there is a good thick coat of vegetable soil over the coral, evidently formed by the large quantity of foliage which falls from the cocoanut and other trees, and is rotted down by the frequent heavy rains of the tropics.

It seems to be characteristic of the phanerogamous plants growing here that the seeds are in every case, so far as I have seen, defended by a thick episperm, sometimes hard and glossy and sometimes tough and stringy. They are thus well suited to float on the sea from one shore to another. And this is the only apparent means of their transportation; for there are very few, if any, frugivorous birds on the island. Those young Englishmen have evidently not found many birds, for I have scarcely heard a shot from their fowling-piece; and it is very likely that the report or two which I have heard was not from their shooting at a bird, for I guess that, failing a bird, they would shoot at any mark, just for the pleasure of shooting.

There is one thing on the island that reminds me of Australia. The ant family is well represented here. I have no time to examine closely, and I have no means of preserving specimens; but, from a cursory inspection, I would say that they are very like those found in Victoria. I see none quite so large as the largest of the Victorian species; but what I do see might, from their sizes and shapes and colours, and the style of their nests, be identical with those which inhabit Victoria. To the question how they could have found their way to a distant island like this, it is not very difficult to imagine an answer. They could spread from shore to shore in the trees which are carried hither by the western currents of these seas. So that there is no reason why they should not be genuine Australian emigrants.

Ah! What a large piece of bamboo! It must have been washed on the shore from some far-away land; for, of course, there are no bamboos growing here. What a lot of water-buckets could be made out of it just by sawing it across under the joints! Its length must be from 12 ft. to 15 ft., and its diameter must be from 1 ft. to 18 inches, and nearly the same diameter all its length. It must, indeed, have been a tall stem when growing.

I walk down to the water's edge, and find among the broken and rubbed pieces of coral a large quantity of pumice stone. There must be tons of it lying on this beach. Surely it would pay to collect it and take it to England; for it is evidently just the kind of pumice that is used by painters, &c. While coming along in the ship, we saw great collections of it on the surface of the sea, blown by the wind into wreaths and carried along by the current. These wreaths I saw for about ten degrees on each side of the equator. The vast quantities of this stone floating on the sea, over twenty degrees of latitude, and lying so plentifully on the Islands of the Indian Ocean, show what a tremendous volcanic eruption there must have been a year ago at Krakatoa. For it is to that spot that the pumice is traceable. I pick up a piece or two, and continue my walk along the beach.

I find a number of shells of various kinds. As I go up from the beach towards the bushes I am surprised to see more than a hundred shells of the same kind moving about under the bushes with a somewhat rapid, bobbling motion. I walk forward, and the shells stop and seem to fall flat on the ground. When I stand still for a little, they gradually rise and recommence their grotesque movement. I pick one up, and find it inhabited by a hermit crab. Some are large and strong, with one of their claws of a rather formidable size. I select three or four small ones, and wrap them up in newspaper. These I took on board the ship, and supplied with food of various kinds. I brought them to Victoria, and kept them several months in my house in Kew. My children used to amuse themselves by setting the creatures to run along the verandah in the sun. The warmer the day the more quickly they ran; until, as the weather grew colder, they moved with less and less alacrity, and at last, one after the other, they died.

On returning through the cocoanut grove I came across a dismantled mia-mia, or something of the sort, with remains of cocoanut husks, leaves, &c. This, I suppose, was one of the camps of the Malagasy labourers who are employed by the French on the island to collect the cocoanuts and to make copra. I believe they used to make a large quantity of cocoanut oil here, besides catching and preserving fish. Some of these Malagasies came on board the ship and brought for sale shells and other curios, including some most lovely delicate pieces of coral, which they had got from the reefs under the sea, and the forms and colours

of which cannot, I think, be surpassed in beauty by anything in nature.

The hour has flown by far too rapidly, and with regret I return to the ship, leaving many species of lichen ungathered, and a most interesting botanical field unexplored.

NOTES ON THE NATURAL HISTORY OF THE WESTERN WIMMERA.

By C. French, F.L.S.

(Read before the Field Naturalists' Club of Victoria, 12th November, 1888.)

Mr. Chairman, Ladies, and Gentlemen,—The following brief notes have been collected during a flying visit, and a very limited stay, to the so-called Tatiara country, now generally known as the Western Wimmera; and this portion of Victoria may be said to commence beyond Dimboola, extending to the Adelaide border.

For some time past I had had a desire to visit that portion of the colony on which the newly-formed railway township of Serviceton now stands; and, for the information of those who are not acquainted with the district, I may state that Serviceton is the last station in Victorian territory, on the overland line between Melbourne and Adelaide, distance 300 odd miles or so from Melbourne.

I left Melbourne by the 4.6 p.m. express and reached Serviceton at 3.5 on the following morning; and being anxious to see the place as soon as possible, I sat in the arm-chair before the fire—the morning being very chilly—until daylight, when I went out to look at the country and to see what would be my probable chances in the botanical line.

My first impressions of Serviceton were not of the most cheerful nature, the township being situated in a low, damp place, covered with bog holes, which were filled with water, blocks of wood having been fixed in front of the doors of many of the houses so as to enable the occupants to pass from one house to the other, and mud everywhere. I found, also, that, instead of this place being, as I had supposed, quite a newly-settled locality, it is in reality the centre of an extensive squatting district, Lockhart station, now owned by Mr. Tully, being a very ancient sort of place; and I soon found out, what I ought to have known before, that sheep runs, whether old or new, are not favourable grounds for the plant hunter, the station itself being but three miles or so from the railway station. Wandering about for a couple of hours or so before breakfast, I could plainly see that the neighbourhood of Serviceton is not a good one for plants—I mean for flowering plants—but I have no doubt that many cryptogams of interest

may be found, if carefully looked for; but as Baron von Mueller was anxious that I should try, if possible, to make some additions to the Victorian flora, so as yet to be in time for insertion in the "Key," I paid more attention to the flowering plants than I might otherwise have done. As on my last trip to Lake Albacutya district, I was very much surprised to see so many introduced weeds growing here, there, and everywhere, the well-known Cape weed, *Cryptostemma calendulacea*, being very common; ranunculi, lychnis, sonchus, and many other well-known weeds being in great numbers, and from between which the beautiful *Swainsonia procumbens* pushed forth its pretty lavender-coloured, pea-shaped flowers.

Returning to the hotel for breakfast, I could judge, from what little I had seen, that I should be losing my time in hunting for plants anywhere near the township; so I engaged a trap and drove out to the Mallee, distance to the N.W. about 9 miles. The place for miles was fairly one continuous chain of mud holes, interspersed with saline flats, covered with surface-water; and the day being very hot, the mosquitoes were in clouds—huge fellows, with a long proboscis—and were very annoying to both men and horses.

Lockhart station is very prettily situated on an eminence above the so-called Tatiara Creek—why this is called a creek did not seem very clear, as it is simply an old watercourse, and, although now so wet and green, is, I understand, quite burned up during the summer months. In the neighbourhood of the station, and for miles around it, everything has been eaten down by sheep, even the prickly-box *(Bursaria spinosa)* having been bitten down to a low stunted shrub of about 2 ft. high, and in one of these tussocks I found a specimen of *Dampiera rosmarinifolia*, a somewhat rare plant.

We now came to a paddock—in which grew thousands of plants in full bloom—of *Craspedia Richea*, *Chamæscilla*, *Hypoxis*, *Bulbine*, and many other of our commonest Melbourne plants, and these I, of course, did not collect.

The Mallee was reached in due course, but such a desolate place—not a plant in bloom save a few *Eucalyptus gracilis* and two or three acacias. I found a few specimens of a dwarf *Cassinia*, on which the flowers of last season still adhered.

The dog and rabbit proof fence runs through this belt of Mallee, which looked as dry and barren as the former part of the drive from Serviceton looked wet and miserable; but had I had time, I should have much liked to have gone through along this line to Albacutya—distance, I believe, some sixty or seventy miles in a direct line; to travel this distance, however, water would have to be carried in canvas water-bags, and this means, of course, time and trouble.

Having had a few hours in the Mallee, we had lunch, and rested the horses; and here, in a shallow pool, I found a few specimens of two species of fresh-water shells, which belongs probably to the genus Physa (?), or near to it.

On our way home, we started clouds of ducks, also a few cranes; and the pretty little native hen *(Tribonyx)* were very common indeed, and had time permitted we might, I think, have found several of their nests.

We arrived at the township about dark, so I resolved to go on to Border Town the next morning, and work back towards Albacutya. I found, however, that I had a couple of hours to spare before starting, so I went out to a large piece of land fenced off for a water reserve, expecting to find something of interest; but in this I was disappointed, nothing but the wretched weeds and long coarse grass everywhere, so, having waded about through the mud for some time, I got back, and started for Border Town. I had intended to have stayed for a day at the Wolseley station, about seven or eight miles from Serviceton, but the district is, I was informed, an agricultural one, and as it did not look particularly inviting, I pushed on, arriving at Border Town about noon.

The old settlement of Border Town is one of the prettiest places I have visited, being beautifully situated on the banks of a creek, which is very picturesque, tall specimens of the red-gum *(Eucalyptus rostrata)* lining its banks on both sides. This creek is however, I believe, dry in the summer.

Being anxious to stay here for some days I "put up" at the Woolshed Hotel, the proprietor of which, Mr. Ward, very kindly gave me much valuable information about the district, also as to the most likely places for plants.

The country around Border Town is to the N.W. mallee, interspersed with box *(Eucalyptus largiflorens)* flats, on which grew many of the little terrestrial orchids which are to be found so common in our Cheltenham and Brighton districts.

The Mallee, which extends for an immense distance right into and through the Ninety-mile Desert, is not nearly of such a dreary and sterile nature as that near Serviceton. Many very beautiful shrubs, as *Baeckea crassifolia*, *B. Behrii*, *Styphelia Sonderi*, *S. costata*, &c., being found growing there in considerable numbers. The scrub is, however, swarming with rabbits, which burrow in the sand, and otherwise do much damage to the crops and grass in the neighbourhood.

I have said that I reached Border Town at noon, so I spent the afternoon in the Mallee with some young people whom Mr. Ward had kindly sent out with me, and who knew the best places for collecting. I did very well, and got a number of good

plants. We got back by dark, and I was very well satisfied with our afternoon's work.

The Salvation Army have a branch here, and whether intentional or otherwise, I noticed that so long as I stayed at the hotel these good people, with their band (which consisted of a very vigorous cornet, drum, and triangle), used nightly to pay us a visit, and perform close to the window of the room in which I used to lay out my plants after having had dinner.

Near to the settlement are two camps of blacks, and being anxious to procure some eggs for my son, I drove over on our way out to try to induce them to collect, as there were two grown-up lads amongst them; and, having shown them the blow-pipe process, they promised to devote two days to collect a pair of such eggs as was to be found in the district. I was much pleased at the prospect, and, in an evil moment, gave them some silver to procure, as they said, "some baccy"; but, instead of this, they, it seems, went down to the township, and purchased two new loaves and some mutton, the result being that when I returned from my trip (which lasted two days), I found them barely able to walk, let alone to climb trees. They had not been out to look for eggs—another instance of the truth of the old saying, never to pay beforehand. I felt very much disgusted; so, after using some slightly powerful language in disapproval of their conduct, I left them. This little incident has strengthened my previous convictions with regard to the Australian aboriginals, viz., that they will not work if they can at all help it, the proverbial Yarra-bank loafer being, in my opinion, a smart business man compared with the average Australian blackfellow.

On the way out to the country lying to the N.W. of Border Town, and working back into Victorian territory, we came across some very good places for plants; and it was close to the disputed boundary where I found *Xerotes juncea*, new to Victoria, it having previously been found in Western Australia only. I saw a good many plants of it, but only the one in flower. The country about here is very like the place where I had left off last year, and many of the plants found were identical with those found at and near Chinaman's Flat, amongst the best of them being *Boronia filipes*, *Melaleuca Wilsonii*, *Prostanthera chlorantha* (out of flower), *Acacia farinosa v. glabra*, &c., &c. Keeping a north-westerly direction, on the way out to Red Bluff station, we came across, also, some very likely country for plants; and about here were seen numerous tracks of kangaroos and wild dogs, the latter being much too numerous in this scrubby country. Thanks, however, to a plentiful supply of strychnine, coupled with a constant vigilance, these dingo pests have been considerably thinned out. Flocks of the southern stone plover were

every now and then started, and in the miserable stringy-bark ranges birds of many kinds are very numerous. In the mallee are to be found several kinds of ants, one of them being a large black and yellow bull-dog ant. These fellows are far more pugnacious than any which I knew of before, as they jump about after the style of the little and well-known black ant, with the yellow mandibles, commonly known as jumpers. I was much amused at the real fightable nature or disposition of these large ants, as, when we approached the mound or nest, they sallied out in droves, advancing in all directions, stopping every now and then to sting the sand, but for what purpose I could not make out. I had my forceps with me, and, upon closer examination, I found they had very formidable stings, and seemed very anxious to use them. This species I found only in the dense mallee, and do not recollect ever to have seen it before.

In the flats which we crossed on the return journey to Border Town I noticed that the small plants—as *Toxanthus Muelleri*, *Drosera*, &c., &c.—were the same as those which grow so common in and around Dimboola, although I did not see a single plant of *Aster pimeleoides*, the handsome white shrub which I saw last year on my way up from Dimboola to Albacutya. Having reached the hotel, I learned that a gentleman had called during our absence and reported having seen "a regular flower garden of wild flowers." So, the next morning, we made an early start, and drove out about eighteen miles S.E. from Border Town, passing Nelanj station, which is very prettily situated on an eminence, in country quite English and park-like. Upon arrival at our destination, we found the said flower garden to be—well, simply the finest patch of *Epacris impressa* that I, at least, had ever seen, the plants being very robust and the flowers of the most intense, dark-crimson colour, but beyond these, and a few very pretty white *Styphelias*, there was nothing else; so I felt somewhat disappointed.

Returning homeward, we crossed some very wet flats, in which the *Ottelia* was just making its appearance; and, from a few straggling plants of *Eutaxia empetrifolia*, I collected a good many specimens, and near to some farm houses which we passed were numbers of the native hen before mentioned. I had no idea that they were so tame as they were amongst the domestic fowls and ducks. Amongst the box trees, many of which were in flower, I noticed several kinds of parrots, the Rose Hill, Pennants, and Swift Lorikeet being the most numerous; and the large gum trees here were covered with a white scale-insect (not lerp), which was quite new to me. This I intend to send, with others, to Mr. Maskell, of New Zealand, whose labours amongst the Coccidæ is so well known and appreciated. There are a good many lizards in this neighbourhood, our old friend the "wallops," or stump

tail, being very common. I brought one home alive, and my little girl used to feed it regularly; but one day it bit her very severely on the forefinger, and, whether intentional or not, it was with some difficulty that it was made to relinquish its hold. The top of the finger became quite black and discoloured, but the bite, although painful, was, of course, not poisonous; still the lesson gained by simply feeding a wallop will not have been thrown away. I did not see any snakes, as these reptiles are, I believe, scarce; but I had a very pretty little specimen of the ringed snake, "Vermicilla," given me. It was taken out of an old mallee stump, near to Lake Hindmarsh.

I had hoped to have been able to spend a few days in the Ninety-mile Desert; but, upon my arrival back at Border Town, I read a telegram informing me of the illness of my wife, so I had very reluctantly to make a start for home much earlier than I had expected. What little time I had to spare was spent in collecting near the Victorian boundary, and it was here I found the rare *Styphelia Woodsii*; and, in a drain alongside the road, I was fortunate enough to find *Lepilæna australis*, a plant also new for Victoria, and only previously recorded from Western Australia. Baron von Mueller, who has been kind enough to identify these plants for me, was very pleased to be able to add these two interesting plants to the Victorian flora. I had now to leave for home; so, after making a short run up towards Mount Monster, I left Border Town by the midday train for Serviceton, which was reached in good time. I left the next morning for Diapur Town, about twenty-five miles nearer to Dimboola, and reached there at 9 a.m. I spent the day in collecting, and found it a very good place for plants, the mallee reaching to within a few hundred yards of the township. Diapur Town, I may explain, is an agricultural district, wheat-growing being carried on rather extensively, as many as 25,000 bags of wheat being stored at the railway station a few weeks prior to my being there.

The country to the S.W. is composed of dwarf stringy-bark ranges, very dry and poor, contrasting strongly with that to the N.W. and S.E., which is open grass country, lightly covered with casuarina (bull oak) and box *(E. largiflorens)*. In the Mallee flats, I saw large numbers of plants of the beautiful pink-flowered melaleuca, *M. Wilsonii*, but as it was too early for the flowers, I had to content myself by collecting a nice lot of seed-capsules. Some very robust plants of Callistemon, also not yet in bloom, were common enough in the old and now dried-up water-courses.

The beautiful yellow-flowering shrub, *Eriostemon lepidotus* (variety, *stenophyllus*), is very common about Diapur Town, and this fine plant would, I am sure, be a welcome addition to our shrubberies.

In the drier parts of the Mallee I noticed a great variety of

ants, also a good many small lizards, and coming to a pool of water I saw growing in it plenty of chara, also a plant or two of *Limosella Curdieana*. Tracks of dingoes were very plentiful near this pool.

The dwarf stringy-bark *(E. capitellata)* seems to extend for an immense distance; and where this tree is found, the place is poverty itself, the sandy, loamy soil having the appearance of baked sand, which in some places is as hard as rock, and in others quite soft. The porcupine grass is very common in most of these stringy-bark patches. In the Mallee I found some very pretty shrubs, one *(Daviesia pectinata)* being of a very singular form, and not unlike the well-known garden shrub, *Colletia*. It struck me as singular that nearly all of the above plants were dead, and although I saw—I may say—hundreds of them, I was only able to get the very small specimen (not in flower) which I show you, with my other plants, this evening. *Thryptomene ciliata, Grevillea ilicifolia*, and several other pretty shrubs grow here in great quantities, and Diapur Town would be well worthy of a visit about the months of October and November.

I must not forget to mention that there was a grand school *fête* on the night which I was at Diapur Town, and the children, under the able guidance of my old friend, Miss Turner, sang splendidly, and would, I am sure, have done credit to many a school of much greater pretensions. The schoolhouse was very prettily and tastefully decorated with wild flowers, from which I got a *Grevillea* I had not previously met with.

I left Diapur Town by the 8 a.m. train, passing several flocks of the native companion *(Grus Australiensis)* on the way, and in a few hours reached Dimboola, where I remained all day. Little to interest me at Dimboola, I having pretty well exhausted the district on the occasion of a former visit. I got a few small things as *Toxotus, Sisymbrium*, &c., &c., but nothing worthy of special mention. I had almost forgotten to mention that, during my absence from Serviceton, our Mr. Bastow had visited the place, and, so far as I could learn, had been fairly successful in his particular line (mosses); and although I was much disappointed at not meeting him, I am very pleased to hear of his success, and trust that he will give the club the benefit of any researches which he may have made on that occasion.

Having made arrangements with several persons to collect plants, I left Dimboola at 1 a.m., and reached Melbourne at 9.30 on the following morning. Upon the whole I was fairly successful, having been absent but eight days, during which time I collected about 76 species of plants in flower (the very common weeds, &c., I did not collect), two of which were

additions to the flora of Victoria, and altogether about 600 specimens. In insects I did little or nothing, as I was too early, and my time was too short.

Appended is a list of such plants collected as Baron von Mueller considers to be worthy of special notice; and those marked with an asterisk are, in my opinion, well worthy of cultivation:—

LIST OF PLANTS CONSIDERED TO BE RARE.

*Those marked * are worthy of cultivation.*

**Acacia* farinosa, v. glabra
* ,, rigens v. tenuior
* ,, obliqua
**Adenanthos* terminalis
**Boronia* filifolia
* ,, coerulea, v. alba
**Brachyloma* ericoides
Choretrum glomeratum
Cryptandra vexillifera
,, subochreata
Chorizandra euodis
**Didymotheca* pleiococca
**Daviesia* pectinata
* ,, brevifolia
**Diuris* palustris
**Dampiera* rosmarinifolia
**Eriostemon* lepidotus, var.
Lepilæna australis
Leptomeria aphylla
**Melaleuca* Wilsonii
**Pultenæa* prostrata
Santalum Persicarium
**Styphelia* costata
* ,, Woodsii
* ,, adscendens
Toxanthus Muelleri
**Templetonia* Muelleri
**Xerotes* juncea

We are pleased to notice that Mr. W. E. Matthews, F.C.S., F.L.S., and a member of the F.N.C. of Victoria, has been appointed director of the new School of Mines, at Maryborough, Victoria.

The Largest Tree in the World.—In a letter to the *Argus*, dated 16th January, Mr. David Boyle, of Forest Hill, Nunawading, states that a eucalyptus tree (probably *E. amygdalina*), growing in the ranges not 25 miles from Melbourne, has recently been measured and photographed by himself and Mr. N. J. Caire, a member of the F.N.C., and found to be 466 feet high, with a circumference 4 feet from the ground of 81 feet, and at the base of 114 feet. The tree was measured by him some ten years previously, before it lost its top, when it was 525 feet high. Some fine photographs of other large Victorian trees were exhibited at the Centennial Exhibition, but none approached near to the dimensions of this giant of the forest.

English Note.—In a recent letter from Mr. T. A. Forbes-Leith to the honorary secretary, he mentions that Pallas's sand grouse had migrated to Britain in great numbers last season, its real habitat being the deserts of Central Asia. Mr. Leith also forwarded for the club's library photographs of drawings of the great extinct birds, the dodo and the great auk.

Field Naturalists' Club of Victoria.

President:
A. H. S. LUCAS, M.A., B.Sc.

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 popularizing 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.; Vol. III. (1886-87), 12 numbers. 6s.; Vol. IV. (1887-88), 12 numbers, 6s.; 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 1886-87, with Rules, etc., can be obtained on application to the Hon. Sec.

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

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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 February, 1889.

The president, Mr. A. H. S. Lucas, M.A., B.Sc., occupied the chair, and about seventy members were present.

Baron F. von Mueller, K.C.M.G., introduced as visitors Dr. Kirtikar, of Bombay, and Mr. Alex. Morton, of Hobart, who were very cordially welcomed. The former, in acknowledging his reception, mentioned the pleasure he had derived from the inspection of the private collections of two or three of the members, and expressed his willingness to do anything in his power to promote exchanges with members of the Bombay Natural History Society. Mr. Morton referred to the necessity to professional scientists of amateur observers, and the advantages to be derived from opening the museums on Sundays as in Sydney and Hobart.

The hon. librarian acknowledged the receipt of the following donations to the library:—"Proceedings of Royal Society of Canada," 1885, 1886, and 1887, from the Society; and "Journal of Pharmacy," January, 1889.

The hon. secretary reported that the excursion to Heidelberg on Saturday, 19th January, had been fairly attended. Attention was principally devoted to entomology, and some twelve species of longicornes, together with a few species of other families, were obtained.

On a ballot being taken, Mr. H. Pausey, Miss C. Taylor, Miss J. Taylor, and Mr. S. Wylie were duly elected members of the club.

The meeting was then devoted to the reception of the report of the party who recently spent nearly a month in easternmost part of Gippsland.

Professor W. Baldwin Spencer, B.A., read the report, which,

taking the form of a diary, detailed the events of the trip. The party, which consisted of five members, traversed the whole distance, some 250 miles, on foot, being accompanied by a guide and pack horses. Their route was, starting from Orbost, on the Snowy River, to the Brodribb, with a divergence to the Upper Cabbage-Tree Creek—the only locality in Victoria where the fan palm *(Livistona australis)* is found in its native state—then along Bruce's track, north-easterly over Mount Goon-merk, and on to Bendoc, then turning westward to Bonang, thence southerly to the top of Mount Ellery (4,425 ft.), from thence south-westerly to the Brodribb, and back to Orbost.

The report was well illustrated with a map, and pencil and water-colour sketches of several notable groups of trees, palms, &c.

The account gave rise to some little discussion, in the course of which Baron von Mueller advocated the reservation of the palm groves, and moved a vote of thanks to Professor Spencer and the party, which was seconded by the Rev. J. J. Halley, and carried by acclamation.

On the motion of Messrs. Sweet and Cornwall, it was decided to interview the Minister of Lands *re* the reservation of portion of the Cabbage-Tree Creek district. [This has since been granted. —Ed. *V. N.*]

The following were the principal exhibits of the evening :—By Mr. P. H. Anderson 8 species of acarus, and two of hemiptera, mounted for microscope. By Mr. A. J. Campbell, a polished piece of tumana wood, or Alexandrian laurel (*Calophyllum inophyllum*), from Queensland. By Mr. J. E. Dixon, 80 species of coleoptera, from Kerrisdale, Goulburn River. By Mr. C. French, F.L.S., mounted and named botanical specimens from East Gippsland. By Mr. C. Frost, 30 species of spiders from East Gippsland. By Mr. C. French, jun., eggs of wandering albatross, from Auckland Islands. By Mr. H. R. Hogg, specimens of poisonous spiders from Riverina. By Mr. W. B. Jennings, fossil coral from Portland, fossil earbones of whale, dolphin, and porpoise from Cheltenham, and skull of platypus from Warrnambool. By Mr. E. E. Johnson, about 36 species of Victorian and other Australian birds. By Mr. G. A. Keartland, a white-headed stilt from Laverton. By Mr. S. Lamble, specimens of sand-encrusted roots (probably ti-tree) from Anglesea River. By Mr. M'Gillivray, eggs of *Strix delicatulus*, *Elanus scriptus*, *Haliastur sphenurus*, *Anas punctata* (?), *Peristera histrionica*, and *Tinnunculus cenchroides*, from Eastern Creek, near Cloncurry, North Queensland. By Mr. J. Searle, a five-legged frog from Yarrawonga.

After the usual *conversazione* the meeting terminated.

THE GEOLOGY OF ARNHEM'S LAND, N.A.

By the Rev. J. E. Tenison-Woods, F.G.S., F.L.S.
(Hon. Member.)

(*Read before the Field Naturalists' Club of Victoria, 10th December*, 1888.)

In 1886 I furnished to the South Australian Government a report on the geology of the Northern Territory. As this report is mainly occupied with the mineral riches of the colony, a little additional information on the geology of the country and its physical geography may be of interest to the Society.

Seven principal formations are found in Arnhem's Land, which may be thus enumerated in the ascending order: 1. Granite, pegmatites, &c. 2. Crystalline schists, slates, and gold-bearing reefs, with other minerals. 3. Limestones. 4. Conglomerates (waterworn). 5. Volcanic remains and trap-rocks. 6. Fluviatile sandstones and conglomerates. 7. Desert sandstone.

From this enumeration it appears that the cretaceous deposits so extensively developed in Western Queensland have disappeared, and there does not seem to be any formation between the crystalline schists and the desert sandstone.

Granite.—This is extensively developed in belts, all of which are of an eruptive character. It is of two kinds, pink and red granite and blue granite. Instances of the red granite in extensive tracts may be seen along the telegraph line, at the Finnis, where it forms a narrow belt, extending a long distance to the eastward; and at Yam Creek, where it forms an unbroken mass as far as the Driffield. It is coarse-grained, with large crystals of orthoclase felspar, such as is called granite porphyry. At M'Minn's Bluff and other places a remarkably fine-grained granite takes the place of the granite porphyry, probably forming dykes or elvans belonging to a subsequent intrusion. The blue granite is extensively represented to the eastward of the telegraph line. This is also an orthoclase felspar, with Muscovite mica. Both the blue and red kinds rise into isolated hills, seldom exceeding 100 feet in height.

Usually, the granite country is level, forming plains, out of which great bosses and boulders continually project. The soil is of a light sandy description, only able to support small trees and poor grasses. It is arid and waterless in the winter, and in the summer or rainy season very boggy. One may know at once, from the aspect of the country, when the underlying rock is granite. It is unmistakably an eruptive rock which has broken up the ancient formations, and therefore a newer intrusion in the geologic history of the continent. The pegmatite is a granite without mica, occupying an extensive tract at the head of the

Katherine, and forming, like the granite, low broken ranges and hills. The name was bestowed upon this formation first by Leichhardt, though now almost obsolete in geology. The country formed by this rock is even poorer than that of the granite, the soil being a grey pipeclay of the most worthless description.

Crystalline Schists, Slates, &c.—These form isolated patches of low, stony ranges, not exceeding 500 feet in height. The strata form a series of anticlinal folds, abounding with quartz reefs and mineral veins of gold, silver, tin, copper, lead, antimony, and other metals. I believe that these strata, which we may term archæan, have been folded into the ridges by the intrusion of the granite when the great system of the paleozoic rocks was broken up into fragments and crushed into folds. Possibly, at this time, some of the veins may have been injected. In the centre of the ranges, generally speaking, the gold is found; while the tin, lead, silver, and copper seem more restricted to the edge of the schistose formation, or on the very boundaries between that and the granite. The archæan rocks are generally conspicuous for the large amount of mica they contain. Where metamorphic action has been very complete the rock is altered into a white quartz, with a mass of large crystals of mica (Muscovite) three or four inches across, mingled with rich oxides of metals, especially tin. Otherwise the crystalline schists are highly variegated, and glistening with small particles of mica. They are much faulted with systems of joints which do not correspond usually with the planes of stratification. The slates are highly fissile, with lenticular masses peculiarly elongated by pressure, the longer axis being parallel to the plane of lamination.

Limestones.—Resting upon the southern edge of the crystalline schists is a small patch of limestone strata of not more than a few acres in extent. The strata are broken by denudation into the most fantastic figures and pinnacles. Some of the strata seem to have been much softer than others, leaving heaps and piles of overlapping layers, sometimes of hard, flaggy stones and blue limestone. The heaps of such fragments, little more than a foot in diameter, make the locality appear like a tiler's or a potter's yard. Strange to say that the area, small as it is, has in its centre one of the very rich silver, lead, and copper mines of Arnhem's Land.

The limestone is completely marmorized and destitute of fossils. It is, however, easy to see that it belongs to a very ancient system, not later than the paleozoic. There is, however, another limestone outcrop on the edge of the desert sandstone, and forming a broken stony country like the desert sandstone itself, on the sides of the valley of the Katherine River, near the telegraph station, about 200 miles south of Palmerston. This limestone has an old look, being completely marmorized, though there

is none of that peculiar stratified or tiled structure which is visible at the Eveleen mine already referred to. I believe it is the same formation, but I do not understand its relation to the edge of the table-land with which it seems to be associated. A similar formation is seen on the side of the Victoria River, with large crystals of calcite. In both cases I was unable to ascertain its stratigraphical position.

Conglomerates.—Lying upon the top of the granite, and underlying the desert sandstone, there are patches of conglomerate in which the pebbles are perfectly rounded and averaging a gauge of three inches or so. There are no fossils, and the formation is one due to fluviatile, and not marine action. The pebbles are derived from the crystalline schists. There may be some formed of granite pebbles also, but of this I cannot be sure. As to its age, nothing more can be stated than that it is subsequent to the intrusion of the granite, and may be as late as tertiary. Since it was deposited, the granite has been cut down to a depth of 100 feet and more by rain and rivers.

The base of the next formation is a conglomerate too; and they may not be distinct formations, only in some places the earlier bed is completely isolated, and forms beds without sandstone, resting on the granite, about 10 feet in thickness. It is highly ferruginous at the base, and thus may be distinguished from the quartz conglomerate in the strata above, which forms large boulders and coarse gravel of milk-white colour, but completely waterworn.

Volcanic Rocks, Dykes, &c. — Igneous rocks are very common throughout Arnhem's Land, and have played an important part in the form of dykes as well as extinct craters and intrusion of ancient lavas. Of the latter there is an extensive outflow at the Margaret River, 114 miles south of Palmerston, on the telegraph line, forming a rich tract of good agricultural country. The rock is diorite, that is, a well-marked crystalline and granular admixture of triclinic felspar and hornblende of dark-green colour to greenish black. It forms intrusive sheets rising into low ridges, with much broken stone upon the surface decomposing into a reddish-brown rock. Probably this formation is one of the ancient trap-rocks of the country. At about ten miles north of the Katherine River, on the telegraph line, there is a volcanic area of several hundred square miles, with very rugged hills and peaks rising to a height of four or five hundred feet. I did not examine the locality closely, but I encamped on a creek at the junction of the trap-rocks with the edge of the limestone table-land. The rocks were tertiary, with much vesicular basalt and chrysolite (olivine). A dyke of light-coloured rock, like some of the altered miocene basalts of Victoria, was much used by the natives for the manufacture of

flint implements and weapons. The ground around my encampment was extensively strewn with flakes and chips, showing that the locality was one to which the natives had had recourse for stone weapons for ages. Other volcanic areas were to be found east and west of Port Darwin, and at the head of the Victoria and Fitzmaurice rivers. Isolated hills, which may have been points of ejection of volcanic material, diversify these areas, which are always more fertile than the surrounding country, with black soil and nutritious grasses. Fisher and Stevens' station, at the head of the Victoria River, is on such a volcanic tract.

Besides these trap-rocks, all through Arnhem's Land one meets continually with an outcrop of a blue, compact, particularly hard, igneous rock, which runs parallel with the ranges of crystalline schists. It is probably an ancient rock, for it stands out in lines of flags six or eight feet high like gravestones, mostly in the valleys or flats at the base of the hills. There are also many dykes of basalts and dolerites with small porphyritic crystals of labradorite, cropping out in the granite, pegmatite, and crystalline schists.

(To be concluded in our next.)

ON VOLUTA UNDULATA AND ALLIED SPECIES.

By Professor Ralph Tate, F.G.S. (Hon. Member).

(Read before the Field Naturalists' Club of Victoria, 12th November, 1888.)

This very beautiful and very distinct volute, singularly remarkable for its undulating colour-lines, has been known by figure and description for nearly three-quarters of a century; and though frequently described and illustrated up to the last three or four years, yet the conchologists of the country which produces it actually do not know it correctly.

Lamarck figured it in "Ann. du Mus." vol. v., p. 157, t. 12, fig. 1, and it was described by him ("Animaux Sans Vert.," vol. vii., part i., p. 345, 1822) from specimens obtained by Peron, the naturalist to the French Exploring Expedition, under the command of Captain Baudin (1800–4), in Bass Straits and Maria Island. The locality in Bass Straits is probably King Island, as the exploring ships sheltered there for a considerable number of days.

Again, had we any doubt about the identification of the Lamarckian species, Quoy and Gaimard's interpretation of it should set us right. The admirable figures of the shell and animal of this species given by these authors are of specimens collected by them at Western Port, in Victoria.

During the last twenty-five years an allied species has

been known to occur in South Australian waters, which has usurped the Lamarckian title through an inexplicable blunder of local naturalists. Thus, Angas in Proc. Zool. Soc., 1865, p. 165, says, "This species (that is, the South Australian one) must not be confounded with the Tasmanian species hitherto known also as *V. undulata*, which has been lately accorded specific rank by Mr. Sowerby under the name of *V. Angasi* in the 'Thesaurus,' fig. 99, sp. 73;" and again, in 1867, loc. cit., p. 193, says, "The true *V. undulata*, Lamarck, is from Port Lincoln." The Rev. J. E. Tenison-Woods, in "Proc. Roy. Soc., Tasmania," 1877, says, "That this species *Voluta Angasi*, Sow., was long confounded with *V. undulata*, which it closely resembles." Petterd, in "Jour. Conchology," 1879, p. 342, falls into the same error, recording *V. undulata*, Lamk., from South Australian coast, and *V. Angasi*, Sow., from Tasmania, Victoria, and New South Wales. Lastly, Tryon, in his "Manual of Conchology," vol. iv., p. 92, suppresses the name of *V. Angasi*, but as the figure to which he applies that name represents *V. undulata*, it seems to me probable that he had not the two species before him.

It is pretty clear that the *Voluta undulata* of Lamarck, and of Quoy and Gaimard, has had the name of *V. Angasi* given to it by Angas, Woods, Petterd, and others, and that they have given Lamarck's name to the South Australian shell. The rectification of this blunder involves a new designation for the South Australian volute. The synonyms of the two will stand thus:—

1. VOLUTA UNDULATA. *Lamarck, id Quoy*, and *Gaimard.*
   V. Angasi. Sowerby and others.
   Hab., coasts of Bass Straits, Port Jackson, and Port Stephens.
2. VOLUTA ANGASI, *spec. nov.*
   V. undulata. Angas and others (non Lamarck).
   Hab. Port Lincoln and Encounter Bay, South Australia.

Whatever value we may attach to the differences between the two shells, yet, for classificatory purposes, the differences are so constant that it is not possible to make confusion:—Firstly, in respect of shape, *V. undulata* has a shorter spire, smaller pullus, and the last whorl is somewhat protuberant round the posterior part, in consequence of which there is a slight concavely-depressed area in front of the suture. The lip of the adult of *V. Angasi* is slightly ascending posteriorly, and the post-angulation of the aperture is not so pronounced as in *V. undulata*. Secondly, in respect of colouration; here the differences are very conspicuous. The reddish-coloured transverse lines in *V. undulata* are sharply and deeply plicate; whereas, in *V. Angasi*, the undulations are little more than somewhat sharp insinuations.

The three following species, occurring in Bass Straits, are

usually regarded as mere individual variations of *V. undulata*; and though my knowledge of them is limited to the excellent figures accompanying Dr. Cox's descriptions, yet, from my general acquaintance with the genus, recent and fossil, I am well disposed to accord them specific rank.

V. SCLATERI is more angulated posteriorly, and the slope of the spire is less regular, than in *V. undulata*, apart from the absence of colour.

V. KINGI, another uniformly coloured shell, differs by its convex spire whorls.

V. AUSTRALIÆ has too small a pullus, and is too narrow to be the young of *V. undulata*, irrespective of the style of colouration, which resembles that of *V. fusiformis*.

OOLOGY OF AUSTRALIAN BIRDS.

BY A. J. CAMPBELL.

(Read before the Field Naturalists' Club of Victoria, 14th January, 1889.)

SUPPLEMENT.—PART V.

30. STRIX TENEBRICOSA—(Sooty Owl). *Locality*—Queensland, New South Wales, and Victoria. *Egg*—In shape almost round, colour white, surface dead (*i.e.*, devoid of lustre or polish), shell slightly granulated. Length, 1 inch $9\frac{3}{4}$ lines; breadth, 1 inch $7\frac{1}{4}$ lines.

This egg was taken at Pimpana, Southern Queensland, by a collector (who also produced the bird) of Mr. A. Coles, our skilful taxidermist.

37. NINOX MACULATA—(Spotted Owl). *Locality*—South Queensland, New South Wales, Victoria, South Australia, and Tasmania. *Egg*—Nearly round, both ends alike in shape, white, surface slightly polished. Length, 1 inch 7 lines; breadth, 1 inch $4\frac{1}{4}$ lines.

This is the smallest owl in Australia, and I am indebted to our honorary member, Mr. E. D. Atkinson, of Tasmania, for this example. Authenticated eggs of the Boobook Owl, in my own collection, are larger than the Spotted by $\frac{3}{4}$ line on either dimension.

I learn from Mr. A. E. Brent, who has taken many nests of the Spotted Owl in Tasmania, that a clutch of two eggs is deposited in a hollow tree generally about the first week in November. Eggs have also been taken at Christmas, probably laid by some bird whose eggs had been taken earlier in the season; but, whether by the same bird or not, the same nesting hollow is often resorted to season after season. Another fact worth recording is the curious method whereby the birds store dead mice about the

hollow, in the splinters and cracks; and when food is abundant some of the little carcasses are there left to dry up like mummies.

At this time I am pleased to be able to add two descriptions of owls' eggs to our oological lore, especially as many species of these birds have been brought prominently under our notice by their presence in great numbers in Victoria this season. It has been conjectured that the wonderful migration of mice that took place in the interior, or the prevailing dearth in the more northern parts, or both, are the cause. In parts, I understand, they were observed "as thick as bats," hawking all night round haystacks for mice.

By way of reminder, I should like to mention that all these useful vermin destroyers are perpetually protected in Victoria, and partially in Queensland and South Australia. It is to be hoped that the other colonies will immediately follow suit.

132. CHIBIA BRACTEATA—(Spangled Dronga-Shrike). *Locality*—Queensland, New South Wales, Victoria (1885), Tasmania (1888). *Egg*—Longish and gracefully shaped, colour of a delicate pinkish blush or tint, sparingly speckled with pinkish red and purple and a few spots of chestnut, except upon the apex, or larger end, where the markings thicken, and in some instances amalgamate.

The eggs are exceedingly pretty, and at first sight resemble a light variety of the better known eggs of the Friar Bird *(Philemon corniculatus)*. Dimensions of a clutch—(1) 1 inch 3 lines x 10¼ lines; (2) 1 inch 3 lines x 10¼; (3) 1 inch 2¾ lines x 10¼; and (4) 1 inch 2¾ lines x 10¼ lines.

According to Mr. Coles' collector, the nest containing the above was taken at Wonga Wallan, Southern Queensland. It was very loosely constructed of vinelets (so much so that the eggs were visible from below) and placed in a "stringybark" tree.

480*a*. TURNIX SCINTILLANS—(Speckled Turnix, or Quail). *Locality*—West Australia. *Egg*—Inclined to be pear-shaped in form. Colour, "pepper and salt," or very finely and uniformly speckled over the whole surface with light brown, grey, and dark purple or black. In some specimens the brown and grey speckles prevail. Length, 1 inch 1 line; breadth, 10½-11 lines.

546. ARDEA SUMATRANA—(Great-billed Heron). *Locality*—North Australia, Queensland, and New South Wales. *Egg*—An example from Dr. Kutter's collection, taken in the Moluccas, is light bluish green, a very long oval, and measures 2 inches 8 lines x 1 inch 7¼ lines.

564. PORPHYRIO BELLUS—(Azure-breasted Porphyrio-Coot). *Locality*—West Australia. *Egg*—Form, oval, slightly swollen towards the larger end. Colour, deep warm stone, fairly marked with spots and patches or blotches of purplish brown of various

shades, the dull shades appearing as if under the shell's surface. Length, 2 inches $2\frac{1}{2}$-$3\frac{1}{2}$ lines; breadth, 1 inch $7\frac{1}{2}$ lines.

ANOUS MELANOGENYS (Black-cheeked Noddy Tern). *Locality*—Coast of North Queensland and throughout Polynesia. *Egg*—Of a soft, warm, white colour, sparingly smudged and spotted with rusty brown, the markings being generally confined to the larger end of the shell. A few clouded markings also appear underlying the shell's surface. Dimensions fairly regular; average of six examples is 1 inch $9\frac{1}{2}$ lines x 1 inch $3\frac{1}{4}$ lines. The Rev. F. M. Nobbs, who kindly forwarded specimens, informs me that this tern breeds on Norfolk Island during December. It breeds in colonies. One egg only is deposited in a nest of seaweed, very firmly secured to branches of trees. Some nests are placed on large trees, half a mile inland; others on dwarf scrub, close to the sea shore. (A. J. C., *Victorian Naturalist*, September, 1888.)

LARUS LONGIROSTRIS — (Long-billed Gull). *Locality*—West Australia. *Egg*—Long in shape, of a light olive colour, fairly distributed all over with spots and patches of darker olive and grey, the latter colour, as usual, appearing as if under the shell's surface. Length, 2 inches 2 lines; breadth, 1 inch 5 lines.

573. PORZANA FLUMINEA (Spotted Water Crake). *Locality*—Queensland, New South Wales, Victoria, South Australia, and Tasmania. *Egg*—Ground colour pale olive, very minutely freckled with reddish brown, and also fairly distributed with larger markings, or round blotches, of reddish and purplish brown. Shell comparatively strong, finely grained, and surface polished. The eggs resemble in a remarkable degree Porphyrio and Gallinule's eggs in miniature. Length, 1 inch 3 lines; breadth, $10\frac{1}{2}$ lines.

I am indebted to Mr. E. D. Atkinson for the pleasure of first examining and describing a set of these rare and interesting eggs. It may be remembered, in describing the eggs of Lewin's Rail (*Hypotœnidia brachipus*), in my last "Supplement," I stated that Gould had in error described one of the *Porzanæ*—an error quite pardonable, considering the similar habits of both birds. It will now be seen there is no room to doubt that the Spotted Crake's eggs were taken by the great author for the Rail's.

Mr. A. E. Brent, by the aid of a favourite Gordon setter, was very successful in finding three of the Spotted Crake's nests in the reedy lagoons formed by the overflow of the River Derwent, in Tasmania, and, therefore, had ample opportunities for identifying the birds. He states that two nests contained each four eggs, and the other five. It was about the first week in November. The nests were among bunches of rushes, partly on the water and constructed of aquatic weeds for foundation, and lined with soft "band" grass, which was damp. A staging or track led up from the water to the nest.

The eggs in my own collection (a set of four) were from Slab Creek, South Queensland. They are similar in every respect to the Tasmanian eggs, with the following dimensions in lines, viz. : —(1) 14½ x 10¾; (2) 14¼ x 10½; (3) 15¼ x 11; and (4) 14 x 10¾. In the case of this nest, it was taken among water-lilies and rushes, and was composed of dead rushes in a wet state.

Since my figure and description of Tabuan Crake (*P. tabuensis*) in "Nests and Eggs," I have received another example from Tasmania, which is more elongated in form, and is 1 inch 2½ lines x 10 lines as against 1 inch 2 lines x 11 lines in the figure. The late Mr. T. H. Potts's dimensions are 1 in. 4 lines x 10 lines. The nest of the Tabuan Crake is found near water, constructed of soft grass, and generally situated under a thick tussock of grass, on the lee side, where it droops over. The complement of eggs appears to be four in number.

The nest and eggs of the Little Crake (*P. palustris*) have been accurately described by Gould.

The White-eyebrowed Crake (*Erythra quadristrigata*) is the fourth and last of the Australian water crakes. Dr. Ramsay described an immature egg taken from the oviduct of this bird in 1868. But, through the goodness of Dr. Kutter, of Germany, who thoughtfully forwarded me extra pages of "Cabanis' Zeitschrift für Ornithologie" (1884–6), containing a more complete description of his examples of nest and eggs of this Crake, taken in the Austro-Malayan Archipelago, I embody with much pleasure the following :—

576. ERYTHRA (*Porzana*) QUADRISTRIGATA (*cinereus*), (White-eyebrowed Water Crake). *Locality* — North Australia and Queensland. *Egg*—The form is somewhat elongated, with well-rounded ends; the ground colour a light clay-yellow. The markings consist of specks or dots, usually close together, and partly confluent, and blotches of reddish-brown. Shell pretty thin, slightly lustrous, and of fine uniform texture. Length, 1 inch 3 lines; breadth, 10½ lines.

Two nests were found on the ground, 11th and 14th April, 1883, with two and four eggs respectively, slightly incubated. One nest was somewhat shallow, constructed of the bottom part of rushes and covered with fine grasses. Diameter about 2¾ x 1⅜ inches. The other was, according to the description of the collector, built of the leaves of rice-straw.

The eggs resemble the former description, but are somewhat broader, and of more compressed form. The markings on the light clay-yellow ground are usually stronger and of a reddish-brown, and a few violet dots and spots are distributed sparingly over the surface of the shell. Only at the larger end are the markings in the form of a belt or zone, so that some of these

specimens approach in their type those of the *Gallinulinæ*, and are very like miniature examples of the eggs of *Erythra phœnicura*. Dimensions, between 1 inch 1½ lines x 10½ lines and 1 inch 2½ lines x 11½ lines.

It is of great interest and importance that the eggs of all these diminutive waders are now known, because "doctors differ," and the birds have been placed under six or more genera. Gould, who was dubious of his own classification, and, alluding to one of the crakes, stated—"I can assure them (the rising ornithologists and, I may add, oologists of Australia) that the study of the eggs will greatly assist them in assigning the birds to which they belong to their proper genus."

The eggs of the Little Crake (*P. palustris*) and the Tabuan (*P. tabuensis*) undoubtedly appear to be typical of the true *Porzanæ*, as contrasted with Spotted Crake (*P. fluminea*) and White-eye-browed (*P. cinereus*), which appear oologically different; or, as Dr. Kutter remarks, with reference to the last-named, they approach in their type those of the *Gallinulinæ*, and form a well-defined oological sub-group of the family *Rallidæ*, or Rails.

627. PTERODROMA MACROPTERA—(*gouldii*), (Great-winged Petrel). *Locality*—New South Wales and Tasmania. *Egg*—An example taken in July at Cape Maria Van Diemen, the extreme north of New Zealand, is white, well proportioned in shape, with a somewhat broad apex, in contrast with the smaller end, which is sharper, but gradually rounded off. Texture of shell rather fine, except at the smaller end, where it is slightly granulated. Length, 2 inches 8¼ lines; breadth, 1 inch 10¼ lines.

The egg of this petrel is mentioned in the "Manual of the Birds of New Zealand" (Buller); one egg is laid in a burrow, with a few leaves and grass for a nest. In the Hauraki Gulf, Reischek found them breeding in colonies in the beginning of September; the young are full grown in February.

It is interesting to record the occurrence of the egg of the Bronze Cuckoo (*Chalcites basalis*) in the nest of the Grass Warbler (*Cisticola ruficeps*). This curious combination clutch, which is exhibited here to-night, was taken on King Island. I also take this opportunity of recording the White-fronted Chat (*Ephthianura albifrons*) amongst the foster parents of this Bronze Cuckoo, undoubted evidence of which I received a season or two ago.

NOTE.—The following new eggs have been described by Mr. A. J. North, F.L.S. :—*Eopsaltria capito* (Large-headed Robin), *Stictoptera annulosa* (Black-rumped Finch), *Ailuræedus maculosus* (Queensland Cat-bird)—reference, P.L.S., N.S.W., vol. iii., part 1; and *Rhipidura priessi* (Priess's Fantail)—same vol., part 2. By Mr. R. D. Fitzgerald, jun., *Sphecotheres maxillaris* (Southern Sphecotheres)—P.L.S., N.S.W., vol. ii., part 4.

THE PALOLO.

[In connection with the note on the habits of this worm, as noticed by Consul Churchward, which we published in our last October issue, p. 76, we have received the following from the Rev. Lorimer Fison, M.A., so well known for his ethnological studies in the South Seas.—Ed.]

The following is an extract from the *Sydney Morning Herald* of 13th December, 1881 (own correspondent's letter):—"The mbalolo also has put in its annual appearance after its own queer fashion, and the natives have rejoiced in their yearly feast upon it. This extraordinary seaworm comes to the surface but once a year, and always at the same time. It appears in thickly crowded masses, near the reef, in the early morning; and, as the day grows hot, its swarms apparently melt away and disappear, to be seen no more until the waning of the next November moon."

The true explanation of this phenomenon was first discovered, I believe, by the Rev. S. J. Whitmee, of the London Mission in Samoa; but his discovery does not appear to have attracted the attention it deserves. The swarming of the mbalolo is the coming together of the sexes, and this event is the termination of mbalolo existence. When it takes place, both individuals burst, dissolving as it were in a shower of spawn, and nothing is left of them but little black specks, which the natives call their "heads." The spawn, or ova, sink down into the crevices of the coral reef, and nothing further is seen of them until they come up, fully developed, in the following year to burst and disappear in their turn. It might be possible to construct an aquarium in which the ova could be preserved and their development watched.

In "Hazlewood's Fijian Dictionary" the following note appears:—"*Balolo* (the B is *mb*), a kind of seaworm found only on some reefs about the 25th November. It is much esteemed by the natives when cooked. It gives the names to the months Balolo-*lailai* and Balolo-*levu (little* and *great)*. From its appearing so seldom, we have the proverb—"E kua gona ni balolo, me na kua sara"—("Now or never.") Literally—"If you don't (eat) balolo (now), you won't eat it at all."

Essendon, 18th February.

NOTES ON AUSTRALIAN LOGANIACEAE.

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

Logania flaviflora.

Almost herbaceous, never tall, imperfectly beset with very short hairlets; branchlets slightly furrowed; leaves short, very narrow, pointed, in distant pairs; flowers solitary, rather large, almost sessile; segments of the calyx linear, acute; corolla somewhat or hardly longer than the calyx, bright-yellow glabrous or bearing only extremely minute papillular hairlets; anthers nearly sessile

between the lobes of the corolla, several times longer than broad, whitish; stigma ellipsoid-cylindrical, longer than the style, smooth; ovulary scantily beset with hairlets.

Near the most eastern sources of Swan-River (Edwin Merrall); found also by James Drummond, but not so far inland, as 651 of his earlier collections belongs also to this species. *Logania spermacocea* differs already in much longer hairlets, quite pale almost white corollas, shorter anthers, style longer than the stigma, and the fruit of the two may also be different. Just as *Mitrasacme lutea* is the only species with throughout yellow corolla within its genus, so *Logania flaviflora* also stands alone among its congeners in this respect. It belongs to the eastern slope of the country in Western Australia, whereas *L. spermacea* pertains to the litoral tracts there.

Logania paniculata (Kunth and Bouchè, index semin. hort. Berolin. 1847, p. 12; Walp. Annal, i. 513) has been identified by Al. Braun as *L. longifolia;* Bureau's *L. neriifolia* ("Thèse de la Famille des Loganiacées" 1856, p. 80), with an analytic drawing, is doubtless also reducible to one of the previously described species.

L. stenophylla occurs near Eucla (G. R. Turner).

L. micrantha has been sent by Mr. Th. Muir from near the eastern sources of Swan-River in a variety, with crowded and shorter leaves, pentamerous flowers and bilobed stigma.

L. floribunda reaches southward to the Genoa. Miss H. Carter, on Hunter's River, noticed the flowers to exhale quite a powerful perfume. Thus the generic name *euosma* is not altogether objectionable.

L. pusilla has been gathered on the Brisbane-River by Mr. F. M. Bailey, on the Myall-River by Mr. Ch. Fawcett, on the Shoalhaven-River by Mr. W. Baeuerlen.

Mitrasacme Archeri grows also at Lake Fenton (F. v. M.) Leaves rigid and shining.

M. montana was found on Mount Arrowsmith by Messrs. Thos. and Benj. Gulliver.

M. serpillifolia was noticed between the Nicholson-River and Tambo (Schlipalius), and on the Clyde (Baeuerlen).

M. pilosa occurs in a sphagnum-bog between Mount M'Intyre and Mount Burr (Prof. Tate).

M. alsinoides was also sent from the Myall-River by Mr. Ch. Fawcett.

M. polymorpha grows on the Clarence-River (Fawcett), near Broger's-Creek and Jervis-Bay (Baeuerlen).

M. gentianea extends to the Ord-River (O'Donnell).

M. distylis was obtained near the Onkaparinga (Tate), Yarra-Yarra (F. Reader), Barwan (J. B. Wilson), in Kangaroo-Island (Tepper).

Strychnos psilosperma extends to Trinity-Bay (Sayer).

On the Irruption of *Syrrhaptes paradoxus* (Pallas's Sand Grouse), (Communicated by Professor Newton, M.A., F.R.S., to Mr. A. J. Campbell).

THE author began by observing that twenty-five years before, almost to a day, he had made a communication with the very same title to the section at Newcastle, and he had then been bold enough to anticipate a recurrence of the irruption of which he then treated, a full account of which appeared in "The Ibis" for 1864. After briefly pointing out the peculiarities of this singular form of bird, and tracing what was known of its early history, especially of its appearance in Europe prior to the first great irruption of 1863, he proceeded to notice the two small and less known visitations of 1872 and 1876. In the former of these it had only been observed in two localities—one on the coast of Northumberland, the other on that of Ayrshire—in both cases in the month of June, though in neither was any specimen procured. In the latter (1876) it was observed in three localities—one being near Winterton, in Norfolk (in May), another near Modena, in Italy (in June), and the third in the county Wicklow, Ireland (in October). The irruption of the present year had been on a large scale, at least as large as that of 1863, if not larger—certainly the number of observations was greatly in excess. It had also taken place fully a month earlier. From the information at present in his possession it had extended further to the southward—in Italy to Orvieto, and in Spain (which country had been for the first time reached) to the Albufera of Valencia; and to the westward—to Belmullet, in the county Mayo; but at present it seemed to have fallen short as regards its northern limits, though very possibly time would prove that localities quite as far towards the north as on the former occasions (the Nord Fjord, in Norway, and the Færoes) had been attained. The limits of all the irruptions from 1859 to 1888 were shown on a map, and in this way it was evident that the general direction of all was practically identical. The discovery of the "radiant point" (which might be assumed to be beyond the Caspian Sea) was very desirable, and on this matter the author hoped trustworthy information might be received from Russian observers. With regard to the causes which had led to these extraordinary movements, he wished to express himself cautiously; but their apparent regularity inclined him to think that they were not due to any "convulsion of Nature," as some persons supposed, but rather, as he had before suggested, to the natural overflow of a redundant population. When more complete information had been obtained he hoped to treat this irruption at length in "The Ibis" for the year 1889 in some such way as he had treated that of 1863 —Report Brit. Assoc. Bath, 1888.

NOTES ON THE BUTTERFLY, *Ialmenus evagorus*, Don.—At the December meeting of the Field Naturalists' Club, I brought forward what to me was a very curious case of apparent sociability between ants and the larvæ of this pretty little butterfly. The matter was, I found, known to a few members; but none of them were able to clear up the singular habits of these insects, the general opinion being that the caterpillars were dependent for their well-being on their friends, the ants. Since last meeting I have had an opportunity of getting specimens of the larvæ, and watching their growth. In their natural habitat, they were found on poor, stunted, and almost leafless specimens of the silver wattle *(Acacia dealbata)*, and in every instance, where noticed, numbers of small black ants, about 3-16ths of an inch in length, were running up and down the shrubs, and about and over the caterpillars, even where there were only chrysalides, the ants were just as numerous; and I found, on further search, it was quite useless to look for the larvæ on bushes where no ants were to be seen. Examining the larvæ closely, no reason for this extraordinary behaviour could be seen, no visible moisture for the ants to clear away being exuded by the caterpillars. I determined to take a few specimens home and rear them, if possible, away from the ants, in order to test the theory before mentioned, and see if it would make any difference in their development. These, perhaps, were not fed quite so regularly as they should have been, and all but one have, up to the present, gone through the chrysalis stage and become perfect insects, apparently none the worse for their removal from the attentions of the ants. The length of time spent in the chrysalis stage was twenty to twenty-two days. It was very curious to watch the little butterflies on emerging from their chrysalises. I timed one or two, and found that in quarter of an hour from the time of emergence, their wings had expanded to their full size, and in another half-an-hour they were able to make use of them to fly. Another point which is rather singular about these butterflies is the amount of chloroform they can inhale before it overcomes them; for their size, they are the most difficult insect to kill by this means that I know of. From these observations I think that the absence of the ants is no hindrance to their proper development, and whatever the functions of the ants may be, can only be found out by observations on the spot, as it would be impossible to remove them with the larvæ. I shall be glad if any member, observing similar cases either with these or other insects, will forward notes on the subject to the Editor of the *Naturalist*, and thus increase the value of our journal as a medium for the exchange of opinions and ideas.—F. G. A. BARNARD, Kew, 8th January, 1889.

Field Naturalists' Club of Victoria.

President:
A. H. S. LUCAS, M.A., B.Sc.

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 popularizing 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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THE FIELD NATURALISTS' CLUB OF VICTORIA.

The monthly meeting of the club was held at the Royal Society's Hall on Monday evening, 11th March, 1889.

In the absence of the president and vice-presidents, Mr. D. Best (hon. treasurer) was voted to the chair, and about 50 members and visitors were present.

A letter was read from Mr. W. B. Waterfall, Bristol, England, thanking the club for the insertion of his exchange notice *re* mosses in the *Naturalist*, and offering to assist members in any way possible in England.

The hon. librarian reported the receipt of the following donations to the library:—"List of the Genera and Species of Sponges descibed by H. J. Carter," by Mr. A. Dendy, M.Sc., from the author; "Key to Victorian Plants," part 1, and "Select Extra-tropical Plants," 7th edition, by Baron Von Mueller, K.C.M.G., from the Government; "Proceedings of Royal Society of Tasmania," 1886 and 1887, from the society; "Proceedings of Royal Society of Queensland," vol. v., part 5, from the society; "Proceedings of Victorian Branch of Geographical Society of Australasia," vol. vi., part 2, from the society; "Descriptive Catalogue of Sponges in Australian Museum, Sydney," by Dr. R. von Lendenfeld, from the Museum Trustees; "Journal of New York Microscopial Society," vol. v., part 1, from the society; "Journal of Bombay Natural History Society," vol. iii., part 4, from the society; "Journal of Pharmacy," February, 1889; "Rural Australian," March, 1889.

On a ballot being taken, Messrs. E. F. J. Love, M.A., A. S. Hemmy, and G. Neilson were duly elected members of the club.

PAPERS READ.

1. By Rev. F. R. M. Wilson, entitled "A Hunt for Lichens in East Gippsland" and "A List and Descriptions of New Victorian Lichens." The author gave an interesting account of a visit to the country around Orbost, on the Snowy River, and around Cunninghame, at the Lakes' Entrance, which latter district he thought in a more favourable season,—*i.e.*, one free from bush-fires—would be well worth the attention of naturalists. He submitted a list of 66 species of lichens new to Victoria, and descriptions of 30 species new to science, which were taken as read.

2. The hon. secretary read a paper by the Rev. J. E. Tenison-Woods, F.G.S. (hon member), entitled "The Geology of Arnhem's Land," part ii. This continued the description of the characteristic geological features of the Northern Territory, and gave some account of the mineral resources of the country.

Natural History Notes.—Mr. T. G. Sloane, of Mulwala, New South Wales, forwarded a note on the effect produced on certain beetles of the group *Carenides* by preserving them in methylated spirits of wine, which created some little discussion.

Mr. A. J. Campbell read a note on the crested penguins of Australia and New Zealand, *Catarractes chrysocome* (Latham) and *Eudyptes pachyrhynchus* (Gray), which he considered identical species.

The following were the principal exhibits of the evening :—By Mr. A. J. Campbell, mounted specimens of crested penguins, *Catarractes chrysocome* (Victoria), with eggs, and *Eudyptes pachyrhynchus* (New Zealand); the little penguin, *Eudyptula minor;* and the fairy penguin, *E. undina.* By Mr. A. Coles, birds from Ceylon, blue and orange-faced eutymiza, and cobra de capello, from Ceylon. By Mr. C. French, jun., eggs of red-necked avocet, New Holland snipe, friar bird, olivaceous thick-head, from Victoria; red-necked rail, from Queensland; and great acanthiza, *A. Ewingii,* and great-tailed thickhead, from Tasmania. By Mr. H. Grayson, a collection of New Zealand diatomaceæ, mounted for microscope. By Mr. R. Hall, specimen of Ceylon tea plant, with seeds. By Mr. G. A. Keartland, a whistling eagle, Jardine's harrier, Australian shoveller, and nest and eggs of lanulated honey-eater. By Mr. H. Kennon, bivalve shells from South Pacific Ocean. By Baron F. von Mueller, K.C.M.G., a new Victorian orchid, *Drakæa Huntiana* (F. v. M.), from East Gippsland.

After the usual *conversazione* the meeting terminated.

THE GEOLOGY OF ARNHEM'S LAND, N.A.—PART II.

By the Rev. J. E. Tenison-Woods, F.L.S., F.G.S.
(Hon. Member.)

(*Read before the Field Naturalists' Club of Victoria, 11th March,* 1889.)

Fluviatile Sandstones and Conglomerates.—These are extremely hard sandstones, found only on the banks of streams. The stone is horizontally stratified and crossbedded, the finer laminations being marked with black specular iron; it contains much rounded and waterworn quartz gravel, varying greatly in size. A few waterworn fragments of the underlying porphyry are also found in the conglomerate. The majority of the pebbles

are of white quartz, of which, strange to say, there are no veins in the porphyry rock. This sandstone forms table-lands on both sides of the Katherine River a mile, or two in width, for some miles. Then the metalliferous slates succeed, with tin and alluvial gold. The fluviatile sandstone formation is much broken into immense boulders, and rocks of most fantastic shapes. It is very hard, but being full of cracks and fissures, it weathers easily, and gives rise to an exceedingly rough and almost inaccessible country. It is composed of sandbanks and river boulders which have hardened since the rivers cut through them.

The formation dips away to the east along the existing streams at an angle of about 30 degrees. Mount Douglas will afford an illustration of this. It is a castellated hill, quite abrupt on its south-western end, and showing in section 400 ft. to 500 ft. of these fluviatile conglomerates. It forms the extreme end of ranges of very broken meridional hills not exceeding 500 ft. in height. The strata dip away from the River Mackinlay at an angle of 30 degrees, possibly representing the direction of the currents wherein the conglomerates were formed. I have noticed a similar dip at the Margaret River, Kekwick's Springs, near the head of the Mary, and at the Katherine and Victoria Rivers. This uniform dip, its hard flaggy nature, and the included waterworn pebbles, are unmistakable characters of this formation.

These conglomerates have probably been derived from a river channel through the paleozoic rocks, which contain an abundance of quartz reefs. The sand has been an ash deposit filling up the channel and mingling with or covering up the conglomerate, which generally increases towards the base of the formation, to the exclusion of the sandstone. This formation does not differ essentially from what are called the "drifts" of Victoria and other colonies.

Desert Sandstone.—This peculiar formation varies much in colour and character, though mostly of a bright and livid red, yet it is often white, yellow, mottled, &c. It is usually composed of small, somewhat rounded sand grains, though in some places there are admixtures of magnesite, carbonate of magnesia, &c. It gives rise to a desert country with scanty vegetation, is generally destitute of fossils, and is of a broken, precipitous character, forming table-lands with precipitous faces, and round, flat-topped hills. It is nearly always of uniform height, and is probably underlain throughout Arnhem's Land by the crystalline schists. Mr. Daintree, who named the formation "desert sandstone," was of opinion that it at one time covered the whole continent; but my own observations and microscopic examination of the sands have led me to conclude that it is derived from

volcanic ashes. This conclusion is borne out by the fact that recent volcanic formations are nearly always found in close proximity to it. The formation is found in patches throughout all tropical Australia. The geological age of these sandstones is uncertain, but they probably belong to the two great volcanic periods of tertiary age. The lowest beds lie upon the cretaceous formation.

The following report upon specimens of desert sandstone has been made by Professor Liversidge, at my request:—"I have carefully examined the two specimens—one labelled 'Building stone, Palmerston;' and the other, 'Cliffs, Fanny Bay, Port Darwin.' Both of them are essentially indurated white argillaceous rocks, such as are commonly called pipe-clays. They are both only slightly soluble in strong acid, and do not give off carbonic acid, and they both give the reactions for alumina; the Palmerston one is free from magnesia (*i.e.*, in the acid solution—I have not examined the insoluble portion, except for alumina); and the Fanny Bay stone give a trace of magnesia only—hence the name magnesian sandstone is hardly applicable. They seem to correspond to the white indurated clay found in the Hawkesbury sandstone about the North Shore, &c."

Minerals.—Arnhem's Land has frequently been represented as a country poor in minerals, or, at any rate, one whose mineral resources were not of a paying kind. It is much to be regretted that the statements of incompetent persons in this matter have prevented speculators from risking their capital. The country is, in fact, fairly rich in minerals; and if, hitherto, the mines have not paid well, the true cause will be found in the fact that the climate is unsuited for European labour. There is no scarcity of gold, though, doubtless, improved methods of extraction, as well as steady and persevering industry, are required to make it pay. But the important point to be remembered is that Mount Morgan, one of the richest mines in the world, has been found under geological conditions which are by no means uncommon in the Northern Territory; and it is not improbable that careful prospecting should lead to the discovery of mines not inferior in value.

Silver is found in many parts of the territory in quartz veins, and also associated with lead and copper. The silver-lead veins have generally been found on the edge of the slates, and near the junction of the granite. Comparatively few of them have been prospected as yet, and only one or two have been worked. The Eveleen mine is situated on a small outlier of ancient crystalline limestone.

The Northern Territory may be said to be exceedingly rich in tin; in fact, it is decidedly a tin country, the lodes being more extensive and numerous than in any other part of Australia. Tin,

however, is a very uncertain mineral, and its tendency to appear and disappear unexpectedly is likely to have a depressing effect on speculators in the mines of Arnhem's Land. There are in many places along the edge of the granite country "pockets" of extraordinary richness. They are not, I believe, connected with veins. A little stream-tin has been found in a few streams, but the great mass of the tin ore remains in its matrix in the crystalline schists.

Copper is found in many parts of the territory, and would be found in many more if prospected for. Iron occurs everywhere, and there are several indications of nickel, graphite, manganese, zinc, antimony, and bismuth. I have also seen excellent specimens of platinum, which is said to be abundant.

This nearly completes all that is to be said about the economic geology of Arnhem's Land. There is, however, something remaining to be told about curious and interesting geological facts. First, with regard to the volcanic period, which I consider to be intimately connected with the desert sandstone. The consequences of the pliocene volcanic period are of tremendous importance. The line of volcanic action seems to have kept mostly along the sea coast, nearly all round the continent, and this fact would indicate that it had something to do either with subsidence or upheaval. The most extensive evidences of upheaval are on the south side, where it has taken place to the extent of about 600 ft. for over 1,000 miles. A tremendous ejection of material from below, chiefly volcanic ash, dust, glass, and sand, with lesser quantities of lava, &c., has accompanied the volcanic period, covered the ground with hills of sandstone, and rendered the sea of North Australia shallow for a great distance off the coast. The chemical character of the ash strata was very varied, as they were composed of ferruginous and siliceous sandstones, magnesite and volcanic glass, and had many other local peculiarities.

The physical features of these volcanic areas are most interesting. Having fallen, like snow, in loose heaps not more than 700 ft. thick, they only lay undisturbed where the foundation was secure. It will be easily understood that in the river valleys they would be swept aside, and form cliffs overhanging the water. These valleys are now lined with great boulders and piles of sandstone, looking as if tremendous earthquakes had shaken and riven the rocks to their foundation. But, in truth, there have been no subterranean forces, and the present state of the strata is probably due to some portions having become sufficiently hardened to resist the action of the water, while the looser portions have been washed away. The effect of running water on loose volcanic beds is clearly shown in the cliffs and gorges of several of the rivers in the Territory. Doubtless these same

rivers existed during the volcanic period, and easily cut channels through the loose ejectamenta, which time and weathering have modified into their present state.

Finally, with regard to the vegetation of this period. It is probably buried in the form of thin coal seams or carbonaceous material. Leaf impressions have been found in similar deposits in other parts of Australia and in Tasmania, attributable, I believe, to the same volcanic period, but none in the desert sandstone. It may be, however, that fossils of the ancient flora may yet be found at the base of the sandstone; but I do not anticipate that such vegetable remains will be very numerous in Arnhem's Land, as the conditions favourable to their preservation seem to have been absent.

The foregoing epitome of the geology of Arnhem's Land I have purposely made very brief, to meet the requirements of the space at the disposal of the Field Naturalists' Club. The facts here stated have not, however, been previously placed before the public. It forms the briefest possible account of the geology of North Australia, which, though discovered nearly 300 years ago, has only lately been explored.

DESCRIPTION OF A NEW FORM OF THE ORCHID-GENUS DRAKÆA, INDIGENOUS TO NEW SOUTH WALES AND VICTORIA.

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

Drakæa Huntiana.

Leafless at flowering time; empty bracts, two; flowers three or two; stalklets much longer than the floral bracts; all three calyx-lobes about as long as the pair of petals, reflexed, somewhat shorter than the prolongation of the gynostemium; petals linear-elliptical; stalk-like portion of the labellum almost longer than the horizontal portion; the latter glandular-bilobed at the lower end, beset with purplish hairlets at and towards the middle, extended at the upper end into a fringed comparatively long membrane; gynostemium provided at and below its summit with opposite semilanceolar membranous much pointed appendages; fruit narrow-ellipsoid.

Between loose stones on Mount Tingiringi, at an elevation of about 5,000 feet (W. Baeuerlen).

In our present state of knowledge, concerning specific demarcations, this plant cannot be considered conspecific with *D. irritabilis*, because that plant, from all its hitherto known localities, has very short flower stalklets, unequal calyx-lobes, very narrow petals, a much shorter protraction of the gynostemium and an unfringed appendage of the labellum.

On this evidently rare and autumnal-flowering Drakæa has been bestowed the name of Robt. Hunt, Esq., C.M.G., F.G.S., Master of the Sydney-Mint and Vice-President of the Committee of the Technological Museum there, in recognition, however inadequate, of his favouring for a long while the collecting journeys of the discoverer of this plant.

Two observers have drawn into doubt the irritability of the labellum of *D. irritabilis*, a characteristic on which, in 1856, I founded the specific name of that plant. But Mr. Baeuerlen also noticed in *D. Huntiana*, that at the slightest touch the labellum snatches across to the anther and stigma, subsequently returning with slowness to its remote positions. On one specimen before me is observable, that the new growth of *D. irritabilis* commences with leaves; these however have withered away, when the stem advances to the flowering state. Unrecorded localities of *D. irritabilis* are: Cave-Creek (W. Armitt), Newcastle (R. Fitzgerald). *D. elastica* occurs on Stirling's Range (F. v. M.), at Geographé-Bay (Miss Bunbury).

Of the nearly-allied genus Caleya we have species now from the following localities, also:—*C. major*, Airey's Inlet (Mrs. E. C. Parke), Barghurk-Creek (J. Johnson), Moe (Dr. Lucas), Fulham (Mrs. Martin), Lal Lal Creek (Weidenbach), Richmond-River (Fawcett). The empty bract is, in some instances, placed near the stem-base; occasionally as many as six flowers occur. *C. minor*, Ulladulla (Baeuerlen). The plant however, which as such is mentioned in the "Fl. Austr." from New England, proves to be a small state of *C. major*. *C. nigrita*, Upper Swan-River (Miss Sewell).

VICTORIAN SHARKS.

By A. H. S. Lucas, M.A., B.Sc.

(Read before the Field Naturalists' Club of Victoria, 14th January, 1889.)

I have thought that it will be convenient to put together a brief account of the members of this sub-order of fishes which are to be met with near our coasts. Whether seen swimming around, or, as has occasionally happened, within, our public baths, or captured after an exciting chase by a crew of indignant fishermen and exhibited at one of our seaside resorts, or when tossed on the shore contemptuously as the nets are emptied, or when pulling familiarly at the line which the disgusted amateur is trailing for flathead or snapper, the shark, great or small, whenever and wherever he appears, is interesting.

It is easy to tell a shark or dog-fish (for dog-fish are but small sharks) from one of the ordinary bony fishes. The shark has five gill-slits on each side of his neck; other fish a single, usually wide, slit protected by a number of flat bones arranged to

form an "operculum." His mouth is not on the front border of the head, but on its under surface, hidden away as if to suggest to the world at large that he really has not got a mouth at all, you know. Thus when a shark turns it means more than when the worm does. His skeleton is not bony but cartilaginous, and thus the suppleness of his long body is secured, while his two pairs of fins are relatively larger and stouter than those of his neighbours, and worked by formidable batteries of muscles. His cerebellum is large, and, in consequence, he can deftly steer and dexterously regulate his movements. The lobes of his tail-fin are very markedly unequal, and if he has scales they are tubercular or spiny, and scattered in their arrangement.

The rays are closely allied to the sharks, but are adapted for life on the sea bottom, and flattened horizontally. The head is very wide from side to side, and the five gill-slits accordingly appear on the under surface.

Owing to their great swimming powers, which renders dispersion easy, and also to their antiquity—for their pedigree can be traced back to early geological periods—the distribution of sharks is world-wide. The larger forms abound in the tropics, as a rule, and hence everyone knows the danger of bathing in the Caribbean or the South Seas, but the smaller forms abound in temperate regions, and it is true, though not a matter of alarm, that the shores of England are beset with millions of sharks, which swarm in her waters.

Even some of the species are world-wide in their distribution. In November, 1883, I was attracted by a placard in Swanston-street, announcing that a huge shark, 36 feet long, was on view within. It was a Basking Shark *(Selache maxima)*. It had never previously been met with out of the Northern Hemisphere. In all probability this individual shark was captured in the middle of a voyage round the world, which recalls the daring and filibustering expeditions of Drake and his comrades. Another solitary visitor from European Seas, a specimen of the Spiny Shark *(Echinorhinus spinosus)*, was captured at Portland in November, 1886, and has been secured by Professor M'Coy, and can be seen, beautifully mounted, at the museum. In an adjoining part of the building is a European specimen, with which our strayed one may be compared. One cannot say that he seems to have suffered in the globe-trotting. In neither of these cases has a second individual, apparently, been detected in Australian seas. But single specimens of each have since been taken off New Zealand. One of the terrible *Carcharius melanopterus*, allied to the "Blue Shark" of European seas, a fellow 15 feet in length, and with 112 serrated teeth, is recorded from Hobson's Bay by Professor M'Coy. He had probably strayed from the North. The form is common in Torres Straits and off North Australia. The Blue Shark itself, singularly enough, is common in Port Arthur, Tasmania. It does

not seem to have been yet recorded in Victoria, but will probably be taken on our side of the Straits.

Other species, which roam widely, reach us more frequently. The Seven-gilled Shark *(Notidanus* or *Heptanchus indicus)*, about 5 feet, usually, in length, is occasionally found in Hobson's Bay, and as it also appears in Port Jackson and in Tasmanian waters, we may fairly claim it as a member of our fauna, though its home is in the Indian Ocean. It has, indeed, been taken anywhere in the seas between the Cape and California. The Thresher or Fox Shark *(Alopecias vulpes)*, with a tail as long as his body, attaining a good 10 feet in length, is one of those found in the English Channel. Professor M'Coy says that it is very rarely met with here ; he has two examples in the Museum, both obtained at Hastings. Mr. Bracebridge Wilson informs me that he has seen a school of them in Port Phillip, below the Quarantine Ground, in 1882, lashing the water with their long tails like so many porpoises. This fish has been noticed, too, in Port Jackson and about Tasmania. It follows the schools of herrings and allied clupeids, and when we have further visits from these we may expect to see more of the Fox Shark. The most terrible and infamous monster of all this notorious family—the great White Shark of the West Indian Seas *(Carcharodon Rondeletii)*—has himself deigned to call on a voyage of inquiry. Two specimens can be seen in the Museum. Both were caught in Hobson's Bay, near Brighton—one in 1873, the other in 1877. The genus is furnished with those huge, flat, triangular, serrated teeth, which impress the fossil-collector at Cheltenham. They are ranged in three ranks around the capacious gape. These sharks sometimes reach a length of 40 feet, and such carnivora as the Felidæ must be nibblers merely compared with such rapacious animals. One might make one bite of a dolphin, and then look round inquiringly for more. And the existing species is a pigmy in comparison with those of eocene and miocene times.

There seem to be only about ten kinds of strictly resident sharks as yet known or recorded, but there are almost certainly more. The list comprises the Hammer-head, the Grey Nurse, the Carpet Shark, the Angel-fish, a spotted Dog-fish, the common European Picked (or Spined) Dog-fish, the Australian Tope and Australian Smooth-hound, the local Saw-fish, and, lastly, the world-famous Port Jackson or Bull-head Shark.

The Hammer-head *(Zygæna malleus)* seems to be well established with us. It lives mostly in rather deep water, and is, in consequence, more rarely met with. The Port Phillip specimens are small. The Hammer-heads have a bad reputation for their ferocity, by which they seem to make up, to a certain extent, for their comparatively small size. They are at once recognized by the great lobes, one on each side of the head, which give the animal a T shape. This shark is to be found in most of the oceans.

The most dangerous of our local sharks is the Grey Nurse of the Sydney fishermen, or Bull Shark (*Odontaspis Americanus* or *taurus*). This is the fellow who is the hero of most of our shark fatalities. He comes into the Bay chiefly in the summer time, and makes a record most seasons. He reaches 10 feet in length, and his mouth is edged with rows of long, sharp, awl-shaped teeth. He is a decidedly Australian shark.

The Carpet and Angel sharks are ground sharks, and adapted to their station in life by their form and colouring. The Carpet Shark (*Crossorhinus barbatus*), or Wobbigong, is from 5 feet to 7 feet long, somewhat flattened, with the back brown, marbled with grey, so as to simulate the appearance of the sea bottom. Further, to imitate the tufts of weed, the head is "bearded," *i.e.*, furnished with a number of skinny appendages. It is probably tolerably abundant, but as it lies in deep water it is not very often seen, unless it has risen in the pursuit of its prey. The Angel-fish (*Rhina squatina*) lives upon the flat-fish, and is constructed to meet its requirements. The name was given to it on account of its form. The pectoral fins are widely expanded in the plane of the depressed body, and these are the angel's wings which have so impressed the fishermen of the old world. The head is flattened and broadened too, so that the fish has more or less of the shape of a fiddle. The Angel lies in wait in disguise, like a ray, until his keen but somewhat hidden eyes detect a flounder or plaice (himself disguised, but, alas! not sufficiently) swimming in wave-like motion close by. Then the Angel flops upon the prey, and by the motions of his great fins works it into his rather awkwardly situated mouth. These Angels are to be found where flat-fish, then, most do congregate.

An Englishman coming to Victorian shores finds the Tope and Smooth-hound very much like those he is familiar with, but notices the absence of spotted dog-fish. These last are the commonest sharks in the English Channel, and do much mischief in and to the fishermen's nets. There is only one Victorian species (*Parascyllium nuchale*) described by Prof. M'Coy, and that is not often seen. It is recognizable by its shark form, and the large black blotches irregularly dispersed over its skin. The Tope and Smooth-hound are our commonest sharks, found in great numbers all around the coasts. They are ground feeders, but are quick enough in their movements. Both have finely shagreened skins, grey-blue on the back and pale beneath. The Tope has sharp teeth for tearing flesh, &c., and the Smooth-hound rounded teeth for crushing shells and crustaceans. Both are slightly different from the European forms, and so systematic authorities make them distinct species. The separate names, *Galeus australis* and *Mustelus antarcticus*, are useful, at all events, to call attention to local variations. Our Picked Dog-fish (*Acanthias vulgaris*), it seems, has found no champion to mention its distinctness from

European forms. It has a strong spine in front of each of the two dorsal fins. It is called picked because of these picks or spines. It is not at all rare here, but not so abundant as in the English Channel. Another Acanthias is found off Tasmania, but I am not aware of a Victorian record.

I saw a letter once in the Melbourne *Daily Telegraph* giving to the public the information that our saw-fish was the *Pristis antiquorum*. A little knowledge is a dangerous thing. Our friend knew what a saw-fish was, and had seen the saw-fish described in popular works on natural history as *Pristis antiquorum*. The conclusion was easy. Any saw-fish is a *Pristis*. But the shark with the snout flattened and long drawn out, furnished with a row of teeth on each side, which is not unfrequently found in Hobson's Bay, is a much smaller fish than the monster *Pristis* of tropical oceans. A *Pristis* (*P. zysron*) is found in Moreton Bay, but the Port Phillip fish is a true shark, with the gill openings lateral and not ventral, the *Pristiophorus nudipinnis* of Gunther.

The last of our sharks is the Pig-fish, Port Jackson or Bullhead Shark, *Heterodontus* (*Cestracion*) *Phillipi*. I believe this is the only one of our sharks, except probably *Parascyllium nuchale* and *Acanthias vulgaris*, which is oviparous. Everyone is familiar with the leathery eggs with spiral folds to be found entangled among the stones and weeds of the shallow water in summer time. The Bullhead has attracted much notice from its dentition, which connects it closely with sharks long ago extinct which lived in European and other seas. It is the only shark with front cutting or tearing, and back crushing teeth. As will have been seen from the few remarks I have been able to make on the other species, this is the most peculiar and characteristic of our sharks. It is not found out of Australian waters.

The number of known species of sharks is about 160. If we reckon our 10 resident and 6 visiting members we make up about one-tenth of the total. Tasmania boasts 18 species; all Australia 39, as yet. As Tasmania records more forms than Victoria we shall probably have to increase our list. I shall be very glad, as Secretary to the Port Phillip Biological Committee of the Royal Society, to receive information or specimens. Notices of occasional visitors are, of course, interesting, but details of the habits and distribution of resident forms are of the greater value.

CORRESPONDENCE.

To the Editor of the Victorian Naturalist.

SIR,—Having seen in the October number of "Science Gossip" a most delightful account of the "Melbourne Field Naturalists' Club" *re* their expeditions to King Island, &c., I venture to ask

if any of the members would exchange specimens of seaweed *zoophytes* and *polyzoa*. I have a collection of some Australian species, and am most anxious to add to it. I have many duplicates of British, South African, and other algæ and zoophytes. I prefer them unpressed, merely dried, as they come out so well in sea-water. A small box by ship would, perhaps, be the easiest way of transmission, and I should only be too glad to pay the freight.—Yours sincerely,

(MISS) E. E. GORE.

26 Brunswick-square, Brighton, Sussex, England,
11th October, 1888.

To the Editor of the Victorian Naturalist.

DEAR SIR,—I wish to bring under the notice of the members of the Field Naturalists' Club the effect of methylated spirits of wine on "smooth" *Carabs* if they are left a long time in it. The result of a lengthened immersion in methylated spirits is to bring out rows of faint punctures on the elytra of at least some species of the group *Carenides*, which are naturally quite smooth. I am now sending specimens of *Euryscaphus arenarius*, *Carenum arenarium* and *Eutoma Loddonense* (?) which will illustrate this. The specimens marked "natural" show the beetles in their natural state, those marked "spirits" show the same species after a four months' immersion in methylated spirits. It will be seen that in these specimens of three genera of *naturally* smooth *Carenums* four months in spirits has produced seven rows of faint punctures—quite conspicuous in *Carenum arenarium*—on each elytron. Such a difference as is here shown to be caused by the agency of spirits of wine in specimens of the same species has been considered by the systematists who have described the species of this group as sufficient to justify their being regarded as *distinct* species. I have observed the same effect in specimens of the genera *Carenidium* and *Promecodorus* among the *Carabidæ*. This remarkable result of leaving their specimens for a long time in spirits is not, as far as I am aware, known to coleopterists. I only found it out through accidentally mislaying a bottle containing some *Carenums* last September. It contained specimens of the common forms here, and I was greatly surprised to find on pinning them about a week ago that the elytra of each specimen showed *punctate striæ*, a feature I had never seen in any of them before, though all were well known to me. I have not had time to investigate the matter thoroughly, but it seems a very important one to collectors, so I hope members will experiment with *any smooth Carabs* they may get, and let us know the result of their investigation. The cause would be worth finding out.—I am, yours, &c.,

THOMAS G. SLOANE.

Mulwala, N.S.W., 4th February, 1889.

Field Naturalists' Club of Victoria.

President:
A. H. S. LUCAS, M.A., B.Sc.

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 popularizing 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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