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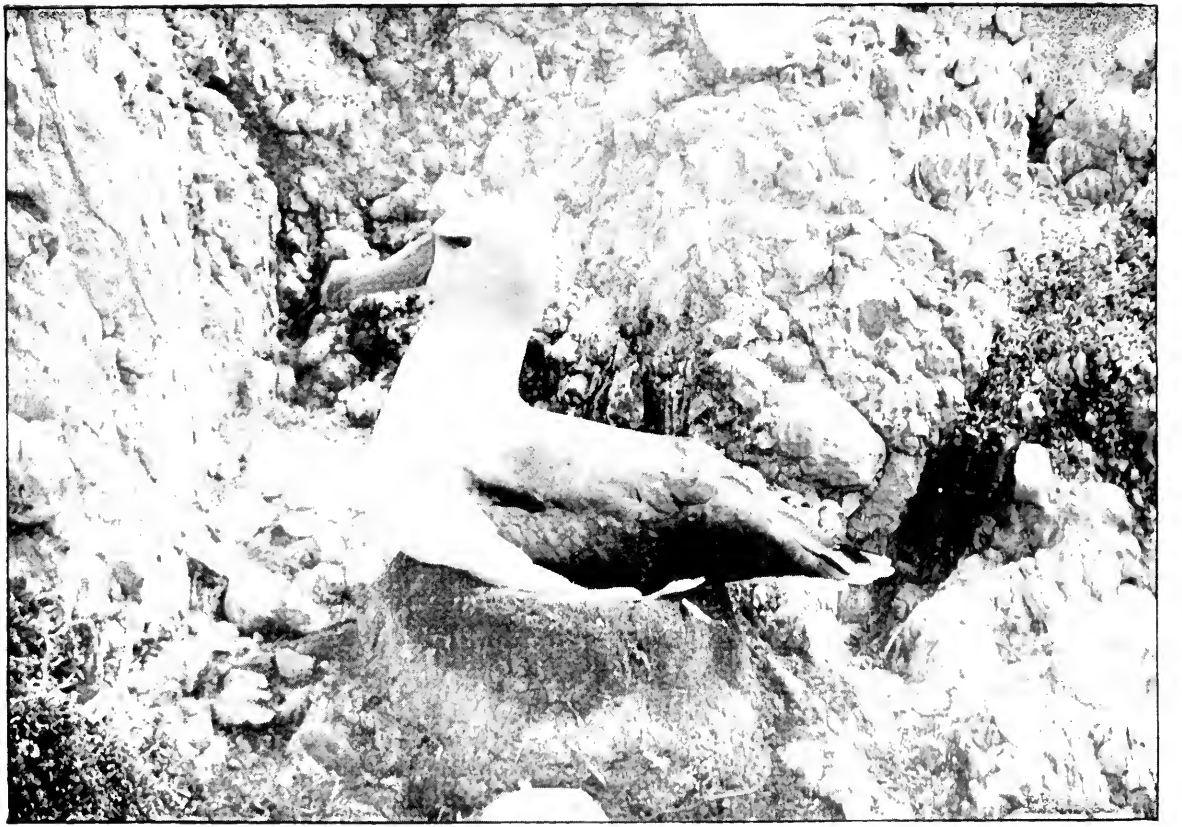
INDEX TO VICTORIAN NATURALIST.

VOL. XIII.

ILLUSTRATIONS.



NEGATIVE BY H. P. C. ASHWORTH.

SHY ALBATROSS ON NEST.

THE

Victorian Naturalist.

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FIELD NATURALISTS' CLUB OF VICTORIA.

THE ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 13th April, 1896. The president, Professor W. Baldwin Spencer, M.A., occupied the chair, and some 60 members and visitors were present.

REPORTS.

Reports of the Club excursions to Studley Park and Willsmere were received from the respective leaders, Mr. T. S. Hall, M.A., and Messrs. W. and J. Stickland. At the former excursion the many interesting geological features of the Yarra basin were pointed out, and the members present were delighted with the lesson in field geology they received. The Willsmere excursion was also well attended, and the ponds in the locality yielded fair results.

PAPERS.

The paper on "Intermediate Hosts of Fluke," by Rev. W. Fielder, was postponed, owing to the rather sudden death of Mrs. Fielder, and on the motion of the Chairman the hon. secretary was directed to convey to Mr. Fielder the deep sympathy of the Club in his sad bereavement.

By Mr. J. Shephard, entitled "A New Rotifer." The paper dealt with the important discovery of a new species of Lacinularia, to which the name of *L. elongata* was provisionally given. Drawings of several species for comparison were shown, and also specimens preserved in formalin under the microscope.

EXHIBITION OF SPECIMENS.

The following were the principal exhibits of the evening:—By Mr. F. G. A. Barnard.—Plant of *Polypodium serpens*, from Queensland. By Miss Cochrane.—Entomogenous fungus, *Cordyceps Taylori*, from Cape Otway. By Mr. A. Coles.—Australian Bittern, *Botaurus Australis*; and Minute Bittern, *Ardetta pusilla*. By Mr. C. French, F.L.S.—Nests, larvæ, and perfect insects, male and female, of Procession Moth, *Teara contraria*, from the Wimmera [Mr. E. Anderson informs me that this insect, the identity of which was formerly doubtful, has been reared from the larvæ in the larger suspended nests, by Mr. Froggatt, of the Technological Museum, Sydney.—C.F.]

By Mr. C. French, jun. — Remarkable double nest of the Black Fantail, collected by Master W. Shepherd at Western Port, Victoria; egg of New South Wales Lyre Bird, *Menura superba;* and orchid, *Prasophyllum despectans*, collected at Western Port, being a new locality for this comparatively rare Victorian orchid. By Mr. J. Shephard.—*Lacinularia elongata*, new species of rotifer, in illustration of paper. By Mr. G. E. Shepherd.—Yellow-legged Spoonbill, *Platalea flavipes.*

After the usual conversazione the meeting terminated.

EXCURSION TO WILLSMERE.

Favoured by a fine though warm afternoon, on Saturday, 7th March, a party of about ten members made their way to Willsmere Park, near Kew, and spent two or three hours pleasantly in searching the ponds at that place. Owing possibly to recent rains, animal life seemed much less abundant than usually is the case, but the customary forms of Polyzoa, sponges, Hydra, and Entomostraca were taken. As at this season last year, the sponges were found to contain gemmules. For the first time in our experience Volvox was plentiful in the locality. As regards rotifers, the beautiful clusters of *Lacinularia pedunculata* and *L. natans* were numerous: they appear to have found their way to the first and largest of the ponds only recently, as we noticed them there for the first time a few months back. All the usual tube-building genera were represented, and amongst these a gigantic specimen of *Floscularia coronetta* deserved special notice. Free-swimming forms were scarce, though the pretty little Green Bag Rotifer, *Sacculus viridis*, and a few more common species were taken. Special mention may perhaps be made of a rotifer which lives parasitic in the Volvox, sailing about in the water with no effort of its own, while it calmly devours its host. Of this one specimen was taken here, the only other place where we have caught it being a pond at Box Hill. Infusoria were poorly represented, the only ones almost being the chlorophyll-bearing *Paramecium bursaria*, and the Stentors. Many of the latter were conspicuous by their colouration, which was pale pink—a peculiarity we do not remember having seen mentioned in any text-book.

Microscopic plant life was present in abundance. In addition to the common filamentous algæ, Spirogyra and Tyndaridea, Oscillatoriæ, Nostoc, Diatoms, and an unusual variety of Desmids occurred. These beautiful little green plants, which would well repay much more study than they seem to receive here, are very numerous just now at Willsmere. Amongst the filamentous forms found were *Hyalotheca dissiliens*, with its broad gelatinous sheath; the curiously twisted *Desmidium Swartzii*; and the chain-like

Sphærozosma. The very large and handsome species *Closterium lunula*, half-moon shaped, shows, when examined with careful illumination, the currents of protoplasm streaming to and from the ends. Others of the same genus taken were the Beaked Closterium, *C. rostratum*, running out at each end into a long, slender, clear prolongation, and the Striated Closterium, *C. striolatum*. Of the genus Cosmarium we noted the Pearl-bearing Cosmarium, *C. margaritiferum*; *C. Broomei*, squarish in shape; and *C. bioculatum*; besides, perhaps, others. Of Euastrum there were one or two species—*E. didelta*, and perhaps *E. ansatum*. The long, narrow, rod-like genus Docidium was represented by one species—*D. baculum*. Of the queerly-shaped Staurastrum there were a couple or more species, while the spiny genus Xanthidium gave us one—*X. armatum*.—W. and J. STICKLAND.

FURTHER NOTES FROM ALBATROSS ISLAND—NARRATIVE OF A SECOND TRIP.

By J. GABRIEL, F.L.S.

(Read before the Field Naturalists' Club of Victoria, 13th January, 1896.)

WE left Queen's Wharf at noon on 17th October in the s.s. *Bellinger*, bound for the Hunter Group of Islands, Bass Strait, where we hoped to obtain additional information *re* the nidification and flight of the Shy Albatross, found there. My companion, Mr. H. P. C. Ashworth, was also very anxious to replace the valuable photographs which he had so unfortunately lost through the swamping of the dingey on his last trip. He had also a forlorn hope of recovering the box, which contained some money. We had a fair run across the Strait, of course paying the usual contributions on the way, being hastened by the characteristic aroma of ten tons of bonedust which was stowed on deck. Early morning, however, found us in better humour, and soon after breakfast we were abreast of the Three Hummocks, with Circular Head, or "The Nut," in the distance straight ahead. We were soon interested in watching the birds, which began to muster up in large numbers. We were able to distinguish the Shy and Sooty Albatrosses, Pacific and Jamieson's Gulls, Mutton Birds, Richardson's Skua, &c. Our old friends the Gannets were seen in considerable numbers, while the pretty Cape Pigeon (*Daption capensis*), with its barred markings, appeared at frequent intervals. The little Stormy Petrel (*Procellaria fregata*) would also occasionally appear. Being thus among our feathered friends we felt quite at home. In a few hours we were steaming around "The Nut," and about noon landed at Stanley. Our *bonâ fides* were kindly vouched for to the Customs officer by a resident whose acquaintance

we had made on board. Certainly our luggage did look suspicious, with imposing boxes containing potatoes, onions, bread, personal effects, guns, cameras, tent, &c.

According to arrangement, Captain Mullins soon appeared, and we at once decided to start the following morning in his 22 feet centre-boarder *The Fox*. Captain Mullins fortunately left the schooner *Martha*, in which Messrs. Ashworth and Le Souëf crossed the Strait last year, before she capsized in the Rip in February last, and in which Captain Stuty and Frank, who accompanied them, lost their lives. After placing our luggage on the little craft we went for a long walk along the beach and into the adjoining scrub, where we recognized the dulcet notes of Selby's Thrush; but we were too early for eggs. The Tasmanian Flycatcher, Horseshoe Honeyeater, Long-tailed Superb Warbler, Scrub Quail, &c., were also seen. The pretty little Azolla was growing luxuriantly in the ponds which we passed, and growing on the roadside was a perfect carpet of white daisies. The scrub was inclined almost parallel to the hillsides where exposed to the east wind, which must blow very severely here at times. During our stay at Stanley we resided at the Temperance Coffee Palace, a comfortable, homely, but curiously planned house, whose architect must have taken his design from Noah's Ark.

Early morning on the 19th October found us quite refreshed and ready to start, and soon the little *Fox* was merrily sailing round "The Nut," from which a Black-cheeked Falcon swooped down to show his anger at our intrusion. Passing two outlying rocks with the euphonious names of Bull and Cow, and rounding a dangerous sunken reef off the headland, we made for Robbins Island, which was to be our first place of call. Our attention was soon attracted to a large number of birds in the distance, whose movements puzzled us for some time, but as we approached we were soon enlightened, and were treated to a magnificent sight. Heedless of our approach, several hundreds of Gannets were working a shoal of fish. I have frequently watched these birds diving for fish in our bay, but here I saw them in company for the first time, and truly it was an exciting scene. A continuous stream of birds were diving into the shoal, and as they rose flying around in a circle, only to dive again until they were gorged, when they would retire, but only to make room for others who were continually arriving from the distance. There is doubtless a method in this circular flight of theirs—very likely it tends to keep the fish together. Nor did they leave off till we sailed right through them, and then, I believe, it was the fish that made away. Our artist took several snap-shots with a kodak, but I am afraid they were not quick enough for satisfactory pictures. The Gannets must consume an enormous quantity of fish during these

raids. Several which we found swimming about afterwards were so gorged that they allowed us to almost cut them down with the boat before they would rise and then only to alight a little distance away. We anchored about midday in a snug little creek on Robbins Island, and went over in the "flatty" to two small islets near, expecting to find Oyster-Catchers and Gulls breeding, but found we were too early. We had some difficulty in getting back, as the tide was running out like a sluice, and several times the "flatty" was aground, necessitating our dragging her over the stones, which, in our bare feet, was rather a treat.

We were not long in making for the Reids' homestead. The good folks were glad to see us, and soon made us welcome, and during our stay supplied us with some valuable notes. After refreshing ourselves, we took a scamper along the beach for a few miles. The large number of whale bones attracted our attention, and we were shown an old "trying-out" station, the cleared sand track on the beach showing where the whales had been drawn up at high tide. This must, in bygone days, have been a busy spot, from the number of bones which were lying around. Further along we were shown what they called a "sea-devil," which had been washed up. This we found to be a female Australian Fur Seal (*Euotaria cinerea*). Captain Mullins informed us that he passed through a shoal of some hundreds of large seals while coming across from King Island. A correspondent has since informed me that he has had a very successful sealing season, which confirms what the captain told us.

Returning from the beach to the homestead we noticed the pretty little Emu Wren (*Stipiturus malachurus*) in considerable numbers. Robbins Island seems to be a perfect aviary for both land and sea birds, but as we were too early for eggs we contented ourselves with collecting notes for future reference. We gather that the island is a place of call for many birds during their migratory flight between Australia and Tasmania. Observations on this subject would be of much interest. Just before our arrival the Martins were seen at dusk clinging on to the trees in bunches like a swarm of bees. Along the flats we were continually flushing Quail, and on the beach the Dotterels, both Hooded and Red-capped, were seen in numerous flocks, the latter just beginning to lay in little ledges under the sandy bank. It is a curious fact that the birds on the larger islands lay some weeks earlier than those on the outlying islands.

The tide serving, about noon the next day we left our kind hosts, and sailing past the east side, were soon abreast of Walker's Island. On a headland is the Sea Eagle's eyrie which Mr. Atkinson found some years back, but it is now tenantless. Our Captain Mullins was there last season with a companion, who shot one of the birds, which fell badly wounded at his feet. The

Captain finished the bird by hitting it on the head with a stick. He then slung it upon his shoulder, but in a few minutes the bird came to and dug its talons into the Captain, who, in a rage, gave the bird another battering. It was again mounted upon his shoulder, but in half an hour the pesty thing came to and again clawed the Captain in a tender part. This time that eagle was killed in earnest and taken home to Duck River, where it is now to be seen alive and well. The wind now began to freshen, and as we passed the Petrels we had to reef down. We had hoped to reach Chimney Corner, on Three-Hummock Island, but, much to our chagrin, a nasty sea forced us to run before the wind to East Telegraph Bay. To add to our discomfort the boat began to leak, and we had to keep baling all the way. Mr. Burgess, who leases this island, has a farm at East Telegraph Bay, and we were shown around by his brother-in-law, who was in charge. The ground is of a rich chocolate character, and has, so far, given satisfactory returns for the labour expended on it. Poultry also do very well, having no enemies. To escape the sandflies, "skeeters," and other live cattle we elected to sleep on the boat, but at 4 a.m. the next morning we were roused up and had to clear out, the wind having changed during the night. We were soon out of the jobble, and made round the north side of the island. We were destined to have more trouble, however, for the wind died away to a dead calm, after which it again freshened into a stiff gale, leaving us beating up the passage between the Three Hummocks and the West Hunter. On the starboard tack off the West Hunter we had to take in our reefs, and shortly afterwards to lower sail and hoist the storm sail. During this fuss we were unfortunate in losing one of our oars and a boathook overboard, and in trying to regain them we split our jib into three pieces, necessitating the hoisting of a spitfire. With this scandalized sail we beat into Shephard's Bay for shelter. We went ashore for a few hours, having the mail for Mr. James, the solitary resident, who hospitably cooked some wallaby for us, and being awfully hungry we declared it to be very good. The wind and sea having abated, we soon ran across to Chimney Corner, on the Three Hummocks, where we were warmly welcomed by the Burgess family, and well pleased to get ashore after our rough trip around. The baling especially had been very trying, so *The Fox* was beached for repairs. We were now only ten miles from Albatross Island, and intended to slip out at the first opportunity, and then, if the weather continued fine, to attempt a landing on the Black Pyramid, sixteen miles further out into the ocean. Little did we reckon on the boisterous weather which was to prevail right up to the last day of our stay, so that we began to despair that we would ever reach even Albatross Island.

On 22nd October repairs to the boat was the order of the day, Captain Mullins being kindly assisted by the Burgesses. A plaster was placed over the worst leak, and some tarred oakum jammed into the others. During the day we made short trips inland, but found nothing of more interest than a fresh Strepera's nest, which we watched for ten days, but the birds were too wary, and waited till we left before laying. Cattle and sheep thrive fairly well at the homestead, notwithstanding the cottonweed, two species of which are very abundant. But the introduction of clovers and lucernes has worked wonders, both here and at King Island, so that a large cattle trade is springing up.

On 23rd October we went for a walk across the island to East Telegraph Bay, some seven miles. Following a track between the sandhills which fringed the coast we soon came to a different class of country to what we expected. All along the coastline we had met with almost impenetrable scrub, consisting of ti-tree and such-like ilk, but inland we passed through forests of what is locally called bastard bluegum, alternating with lanes of swamp ti-tree, which, being festooned with the pretty bush Clematis, pleasingly reminded us of Gippsland scenery. A little further on we came to a sandy plateau, commanding a fine view around. On our right the Big Hummock, with its commanding height of 790 feet, was to be seen; to the left was an immense swamp, while immediately around us the country was ablaze with the familiar flowering shrubs which adorn our own heath grounds. Among others we noted *Sprengelia incarnata*, *Pultenæa humilis*, *P. daphnoides*, *Aotus villosa*, *Pimelea humilis*, *Styphelia Australis*, and the orchids *Thelymitra longifolia*, *Caladenia carnea*, *C. latifolia* and *Pterostylis cucullata*. Our track next led us through a dense belt of the ever present ti-tree, and then, to our surprise, into a lovely little gully, in which tree ferns grew luxuriantly. The total absence of mistletoes on these islands has caused Baron von Mueller to remark in his report on the plants brought from King Island by the Club expedition:—"It does not seem that mistletoes have been noticed by the party, the genus Loranthus, though represented by more than one species quite to the southern extremities of the Australian continent, having never yet been traced to Tasmania." It is satisfactory to know that this may now be explained by the fact that the Swallow Dicæum, which bird has been shown by Mr. Ashworth to be the sole agent in dispersing the mistletoe, is confined to Australia.

Arriving at East Telegraph Bay, we startled our solitary farmer having his midday smoke. After dinner he led us around nesting. A Boobook Owl flew out of a dead tree, which was climbed, with no result. An unfinished nest of the Flame-breasted Robin showed us that we were too early. We were pleased to

see the Spotted Diamond Bird, *Pardalotus punctatus*, breeding in holes in a sandbank; it does not seem to have been recorded before from the islands. On the return journey we paid a flying visit to the large swamp; but as we could see no signs of bird life, owing to the dense scrub, we retraced our steps. When we came to the sandhills, with their Boobyalla and Honeysuckle trees, we decided to make a short cut to the beach to gather shells—a decision we soundly regretted ten minutes afterwards. However, by crawling on all fours the greater part of the distance, we at last broke through.

On 24th October, the weather being still too unsettled to venture on the waters, we went for a long walk towards West Telegraph Bay, but came across nothing more interesting than a 9 in. x 2 in. Oregon plank, which, being of no scientific interest, we left behind. A crow's nest containing four fresh eggs was found in the top of a ti-tree growing in a swamp.

On 25th October, the weather being still very rough, we spent the day in wandering along the beach in search of shells and polyzoa, and in taking lessons in crayfish pot making. The Crayfish (*Palinurus Lalandii*) industry is now a considerable one among the islands of the Strait, but these fine fish are becoming fast decimated through the suicidal policy of allowing the female fish to be taken during the spawning season. Of course, fish with spawn are not allowed in the markets, but this is easily overcome by the fishermen removing the spawn. Some few fishermen do not take spawning fish, but their good intentions are frustrated by others who take all. Our friends on the island suggest what I consider the only remedy, viz., that female fish be not allowed to be sold during the spawning months, say from 1st September to 31st December. Our Club has been useful in the past in placing insectivorous birds upon the protected list, and I do not think it would be out of our province to move in this matter. The female fish are readily recognized by the extra appendages on the tail flap which hold the spawn in position, and also by the subchelate claws of the fifth or last legs.

On 26th October, the wind abated a little, and we sailed across to Stack Island, a distance of ten miles, to see an eyrie of the Sea Eagle, *Haliætus leucogaster*, but we found the birds had not yet laid. A crow's nest found on a ledge near the top of a rocky pinnacle was also empty. This island is rented from the Tasmanian Government by Captain Mullins, who anticipates a good harvest of Mutton Birds this coming season. He tells us that the Tasmanian Government now prohibits the sale of eggs, which I think is a wise action. When we consider that half a million birds are taken yearly in the Furneaux Group alone, there must in time be an appreciable difference. Nor must we look to the robbery of eggs alone as a destructive

influence, for from several correspondents I hear that this season thousands upon thousands of these useful birds have been found dead upon our shores, from Phillip Island to nearly as high as Sydney Heads. Can any of our members suggest an apparent cause for this destruction? The harvest of eggs this season at Phillip Island has been a complete failure. Some have suggested the heavy gales prevailing early in the season; but these birds are in their element in the roughest of weather, and I can hardly accept this as a reason. We have always been told that the birds, after cleaning out their holes in September, are not seen again till November, when they come to lay; but to our surprise they came in at dusk as usual. We had beached the boat on the sand for comfort's sake, and as it was now raining heavily we slept on board. Early in the morning the tide came in, and we had to turn out into the cold sea and get her afloat. After breakfast we left for Penguin Island, where, with a little difficulty, we landed. Scrambling through the saltbush and tumbling through Mutton Bird holes, we made our way to the Pelican rookery, noting on the way the Little Grass Bird (*Sphenœacus gramineus*). The Pelicans made out to sea as we approached, so we contented ourselves with taking photographs of the rookery. The eggs proved to be fresh—indeed, several clutches were not completed. Returning to the boat, we hastened on board, as the wind was fast rising, and, hoisting sail, we headed for Chimney Corner again. On the way up we had another unpleasant baling experience, necessitating the beaching of *The Fox* for examination. We found that the plaster which had been put on was a "porous plaster," and there was nothing for it the next day but a renewal of repairs. At night we had a haul of about ten dozen fine garfish. This proved an acceptable change from Mutton Bird, which, however, we had got to relish at our meals.

Early in the morning of the 29th October we started for Albatross Island, and after crossing the "pot-boil" north of the West Hunter, we were not long in approaching this lonely rock. Bold and rugged it is indeed, and doubly so to-day, for the wind had changed round to the north and rolled a nasty sea into the landing-place. We could see the Albatrosses sitting on their nests upon the shelving rocks, but after standing off and on for some time in the hope of a change, we had to swallow our disappointment and return. The following day an easterly gale raged all day, raising such a heavy swell that it was with little hope of success that we started again at dawn on 31st October. The "pot-boil" was very lively, and tossed our little boat about like a cockle shell. After a couple of miles of this we despaired of getting on the rock, but as we had the day before us we held on, and when within a few miles of the island our skipper declared we would get on after all we cheered up considerably. Shortly after we were anchored amongst the kelp in comparatively smooth

water. Dreading the backwash of the cove where the dingey was capsized last year, we scrambled on to the ledges of an outlying rock, and, following a Penguin track, were soon through the caves. In the gulchway we were surprised to see a Tasmanian Flycatcher and a Bronze Cuckoo, with his resplendent green back. Climbing over the hill, the Black-cheeked Falcons showed by their clatter that they had eggs, and a large Wedge-tailed Eagle soared away overhead. We were rejoiced to find the Albatross rookery in full swing. It was the beau ideal of a photographic day, with little wind and light fleecy clouds, and our artist lost no time in proceeding to work. As to myself, I was soon arguing the point with the birds *re* possession of eggs, the powerful mandibles on the one hand, and my foot and a bucket on the other being the argumentative media. These beautiful birds sit gracefully on their nests, but when disturbed they flounder about in quite a ludicrous manner, strongly in contrast to their glorious appearance at sea when they so majestically sweep through the air on expanded pinions. After its egg was taken the silly bird could not make out where it had got to, and would put its head into the nest to look for it. I have little to add to the descriptive account so ably given last year by Mr. H. P. C. Ashworth of the nidification of these birds. The eggs taken by me, with three exceptions, contained chicks in all stages of growth. From this I gather that the laying season must commence late in September and early in October, with an incubation of probably eight weeks. The Hon. Walter Rothschild has lately reviewed the nomenclature of the Albatrosses and has referred this bird to the genus Thalassogeron. The bird breeding on the Snares in New Zealand differs from Gould's type, *T. cautus*, and has been named *T. Salvini*, after that eminent authority on oceanic birds.

There can be no doubt of the identity of our species with Gould's *T. cautus*, and Albatross Island is, therefore, the only known breeding haunt. As Mr. Rothschild observed to Sir Walter Buller, "Why, every group of islands seems to have its own species of albatross." The flag was now flying as a signal for us to leave, and so busy had our artist been that he forgot all about looking for the treasure lost last year, and, indeed, did not have time to look at the spot. We had had no food for ten hours, and were surprised to find we had been six hours on the island. On regaining the boat, a decisive "Give me a hand with the chain" caused us to postpone the luxury of "tucker." Oh! that 25 fathoms of chain, wasn't it heavy! As we got near the West Hunter the wind died away, and we lost the tide, and drifted slowly back. Just before dark we came across an Albatross, a Mutton Bird, and a Cape Pigeon quarrelling over a Cuttle-fish. As we approached the Cape Pigeon was left in possession. In the moonlight we set the fire-pot going, and made coffee, waiting for the turn of the tide. Music, also, helped to pass the time,

our only audience being a Cape Pigeon which flitted about. About midnight we got a breeze, and arrived at Chimney Corner shortly after 1 a.m. After a final breakfast in the morning with our kind friends we left for Stanley with a fair wind. Just as we reached "The Nut," a stiff sou'-wester gave us the worst wetting of the trip. At 9 p.m. on 2nd November we left in the *Bellinger* for Melbourne, and being by this time good sailors we had the satisfaction of sleeping while our fellow-passengers persisted in being sick.

THE FLIGHT OF THE ALBATROSS.

By H. P. C. Ashworth.

(Read before Field Naturalists' Club of Victoria, 10th February, 1896.)

When a paper was read before the Royal Society of Victoria last year by Mr. Le Souëf and myself on the birds found breeding in the Hunter Group, the president, Professor Kernot, M.A., remarked that he was sorry we had not more fully dealt with the important question of the flight of the albatross, and my main objects in revisiting Albatross Island were to make observations on this subject, and also to replace the photographs which were lost through the capsizing of our dingey. I was further induced to make the investigation by the great amount of misconception by nearly all who have written on the subject, either in the principles involved or in the description of the movements of the bird. The subject has attracted the attention especially of those engaged in the problem of constructing flying machines; and, indeed, the apparent contradiction of mechanical principles in the flight of a bird without perceptible movement of its wings—that is, without the expenditure of any external work—is sufficiently startling. If we know anything of the mechanical conditions, it may be taken for granted that no bird can glide with outstretched motionless wings in a wind which is both uniform and horizontal without losing either in vertical elevation or in velocity. The fact that an albatross does glide for hours together without movement of the wings shows that the solution of the problem lies altogether in a study of the movements of the wind, and not in any peculiar property inherent in the bird itself.

A review of some of the theories advanced is given by Sir Walter Buller in "Trans. New Zealand Inst.," vol. xxvi. He says:—"It seems to me that we have not yet solved the problem involved in the flight of the albatross—a rapid, well-sustained motion, ever against the wind, with scarcely any visible movement of the wings. There are some very sensible observations on the subject in Dr. Bennett's 'Gatherings of a Naturalist in Australasia.' Professor Hutton has grappled with the mechanical principles it rests upon, and the Duke of Argyll has treated the question in a masterly way in his 'Reign of Law.' But, after all, can it be

said that the problem has been satisfactorily solved? I think not. Sir James Hector believed with myself that it might be explained by some peculiar mechanism in the wing of the bird, and at a meeting of our society some years ago he elaborated a very ingenious theory on the subject, exhibiting at the same time an albatross wing specially prepared to illustrate his argument. In 1889 he took the trouble to send to England a fine adult specimen in spirits of wine for critical examination by an expert. I forwarded it to the well-known comparative anatomist, Dr. Hans Gadow, F.R.S., at Cambridge, but he reported that he could not discover any departure from the normal character in the structure of the wing; and so the matter rests at present."

All the older theories ignored the fundamental condition laid down above, and on the evidence of imperfect observers scientists spent their energies in futile efforts to solve the so-called soaring problem, not recognizing our old friend perpetual motion in a different guise. Mr. L. Hargrave, a well-known experimenter in aërodynamics in New South Wales, says on this point—"No amount of observation of birds will solve the soaring problem; it can alone be done by making some kind of apparatus that will advance against the wind without losing its velocity." I must reply that no apparatus will ever be made to fulfil this condition unless provided with motive power, such as the revolving screw in Mr. Maxim's machine; and if an apparatus be ever made that will gain motion relatively to the earth (which is a very different thing) without the expenditure of power, it will have to take advantage of the same variations in the wind as a soaring bird. The latter achievement is however very problematical, though Mr. Maxim's successful experiments seem to promise flying machines provided with motive power in the near future.

A most extraordinary theory is advanced in a letter to *Nature*, October, 1894, by Mr. A. Kingsmill, who found, on developing a snap shot at an albatross, that the wings in the picture were vertical, although the indication on the camera showed them at the moment of exposure apparently at full stretch. The bird was probably in the act of turning to one side, but his conclusion that it seems to entirely upset the accepted theories as to the flight of this bird involves the fantastic suggestion that the movement of the wings is too quick to be perceptible to the human eye.

In his account of Tristan da Cunha, in "Linn. Trans.," vol. xii., Captain Carmichael relates that he threw a Mollyhawk (*Diomedea culminata*) over a cliff and saw it fall like a stone without attempting to flap. On my last visit to Albatross Island I repeated this experiment on some of the Shy Albatrosses, but after falling a short distance they all found their wings and soared away. I have said that it is only by a consideration of the movements of the wind that a solution of the problem is possible, and here it may be noted that soaring is only practised when there is a

stiff breeze—indeed, the stronger the wind the more motionless are the wings, and the less necessity for resorting to flapping. Two theories based on the movements of the wind have been propounded—the first that a soaring bird is supported by upward currents, that is, that the wind is not horizontal; the second that the wind is not uniform in velocity, so that a bird can by manœuvring take advantage of this want of uniformity, and it was to test which of these theories is supported by the actual movements of soaring albatrosses that my observations were made. The first is championed by no less an authority than Mr. Hiram Maxim, and therefore deserves some notice. In an article in the *North American Review* for October, 1895, he states that Professor Froude, the mathematician, observed the flight of that greatest of all flyers, the albatross, and admitted that no existing mathematical formula could account for the soaring of these birds, and proceeds as follows :—"Air near the surface of the earth becomes heated and ascends in columns. The velocity with which these vertical currents move is, say, from 1 to 6 miles an hour, and they are quite independent of any other horizontal current that the air may have as relates to the earth at the same time. Suppose the velocity of a bird to be 30 miles per hour, this would account for the whole phenomenon of soaring on an upward current of only 1½ miles an hour." Now, do these vertical currents exist? I think not. The smoke of steamships exhibits practical uniformity in a vertical direction, while Mr. Maxim supposes the air divided into alternatively ascending and descending columns; and to account for the birds not being caught in the latter currents, he advances an ingenious but unproven theory that birds have some very delicate sense of feeling and touch to ascertain whether they are falling or rising in the air, just as deep-sea fish can tell by the pressure on the bladder whether they are approaching the surface. Mr. Maxim goes on to say :—"Albatrosses and seagulls find a resting place, and follow the ship for days at a time without any apparent exertion, but whenever they find themselves in front of the ship or at one side they have to work their passage very much as other birds do." This statement is incorrect as far as albatrosses are concerned; they never move continually in a straight line, but are always circling and sweeping up and down the wind, alternately rising and falling. This fact is the strongest argument against the theory, for these continual movements between the upper and the lower strata of the air would have no object. I do not deny that upward currents exist, but Mr. Maxim has undoubtedly given the principle a too extended application. I have noticed albatrosses keeping to the leeward of the crest of a large wave, where the wind is undoubtedly deflected upwards. Herr Lilianthal, who has used an aëroplane to soar several hundred

yards, by throwing himself off a height against the wind, makes the astonishing statement that the wind is always inclined upward; but this position is untenable.

Before passing on to the second theory it will be well to consider how a bird is supported in the air, and what are the forces to be overcome. Premising that the bird must always have some velocity relatively to the surrounding air—that is, that the wind must always be in its face (for nothing is more helpless than a bird borne with the wind)—it is evident that there will always be a certain amount of resistance to its progress. This resistance, according to the known laws of wind pressure, is directly proportional to the square of the relative velocity, and it must be remembered that all motion is relative, so that the conditions are the same whether the bird has a certain velocity relatively to still air or the air has the same velocity and the bird is still. This atmospheric resistance will reduce the velocity of the bird relatively to the surrounding air, therefore a gain in relative velocity will overcome the resistance. But there is another force to be overcome, and that is gravity. To balance this, the pressure of the wind underneath the bird must be equal to its weight, unless the bird be rising, when it is greater, or falling, when it is less; but in rising or falling the pressures due to its vertical motion acting on its full sail area have also to be taken into account. To obtain a pressure underneath equal to its weight, an albatross must incline its body against the wind till the pressure is equal to 2½ lbs. per square foot. This is exactly the weight of Mr. Maxim's machine, and his experiments showed that it requires a velocity of 40 miles an hour to lift it, the aëroplane being inclined 7¼ degrees. Now, the pressure at right angles to the wind would only be 6 lbs. per square foot, and Mr. Maxim accounts for the large results obtained with slightly inclined planes to the advantage of moving forward on to new air, the inertia of which had not been disturbed. Professor Proctor give a similar explanation, that when moving forward at a high velocity a bird does not rest on the same air long enough for the air to be set in motion. To Mr. Irminger, a Danish engineer, belongs the credit of giving the true explanation—that the lifting force is largely a negative pressure or suction on the upper surface due to rarefaction of the air. He also determined the fact that a narrow aëroplane, such as the wings of an albatross, is twice as effective as a broad one. We are now in a position to understand how a bird can by manœuvring take advantage of a want of uniformity in the wind to gain relative velocity, which we have seen is necessary for the support of the bird in the air and can also be utilized in overcoming atmospheric resistance. The theory was first advanced in *Nature*, vol. xxix., by Lord Rayleigh, and independently by Dr. Hubert Airy, to account for the continuous rising of eagles, pelicans, &c., as observed in Assam by

Mr. S. E. Peal. It rests on the fact that the velocity of the wind always increases with the height above the ground, owing to the lower strata being retarded by friction. Now in ascending against such a wind, a bird will be meeting stronger currents in its face as it rises—that is, it will be gaining in relative velocity, and in descending with the wind they are also gaining in relative velocity, since the lower strata really have a velocity, as compared with the upper strata, in the opposite direction. A bird may circle around indefinitely on this principle, the circles being inclined downwards to leeward, provided the successive gains in relative velocity balance the resistances to its motion. The ascent against the wind is made with inclined body, so that the pressure underneath is greater than the weight of the bird; but the atmospheric resistance is also great, and the ascent is made as quickly as possible. On wheeling around to descend with the wind the relative velocity will be small and the lifting pressure less than the weight of the bird. In falling into the slowly moving strata it will be really meeting a stronger wind in its face, having itself a velocity at least equal to that of the upper stratum, and will also be aided by the upward pressure due to its vertical descent. We possess no experiments to determine this latter pressure, but it is probably greater than if the bird were falling with the same velocity in still air. An albatross does not, however, move always in circles; it seems to make best progress in a direction across the wind, alternately rising quickly against and across the wind and then gliding downwards with the wind and across in the same direction as before, the resultant motion being at right angles to the wind. It may be asked what evidence is there that this variation in the velocity of the wind actually exists. In 1889, at the Eiffel Tower, in Paris, experiments were made upon the relation between the velocity of the wind at the top and at a station 70 feet from the ground. It was found that the velocity at the top was from two to five times as great as at the lower station. In *Nature*, 22nd April, 1886, Mr. E. D. Archibald records observations made with kite-wire suspended anemometers, which show that the velocity in high winds was 38 per cent. greater at 250 feet above the ground than at 100 feet above, and 56 per cent. greater at 550 feet up, and also that there is a steadily diminishing increase up to a height of 1,300 feet. It has been contended that the progressive increase in the velocity of the wind does not extend sufficiently above the earth to account for the soaring of eagles at great heights, and that they may gain in relative velocity by always facing gusts; but the regularity of their movements seems to preclude this view, and it must be remembered that these birds take very large sweeps, and are much lighter in proportion to their supporting area than an albatross, and can take advantage of smaller differences in velocity. The difference between the velocity of the wind in the troughs of

an ocean swell and that above the crests of the waves must be very great, and an albatross, in descending with the wind into the trough or ascending against it above the crests, gains an increment of relative velocity equal to this difference. That the wind above the crests has a high velocity relatively to the waves is shown by the familiar "white horses," and fishermen well know the danger of losing the wind in the bottom of a trough.

In conclusion, the albatross is a skilled aërial gymnast, which has learned by experience to take advantage of the various inequalities in the wind to gain in velocity relatively to the surrounding air. I hope at some future time to pay a visit to the island when the young birds are learning the art. It is known that in the islands south of New Zealand they take a full year of practice, and have to be driven off the nests by the old birds when they return to breed. With a knowledge of this theory, which is confirmed by every movement, to watch the flight of an albatross has a never-failing interest.

ON THE USE OF TURPENTINE IN MICROSCOPIC WORK.

HAVING lost several carefully prepared specimens of insects by using as a final clearing agent the ordinary turpentine of the shops, I was led to inquire into the matter, when I found that the trade article is not the turpentine referred to in Davis's "Practical Microscopy," p. 415, and Carpenter's "The Microscope," pp. 441 and 442 (1891 edition). It is the natural balsam which flows from the trees that is referred to, and not the distilled extract sold as turpentine or oil of turpentine.

The following definition is taken from Cooley's "Cyclopædia of Practical Receipts" (1892 edition), p. 1720:—"Turpentine, Turpentin, Terebinthina—an oleo-resin flowing from the trunk (the bark being removed) of *Pinus palustris*, *P. tæda*, *P. sylvestris*, and various species of Pinus and Abies. It is viscid, of the consistence of honey, and transparent. By distillation it is resolved into oil of turpentine, which passes over into the receiver, and into resin, which remains in the still. Bordeaux, or French, turpentine is from *P. maritima*. Chian turpentine is from *P. terebinthus*. It is pale, aromatic, fragrant, and has a warm taste devoid of bitterness. It is much adulterated, and a fictitious article is very generally sold for it. Venice turpentine is the liquid resinous exudation from the *Abies larix*. It is sweeter and less resinous tasted than common turpentine, but is now scarcely ever met with in trade. That of the shops is wholly a fictitious article."

In Carpenter, p. 442 (1891 edition), it is stated that the natural balsam has a peculiar power of rendering the chitinous textures of insects transparent.—H. BULLEN. *10th February*, 1896.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 11th May, 1896. The president, Professor W. Baldwin Spencer, M.A., occupied the chair, and some 70 members and visitors were present.

REPORTS.

A report of the excursion to Black Rock was read by Mr. J. Shephard, and of the visit to the Biological School by the chairman.

ELECTION OF MEMBER.

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

GENERAL BUSINESS.

After the nominations of office-bearers for the ensuing year had been made, Messrs. R. Hall and H. Cummins were elected to audit the accounts of the past year.

PAPERS.

1. By Rev. W. Fielder, entitled "The Intermediate Hosts of Fluke" (third note).

The paper gave a record of the results so far attained in following up the life-history of the various forms of fluke found in the shells forwarded from different parts of the colony. It is hoped by isolating the different forms to get a definite clue to the exact larval form of the liver fluke of sheep. It appears to be proved, however, that although the adult form is precisely like the text-book form, the life-history is different. Encystation takes place in the larval host, which is so small that it may be taken in by the sheep when drinking.

Some discussion ensued, in which Professor Spencer and Messrs. Keartland and T. S. Hall, M.A., took part.

2. By Mr. G. A. Keartland, entitled "Ornithological Notes from Central Australia, part i.—Raptores."

Many interesting field observations—jotted down during the journey of the expedition despatched to Central Australia, in 1894, by Mr. W. A. Horn—were given relating to the eagles, hawks, and owls, which are the characteristic forms of that dry region.

NATURAL HISTORY NOTES.

Mr. G. Lyell, jun., of Gisborne, read a note on the specific distinctions between the various butterflies commonly known as "blues;" and Mr. H. Bullen contributed a cutting from the *Therapist* on the advantages of formalin as a preservative.

EXHIBITION OF SPECIMENS.

The following were the principal exhibits of the evening:—By Mr. C. French, F.L.S.—Group of exotic Buprestidæ, including new species from the Congo. By Mr. C. French, jun.—Eggs of the following rare Australian birds, viz.:—Western Black Cockatoo and Striated Wren, from Central Australia; Red-backed Superb Warbler and Long-billed Shore Plover, from Northern Queensland; also skin of Tiger Snake, four feet long, and Black Snake, six feet long, from Paynesville, Gippsland, lent by Mr. Maynard for exhibition; and plants in flower: *Epacris microphylla* and several varieties of *Epacris impressa*; and variegated leaves of *Eucalyptus Gunni*, from Dandenong Ranges. By Mr. J. A. Kershaw.—Nest of Water Spider, from Queensland. By Baron von Mueller.—*Polygonum orientale*, from Lake Cowal, near Lachlan River, N.S.W., in order to draw attention to this so far southern locality for this plant, as it would be desirable to search for this species on the Murray River, and if shown to exist there would be new for Victoria.

After the usual conversazione the meeting terminated.

A TRIP TO MALLACOOTA.

By D. Le Souef.

(Read before Field Naturalists' Club of Victoria, 13th January, 1896.)

I LEFT Melbourne on 2nd November for Lakes' Entrance, and then went on overland on my bicycle, and propose now to mention a few natural history notes I observed on my way, as a redescription of the country is unnecessary. When near Traralgon a Laughing Jackass (*Dacelo gigas*) was noticed sitting on the telegraph wires as the train passed by, showing it had grown accustomed to them, but in any case a telegraph wire must have been a difficult resting-place for a bird of that size. I broke my journey for a short time at Rosedale, and while there found nests and eggs of the Yellow-breasted Robin, White-throated Thickhead, Black-throated Grebe, Garrulous Honey-eater, and Pallid Cuckoo. One Copper-head Snake was passed by, but as it remained perfectly still, although close to us, was taken for dead, but when disturbed soon made for a patch of scrub, which, however, it never reached. A flock of about seventy Sulphur-crested Cockatoos were seen feeding on the ground. White and the Roseate Cockatoos seem to feed far more on the ground than anywhere else. When passing

through the Gippsland Lakes a pair of Black Swans were noticed with their five little ones—a full clutch. Some of the adult birds were moulting, and were unable to fly. At Cunninghame I noticed a gull feeding on the shore, hopping along on one leg, whether the other was lost or tucked up I cannot say, probably the latter. The Silver Gulls, when hovering close over the water, bend down their outspread tails and also their heads, giving then a curved appearance. On the banks of the Snowy River a flock of sixty Spurwing Plovers were seen feeding together on some cultivated ground. A domestic cat was also disturbed capturing a Landrail (*R. phillipensis*). The bird was on its back, kicking and pecking vigorously and crying out loudly at its enemy, which seemed to be trying to get hold of it. On the cat leaving it at my approach the bird still remained on its back until it noticed me alongside, when it jumped up and ran off. An Australian Cormorant was seen resting on the middle of the road, a long way from water; I rode at it with the expectation of its flying away, but it didn't, consequently I rode over it, and then coming back killed it, and found it a very old and exceedingly thin specimen.

Near the Little River a beautiful White Hawk flew past. New Holland Honey-eaters were numerous in the various belts of scrub passed through, and several of their young seen, and also two clutches of black downy little Coachwhip Birds, hopping about in the thick scrub, attended by their anxious parents. Some young birds seem to leave the nest much sooner than others, as neither clutches of the young Coachwhip Birds could fly, and one pair of young New Holland Honey-eaters could only just manage it. Near the Bemm River a Flame-breasted Robin was busy building its nest on the top of a high stump, and another nest was found with young in. White-eyebrowed Wood Swallows were plentiful, but only one nest with young found. Bell Birds were numerous in places, and one nest found ready for eggs high up in a gum sapling. Black Duck and Wood Duck (Maned Geese) were noticed in some waterholes near the Cann River; the latter bird is seldom seen in this part of Gippsland. In the scrub on the banks of the Tonghi River the nest of the Little Brown Sericornis was found, with one fresh Sericornis egg in and one Fantail Cuckoo's. These Cuckoos seemed to be numerous, and their call often heard. The shrill noise made by the cicadæ was almost deafening. I noticed four kinds — two of the large greenish variety, a smaller brown one, and one small black one. Then, again, in some of the swampy ground passed by numerous frogs added their quota to the din: when one frog starts all the others seem to join in.

When walking up a steep hill near Cockatoo Creek I was startled by seeing a Brown Snake coming rapidly down the hill; it

caught sight of me when too late to stop its career, and passed under my bicycle and between my feet, and quickly disappeared in the scrub: something had evidently disturbed it. As the clearer country was reached near the Genoa River, two Grey Kangaroos were passed close to the road. Although so early in the season, a great deal of the country had been burnt by the bush fires, and the blackened tree trunks gave the country a very dismal appearance. In the country round about Mallacoota nests and eggs were found of the following birds:—The Bronze-wing Pigeon, Coachwhip Bird, Brush Wattle Bird, Superb Warbler, Grey-backed Zosterops, New Holland Honey-eater, White-throated Thickhead, Sordid Wood Swallow, Welcome Swallow, White-shafted Fantail, Laughing Jackass, Brown Tree-creeper, Blue Mountain Parrots, Spurwing Plover, Fire-tailed Finch, Flame-breasted Robin, Emu Wren, and Spotted Ground Thrush. Among other birds noted were the Funereal Cockatoo, Leach's Cockatoo, Wonga Wonga Pigeon, King and Pennant's Parrots, Satin Bower Birds; and Chestnut-breasted Teal were very numerous, and nesting. I saw none of the Slender or Grey Teal. Musk Ducks were very plentiful in certain portions of the inlet, and they were very local, probably because their food, which was obtained by diving, was more plentiful there. A fisherman once caught over one hundred of these birds here in one haul of his net. There were a few Black-throated Grebes diving for their food like the Musk Ducks. Lyre-birds were numerous in the gullies, and their clear note often heard; and I heard one mocking the whining of a puppy to perfection—it was by a deserted miners' camp, and they used to leave the puppy fastened up while they were away. The surveyors complain that these birds fill up their trenches by scratchings, and pull off the pieces of paper they place on their pegs when running a surveyor's line. I saw a Harmonious Shrike Thrush catch a large grasshopper, and flying up to a tree, impale the unfortunate insect on to a splinter of wood, and then the bird began to devour it piecemeal, as it was too large for one mouthful. The Black Snake is common here in suitable localities, and on one occasion I unknowingly walked between two of them, each about four feet six inches long—they were about three feet away from me in the open, but as I was looking up into a tree, had not noticed them; after watching them for a short time, the larger went down a neighbouring rat-hole, and then the other disappeared under a heap of dead scrub. They grow as long as six feet, and when that size are formidable-looking customers to come across. Brown Snakes are occasionally seen, and also Carpet and Diamond Snakes—the latter is looked upon as a strictly New South Wales snake, but it is found in Croajingolong, as far down the coast as the Bemm River, sixty miles from Mallacoota, and perhaps

exists further this way still. I saw a specimen which had recently been killed. A resident at Mallacoota put a log on his fire, and after a few minutes was startled to see seven small snakes quickly wriggle out on to the floor. Insects were scarce, even to mosquitos, except in the gullies. Ticks occasionally made their presence felt, and are very difficult to remove when once they have taken a hold; occasionally dogs die from them if the insects are not taken off in time. Fish are very plentiful, and in the evening, when the water is calm, the inlet seems alive with them, and a continuous noise going on, difficult to describe, caused by the fish rising to the surface. I saw a Flathead caught which weighed 14 lbs. and measured three feet long. Stingarees (Ray) are very plentiful, and on one occasion eighty-six were caught by a fisherman in his net at one haul. The various kinds of fish found in the inlet are as follows:—Schnapper, Kingfish, Ludrick, Flathead, Bream, Perch, Soles, Flounders, Whiting, Mullet, Sand Mullet, Skipjack, Salmon, Silverfish, Trevalla, and Sharks of course, although they do not appear to be very numerous. Octopus are also seen of a good size. The varieties of shells were not numerous.

After staying for a fortnight in this delightful place, I started on my return *viâ* Genoa. On going up the river a pair of Whistling Eagles were noticed performing a series of evolutions high up in the air, and occasionally uttering their curious cry. Skipjack were to be seen jumping clear out of the water, their silvery sides gleaming in the sun, and in the small swamps behind the ti-tree near the water's edge numbers of ducks were found feeding. At a settler's place were noticed the skins of a Delicate Owl and Tawny-shouldered Podargus. Native Bears were plentiful, and two were noticed on a very thin bough overhanging the water; it seemed wonderful how they could keep their balance. They seem to have a preference for the White Eucalyptus trees, and are seldom found on the Stringybark or Messmate trees. Water Lizards from six to twelve inches long were occasionally seen basking in the sun on the logs or rocks by the river bank, but they at once dived into the water when approached. Towards evening the Boobook Owl was heard.

On arriving at the Bemm River I took the opportunity of visiting Sydenham Inlet, and we rowed five miles down the river to it. I noticed that the Welcome Swallows built their mud nests on the top of and inside the hollows of snags and logs in the river, and not far from the level of the water, so that if a flood occurs during the nesting season all the nests and their contents get destroyed. I suppose that experience has taught the swallows that they have fewer enemies to contend with over the water than anywhere else, as well as being near their winged insect prey; they often seem to start

building in holes that are too small to allow them to finish, and then they have to leave them for more roomy quarters. A Platypus dived near the bank as the boat approached. Cormorants were exceedingly numerous, evidently showing that food was abundant. We passed a towering White Gum tree, and saw two hawks' nests on it, one belonging to a White Goshawk and the other to a Collared Sparrowhawk, but they were well out of reach. A pair of Plotus Birds were passed; when these birds dive they do not do as most other birds, head down and tail up, but they seem to sink and draw their long neck under the water and so disappear. Towards evening several shoals of Mullet passed up the river to the falls; they made a considerable noise as they went along, swimming near the surface. Sydenham Inlet is a fine sheet of water, with a picturesque bar. There were hundreds of Black Duck, Chestnut-breasted Teal, and Swans on its surface, and a few Pelicans, and any quantity of fish. It must be a delightful place to camp for a holiday. A large nest of the White-bellied Sea Eagle was seen about fifty feet up an old gum tree, and it contained about a cartload of material. The Black Wattle trees lining the bank were all in bloom, and looked very beautiful, and the water was in many places covered with their fallen flowers, but the bark strippers were busy at work taking the bark off. When passing through the Gippsland Lakes again, ducks, swans, and the Sombre Gallinule were seen in many thousands, and they could only be described by acres of them. They kept in the shallow water, and were probably here in such numbers on account of the extreme dryness of the season. The flight of the Gallinule is very weak. When passing up the Thompson River numbers of young ducks were seen close under the river bank and among the reeds, and two Copper-head and one Tiger Snake were seen swimming across the river. A good many dead eels were floating about on the surface of the water, and we presume that they were killed by the dredge that was at work in the channel.

A NEW ROTIFER—*LACINULARIA ELONGATA.*

By J. Shephard.

(Read before Field Naturalists' Club of Victoria, 13th April, 1896.)

On 11th January, on the occasion of a Club excursion to Heidelberg, was found a considerable number of colonies of this rotifer, which I take to be new, and have ventured to name *Lacinularia elongata.*

Before describing it I would mention that when Hudson and Gosse's "Rotifera" was published, in 1889, only two species of the genus Lacinularia were mentioned—*L. socialis*, a widely distributed form, and *L. pedunculata*, peculiar to Australia. Up to June, 1893, when Mr. Rousselet published a list of new species de-

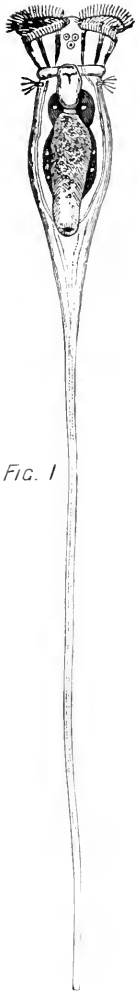


FIG. 1

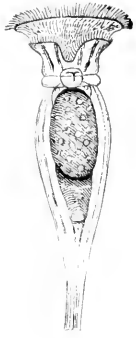


FIG. 2

FIG. 3

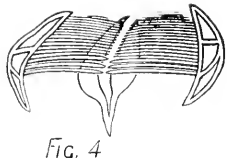


FIG. 4

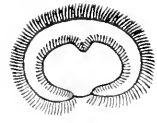


FIG. 5

J. Shephard del.

Fig. 1.—Dorsal view.
Fig. 2.—Ventral view of anterior part of animal.
Fig. 3.—Lateral view of anterior part of animal.
Fig. 4.—Trophi.
Fig. 5.—Outline of corona (seen from above).

LACINULARIA ELONGATA

(NEW ROTIFER).

scribed since 1889, four more had been added—two from China, one from Victoria, and one in England, the latter being *L. natans*, now often met with in the lagoons along the valley of the Yarra, though it has not been reported from any place other than Littleton, near London, and the abovementioned locality, so far as I know. It would therefore appear that Australia is rich in forms of this genus, as three out of seven known forms are not reported from elsewhere, and of the remaining four two are common, leaving but two, the Chinese forms, as unrecorded here. The literature I have access to does not contain any newly described species of Lacinularia since 1893. In addition, I would say that Prof. Baldwin Spencer obtained a form from Central Australia, which, owing to its being preserved in spirit, I was unable to definitely identify. Such points of the anatomy as could be discerned differed very little from *L. socialis*. In the formation of the colony there was, however, a most emphatic departure from the ordinary type. Instead of a spherical colony of about $\frac{1}{10}$ in. in diameter, the individuals were spread over a twig of about $\frac{1}{8}$ in. diameter, completely surrounding it for 2 in. of its length, forming a thick felt, closely resembling to the naked eye a freshwater sponge, which are found in Australia, despite recent statements in widely read journals to the contrary. Whether this abnormal luxuriance indicates a new species must be left for decision until the living form or suitably preserved specimens are obtained.

The form which is the subject of this paper was found adhering to the stems of water plants in spherical clusters of a dirty brown colour. This brown colour appears characteristic of the species, as colonies of *L. socialis* found on the same stem retained their usual whitish appearance, and therefore the difference must be attributable to some habit or property of secretion peculiar to the species. The clusters are about 2.5 mm. in diameter. The individuals are more sparsely spread over the surface of this sphere than in other species of the genus, and are at once distinguishable by their narrower body and corona. The corona is slightly oval, the shorter axis being placed dorso-ventrally. There is a very distinct dorsal gap. The groove between the principal and secondary ciliary wreaths is covered with shorter cilia. Two antennæ are placed towards the dorsal surface, low down on the neck. These antennæ are very small, and can only be seen when the animal is suitably placed and the illumination effected in a proper manner. Taking the general outline, the corona is rather wider than the body, and in living specimens the neck is constricted and there are two transverse furrows on a level with the mastax. From the neck the outline broadens until the widest part is reached, a little below the neck, from whence it tapers off somewhat quickly to a long peduncle of about two-thirds the entire length of the animal. The peduncle is highly contractile. The

trophi have the form characteristic of the family, but are much smaller, being ·023 mm. across, as against ·072 mm. for some of *L. socialis* measured for comparison. The fulcrum is pointed at its termination, and not swollen as in *L. socialis*. The arrangement of the internal organs does not vary from the usual type, except that the alimentary tract is not so sharply divided into intestine and stomach as in other species of the genus. A mounted specimen showed the anus to be ciliated. Three round nucleated bodies were noticed towards the dorsal surface, just below the dorsal gap, which are shown in fig. 1, the two anterior ones being smaller proportionately to the third than figured. Fig. 1 was drawn from a preserved specimen, figs. 2 and 3 from life. I am indebted to Mr. W. Stickland for the careful manner in which he has engraved the figures.

I sum up the specific characters as follows:—Clusters fixed, with a dense matrix of adherent tubes of a dirty brown colour. Body of individual narrow and much elongated, terminating in slender peduncles two-thirds of whole length. Corona rather wider than body, slightly oval, with short axis, dorso-ventral, at right angles to trunk, ciliate between wreaths. Dorsal gap distinct. Antennæ two, dorsal, minute. Dimensions.—Clusters, up to 2.5 mm. diameter; individuals, .8 mm. to 1 mm. long; corona, .08 mm. wide; body, .06 mm.; trophi, .023 mm. across; ova, .07 by .048.

Habitat—Heidelberg, Victoria.

INTERMEDIATE HOSTS OF FLUKE.—Third Note.

By Rev. W. Fielder.

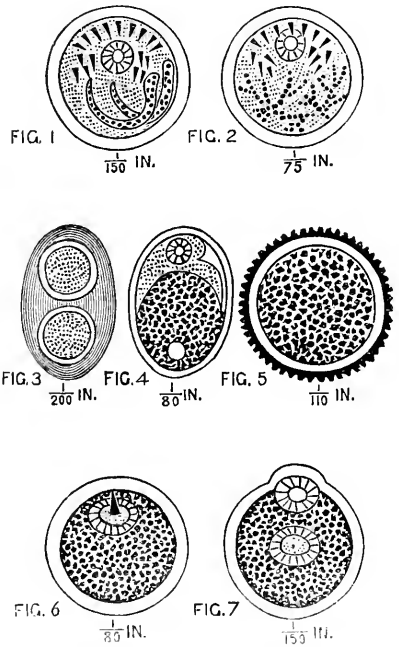
(*Read before the Field Naturalists' Club of Victoria, 10th May*, 1896.)

Some twelve snails have already been recorded for Victoria as harbouring fluke embryos. One or two others from New South Wales have since given examples, notably *Isidora (Bulinus) newcombi*, together with varieties of *Limnea brazieri*, embryos from these forms being more common now than earlier in the year. Perhaps the most interesting find of the month, however, is that of the occurrence of curiously modified fluke embryos in the Freshwater Mussel (*Unio Australis*). The cercaria embryos are somewhat oval in shape, the head region being narrower than the tail region. Towards the posterior border a pinching-in takes place, a segment, so to speak, being almost separated from the body proper. From the groove thus formed springs a whip-like structure on either side, each process when in a contracted condition being about the length of the body. The method of extending these processes is extremely interesting. The substance appears to run out from the base like the tape from a winding measure till it reaches a length five or six times that of the body.

A slight jerk, and the extended filament is rapidly contracted till it assumes a state of rest. Although of such length, it does not take up much space, since it arranges itself in coils which overlap each other. A gas-globule is usually present at the extreme tip. The nurse-sacs of this form are very long compared with typical ones, being crowded with cercariæ, and are present in great numbers in the "liver" of the host.

In the last note reference was made to the occurrence of cysts *within* the snails and the comparative absence of encystation *outside* the snail was commented upon. The appearance and structure of these cysts will be described in the present note. Seven varieties have been observed, and there is every reason to believe that they are the temporary home of distinct forms of fluke embryos. Rabbits and ducks have been fed upon some of them, but up to the present no satisfactory results have been obtained. However, the experiments cannot be regarded as conclusive, since the material operated upon has been of too limited a character to found upon it any definite conclusions.

The first cyst to be described is that occurring in very large numbers in *Isidora texturata*, *Isidora alicie*, and *Limnea lessoni*. It reaches a size of $\frac{1}{150}$ of an inch, and is easily known by the curious appearance of some glassy-looking cells, which are always arranged in a very definite manner. In the cercaria these cells stand out quite distinct from the rest, and are seen as a band extending down each side of the body. When the animal is about to encyst it doubles the anterior of its body over the posterior portion, and throws off the tail. This doubling is not quite equal, so that darkish cells in the upper fold do not lie quite above those in the lower, but rather a little to one side. Two loops, therefore, of these specially modified cells are seen (fig 1). It was not till actual encystation had



Cysts of Fluke Embryos.

been witnessed that the full explanation of the arrangement was definitely understood. In the living cercaria the cells are confined to two ducts, which end blindly behind but open in front just behind the anterior sucker. The cells are probably cystogenous in function, yet only a few seem to be used up in the actual process of making the cyst. Shining through the cyst a circlet of spines is clearly visible, encircling the anterior sucker, and if the cyst is ruptured this circlet is seen to be made up of a double row of small spines. The ring is broken by the anterior sucker, and at the points lying near its posterior border are two patches, each bearing four large pointed spines. Exceedingly minute spines cover the anterior end of the embryo, and extend down the body to the level of the posterior border of the ventral sucker. Rudimentary spines can be made out on some of the active cercariæ, but growth of the spines seems to proceed most rapidly in the period immediately following encystation. This example affords evidence of what is known as an "armed" variety of embryo fluke—the armour referring to the presence of specially modified spines or stylets, which are, doubtless, of use to the embryo for attachment purposes in a final host. The cysts themselves occur not only in the liver, but also in the albumen gland and near to the pericardium, and in one instance a redia also contained cysts.

Another interesting cyst occurs in the snails *Isidora texturata* and *Limnea lessoni*. It is just twice as large as most of the others, being about $\frac{1}{75}$ in. in size ; so large, in fact, that no active cercaria has been seen which can be exactly fitted to it, and it is probable that the earlier stages have yet to be observed. The semi-transparent cells which have already been described in connection with the other cyst here take the form of a crescent, the edges of which give off branching processes. In the space between the limbs of the crescent structures like the teeth of a comb can be seen (fig. 2). If now the cyst be ruptured carefully, this comb-like structure assumes the shape of a nearly complete ring in the region of the anterior sucker—the ring being made up of about thirty-seven large spines. On either side of the pharynx is a tuft of four spines, then the others follow in a single row till they meet in the mid-dorsal line. Covering the whole of the anterior portion are small spines which extend, as in the case of the fluke before described, as far as the ventral sucker. At this stage the embryo has practically all the rudimentary structures of an adult fluke.

Occurring side by side with the cysts already described, a great number of somewhat smaller cysts, about $\frac{1}{200}$ in. in diameter, were occasionally met with. No opaque cells were present, but the included protoplasm presented a uniform granulated appearance. In most cases the cysts occurred in

groups of two to twelve, surrounded by a very thin transparent gelatinous substance, enclosed in a definite cell wall (fig. 3). When the cysts were ruptured, both anterior and posterior suckers were clearly defined in the embryo, as well as a circlet of small spines near the anterior sucker.

Another curiously modified cyst also occurs in immense numbers in *Isidora texturata*, and occasionally in *Isidora tenuistriatus*. This cyst is about $\frac{1}{80}$ in. in length, being somewhat oval in shape, with the anterior end just a little wider than the posterior one. The whole of the posterior region is obscured by a large number of dark pigmented cells, with the exception of a small circular patch which occurs near the posterior border, in the region probably of the excretory pore (fig. 4). If these cysts are kept for any length of time within the snail, the pigmented portion becomes less in size and lighter in colour, and it is quite probable that the pigmented cells are food yolk cells, upon which the young embryo is supported during its temporary imprisonment. During the last three months these cysts have been frequently met with in the same gathering of snails, and it is probable that they will exist in a living condition for some considerable time when protected by the tissues of the snail. The embryo which issues from this cyst does not appear to be an "armed" variety, no *large* spines being visible. The anterior portion, however, is, as in the other cases, covered with very minute spines.

Another pigmented variety of cyst, $\frac{1}{110}$ in. in size, occurs in *Limnea brazieri*. In the case of this form encystation was seen to take place directly it was taken from the snail. A granulated material was passed over the cercaria and the tail eventually cast off. A very large amount of pigment was present in the cercaria, and when the cyst was complete the centre of it was so dark as to be quite opaque to transmitted light. The outer border of the cyst presented a serrated appearance in all the examples observed on this occasion (fig. 5). No spines were noticed on any of the embryos.

The embryo fluke (cercaria stage) with one spine springing from the anterior sucker has already been described as occurring in *Isidora texturata*, *I. gibbosa*, *Limnea lessoni*, and *L. brazieri*. Encystation has been observed in one or two instances, the resulting cyst being about $\frac{1}{180}$ in. in diameter. The central protoplasm is very granular, but a single stylet is clearly seen shining through (fig. 6). If the embryo is released, both anterior and posterior suckers come into view, as well as the typical arrangement of the alimentary track. A depression with an opening on either side of the anterior sucker is visible at a slightly higher level than the openings referred to in the first embryo described.

The last cyst to be described is one found in company with *Segmentina victoriæ*—a few only of the cysts being noted, and

the embryos in *Isidora tenuistriatus* and *Ancylus tasmanicus* and those during the month of January. These cysts were of average size, being about $\frac{1}{150}$ in. in diameter, and the anterior and posterior suckers could be distinguished through the deeply pigmented mass of the central protoplasm (fig. 7).

In dealing with these cysts the question naturally arises, "Where do they find their future home—is it in bird, fish, sheep, or man?" The answer to this, as far as Australia is concerned, has yet to be found, and bearing, as it does, upon the everyday life of the people of infected districts, its economic value is of the very greatest importance.

MICROSCOPIC WORK.

THE note by Mr. Bullen in the last *Naturalist* on the use of turpentine in mounting recalls to my mind a somewhat similar experience which I have had. Some years ago I put up a number of slides of calcareous sponge spicules, using oil of cloves to displace the air from the spicules, and in turn replacing the oil of cloves by running in balsam in benzine. From these slides the spicules have completely disappeared, having evidently dissolved in the balsam, which would, perhaps, retain a trace of the oil of cloves.—THOS. STEEL. Sydney, 11th May, 1896.

THE CALVERT EXPLORING EXPEDITION.—This expedition, which has been fitted out by Mr. Calvert for the purpose of completing the work of the Elder expedition of 1891, will start from Derby, on the north-west coast, and work in an easterly direction towards the overland telegraph line, somewhere about Powell's Creek. Members of the Field Naturalists' Club will doubtless be pleased to learn that a fellow member, Mr. G. A. Keartland, has been selected to fill the position of zoological collector, for which duty the experience gained on the Horn expedition will prove of great service. The party has already left Adelaide *en route* to Western Australia, and will probably be away about twelve months.

GEOLOGICAL—A CORRECTION.—We notice that several of our geological friends are accustomed to style Dr. Selwyn "Sir A. R. C. Selwyn," and we even note it in the index of one of our English contemporaries. This is an error. Dr. Selwyn has received the title of C.M.G. at the hands of Her Majesty, but has not been knighted. Attention has previously been called to a similar mistake with reference to Richard Daintree, but error dies hard.

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FIELD NATURALISTS' CLUB OF VICTORIA.

THE sixteenth annual meeting of the Club was held at the Royal Society's Hall on Monday evening, 8th June, 1896. The president, Professor W. Baldwin Spencer, M.A., occupied the chair, and some 60 members and visitors were present.

REPORTS.

A report of the dredging excursion in Port Philip Bay, on Queen's Birthday, was received from Mr. J. Shephard. The party was successful in locating a splendid dredging ground, and this has been marked for future operations. It was decided that Messrs. Cooke and Cottell be again thanked for the use of their boats.

Mr. F. G. A. Barnard submitted a report of the excursion to Olinda Creek, Lilydale, on the same day, which was enjoyed by those present in spite of the wet weather.

ELECTION OF MEMBERS.

On a ballot being taken, Miss Brent and Messrs. L. Arendts, F. Buckie, and Rev. J. S. Hart were duly elected members of the Club.

ANNUAL REPORT.

The hon. secretary (Mr. H. P. C. Ashworth) read the sixteenth annual report, 1895–96, which was as follows :—

"To the Members of the Field Naturalists' Club of Victoria. Ladies and Gentlemen,—Your Committee has much pleasure in presenting to you the sixteenth annual report of the Club's work, being for the year ending on 31st May, 1896.

"The past few years have, of necessity, seen a slight diminution in the membership of the Club, in common with that of other societies in the colony, but though this has been the case it is satisfactory to note that the interest in the monthly meetings has been fully maintained, the average attendance at which has been about 60.

"During the past year 11 new members have been elected, and the total membership is now 157, including life and honorary members, the latter numbering 11.

"The Club has to regret the loss, by death, during the past year of one honorary member, Dr. J. E. Taylor, and of three ordinary members, who have been for many years associated with the Club—Mr. J. Bracebridge Wilson, Dr. P. MacGillivray, and J. L. Bowen.

"Twenty-three papers have been read at the meetings, and in addition 11 others written by members of the Club have appeared in the *Naturalist*, of which 8 were botanical, 16 zoological, 2 geological, 3 dealt with excursions, and 5 with general subjects.

"The names of those who have contributed papers to the meetings and to the *Naturalist* are Baron von Mueller, H. P. C. Ashworth, F. L. Billinghurst, H. Bullen, Rev. W. Fielder, R. J. Fletcher, C. French, C. French jun., J. Gabriel, R. Hall, T. S. Hall, T. S. Hart, W. H. F. Hill, Oswald B. Lower, G. Lyell, D. M'Alpine, Mrs. Martin, A. J. North, C. M. Maplestone, O. A. Sayce, D. Le Souëf, Professor Spencer, and H. T. Tisdall.

"The number of papers is considerably larger than that of last year, but your Committee trusts that the coming year will see still further activity in this direction. In particular it would point out to country members and to those who have the opportunity of investigating the fauna and flora of special districts the importance of drawing up local lists dealing with the fauna and flora of special parts of the colony. This work can advantageously be carried on side by side with an investigation into the habits and life-histories of the animals recorded, and such carefully drawn up faunal lists are of considerable importance in dealing with general questions concerned with the distribution of animals and plants. In this respect it is to be hoped that the Club will be able to publish series of papers from various members, such as those now being written by Mr. Billinghurst on the fauna of the Castlemaine district.

"The excursions have been fairly well attended, but there is room for considerable improvement in this respect, and the attention of members is once more drawn to the advantages to be gained from taking part in field work in company with other members of the Club with whom they have interests in common. No extended excursion has been held during the year, but the Club has received accounts of excursions made to Albatross Island by Messrs. Gabriel and Ashworth, and to Mallacoota Inlet by Mr. D. Le Souëf.

"During the year seven meetings have been held for practical work, three of which were devoted to a course of demonstrations given by Mr. C. A. Topp on systematic botany; two were presided over by Mr. O. A. Sayce, who dealt practically with "Killing, Mixing, and Staining Reagents for Microscopic Work;" one by Rev. W. Fielder, who dealt with the Tunicata; and one by Mr. Shephard, on the measurement of microscopic objects. Reference

may be made here to the interesting results obtained by Mr. Fielder in regard to the intermediate hosts of various species of flukes. It is to be hoped that further work will enable Mr. Fielder to arrive at definite conclusions with regard to the life-histories of the forms now being studied by him.

"In the last report reference was made to the despatch of a scientific expedition to Central Australia by Mr. Horn. The zoological report, a copy of which Mr. Horn has presented to the Club, has now been issued, and the Club will notice with interest that out of the thirteen authors of the seventeen memoirs contained in the report nine are members of this Club. In this connection members will note with interest that Mr. G. A. Keartland, who accompanied the Horn Expedition, has recently been appointed zoological collector on the Calvert Expedition, so that in various ways members of the Club are engaged upon work which will serve to considerably extend our knowledge of the natural history of Australia.

"The twelfth conversazione of the Club was held in the Athenæum Hall on Thursday and Friday, 28th and 29th May, and was a decided success. As on the last occasion, it was held on the two evenings and the intervening afternoon. The attendance was such as to render it financially a success, whilst in drawing attention to the aims and work of the Club it cannot fail to be of future advantage. It was opened by our senior patron, the Baron von Mueller, who was supported by Sir Frederick M'Coy, and during its course lecturettes were delivered by Mr. C. Frost, Mr. T. S. Hall, and Professor Spencer. The display of natural history and other exhibits was a good one, but on a future occasion the committee hopes to see a larger number of members taking part as exhibitors. As usual, one of the most attractive features was the display made by the microscopical section.

"The twelfth volume of the Club's journal has been completed, and the thanks of the Club are again due to Mr. F. G. A. Barnard for the work which he has so admirably performed as editor of the journal, the circulation of which is of the greatest advantage to the Club.

"In regard to the finances of the Club, the treasurer reports that the receipts are £129 8s. 10d., the expenditure £123 6s., leaving a balance of £6 2s. 10d. The expenditure includes the sum of £26 9s., which has been paid on account of liabilities previously incurred, so that from a financial point of view the Club may be regarded as having improved its position.

"Your committee, in conclusion, would remind members that the usefulness of the Club can be extended not only by the attraction of new members, but by each individual member

taking as far as possible an active share in the work of the Club.

"Signed, on behalf of the committee,
"W. BALDWIN SPENCER, *Chairman.*
"*8th June*, 1896." "H. P. C. ASHWORTH, *Hon. Sec.*

FINANCIAL STATEMENT.

The hon. treasurer, Mr. C. Frost, F.L.S., then read the financial statement for 1895–96, which was as follows:—

RECEIPTS.

To Balance, 30th April, 1895							£16	7 1
,, Subscriptions				£92	2	6		
,, *Victorian Naturalist*—								
Subscriptions	£4	10	6					
Sales, &c.	7	8	9					
Advertisements	9	0	0					
				20	19	3		
							113	1 9
							£129	8 10

EXPENDITURE.

By *Victorian Naturalist*—								
Printing, on account 1893–4	£26	9	0					
,, 1895–6	58	6	6					
Reprints	1	15	0					
				£86	10	6		
,, Rooms—Rent and Attendance				14	13	6		
,, Library—Binding				0	18	0		
,, Printing and Stationery				4	19	0		
,, Postages and Advertising				16	5	0		
							£123	6 0
,, Balance							6	2 10
							£129	8 10

C. FROST, *Hon. Treasurer.*
1st June, 1896.

Audited and found correct.
H. CUMMINS,
ROBT. HALL, } *Auditors.*
4th June, 1896.

On the motion of Mr. H. T. Tisdall, F.L.S., seconded by Mr. C. French, F.L.S., the report and balance-sheet were received and adopted.

OFFICE-BEARERS FOR 1896-7.

The following office-bearers for 1896-7 were declared duly elected, being the only nominations received:—President, Professor Baldwin Spencer, M.A.; vice-presidents, Messrs. C. French, F.L.S., and J. Shephard; hon. librarian, Mr. O. A. Sayce; hon. treasurer, Mr. C. Frost, F.L.S.; and hon. secretary, Mr. C. French, jun.

A ballot for five members of committee resulted in the election of Messrs. H. P. C. Ashworth, D. Best, J. Gabriel, F.L.S., T. S. Hall, M.A., and W. Stickland.

On the motion of Mr. E. T. Carter, seconded by Mr. C. French, jun., a vote of thanks to the retiring hon. secretary was passed with acclamation.

PAPER.

By Mr. H. R. Hogg, M.A., entitled "The Flight of Sea Birds." The author showed how, in flying against the wind without flapping their wings, the motive power is obtained chiefly by utilizing the momentum gained by force of gravity, and offered some remarks on the methods of regaining vertical distances lost in the process.

In the discussion which followed Professor Spencer and Mr. H. P. C. Ashworth took part, the latter holding that Mr. Hogg's explanation amounted to perpetual motion, since a bird on entering the air formed part of it, and no movement of the whole of the air could therefore be of any advantage.

NATURAL HISTORY NOTES.

A note was received from Miss Agnes F. Kenyon, recording the occurrence of *Voluta Roadknighti*, a shell hitherto supposed to be confined to Victorian waters, from the east coast of Tasmania.

EXHIBITION OF SPECIMENS.

The following were the principal exhibits of the evening :—By Mr. F.G.A. Barnard.—Queensland moths and flowers of *Melaleuca squarrosa* grown by exhibitor. By Mr. G. Coghill.—Young Copper-head Snake, alive. By Mr. C. French, F.L.S.—Rare Australian butterflies, *Epinephile Joanna*, *E. Helena*, *Atella propinqua*, *Libythea myrrh*, *Holochila cyprotus*, *H. albosericea*, *Pseudodipsas Digglesi*, *P. Brisbanensis*, *Hypochrysops Olliffi*, *Lycæna oranigra ;* also insects from Duke of York Island, collected by Rev. E. Brown. By Mr. C. French, jun.—Orchid in flower, *Pterostylis vittata*, collected at Sandringham, 6th June, 1896. By Mr. R. Hall.—Bird, nest, and eggs of Little Chthonicola. By Baron von Mueller, K.C.M.G.—*Struvea plumosa*, found by Mr. O'Halloran at Spencer Gulf. This alga is new for South Australia, having previously been known from near the estuary of Swan River and from Champion Bay ; *Claudia elegans*, also from Spencer Gulf, and obtained by Mr. O'Halloran, the locality being the sixth from which this magnificent seaweed is known ; *Alysicarpus vaginalis*, sent by Mr. Joseph Harris, F.R.H.S., who obtained it from Fiji, where it has been introduced and is rapidly supplanting the original pasturage. It is remarkable that stock are passionately fond of it, and that neither this nor any other Alysicarpus has been previously recorded as a rural plant.

After the usual conversazione the meeting terminated.

FIELD NATURALISTS' CLUB CONVERSAZIONE.

THE twelfth *conversazione* of the Field Naturalists' Club of Victoria was held at the Athenæum Hall, Collins-street, Melbourne, on Thursday and Friday, 28th and 29th May, 1896.

The arrangements of the *conversazione* were practically the same as of that held in June, 1894. It was inaugurated on Thursday evening, in the presence of a large number of members and friends, with a brief address by Baron Sir F. von Mueller, K.C.M.G., M. and Ph. D., &c., one of the patrons of the Club, who called attention to the aims and objects of such organizations, and the opportunities they afforded for working out the geographical distribution of both animal and vegetable life. He expressed his pleasure at seeing so many ladies interested in the subject, and hoped that some of them at least would become prominent workers in natural science.

A vote of thanks to Baron von Mueller was proposed by Professor Sir Frederick M'Coy, K.C.M.G., D.Sc., who referred to the great help field observers could be to the scientific specialist, who was perhaps unable to devote sufficient time to working out the life-histories of such animals or plants as he might require to complete his investigations, and spoke with great appreciation of the prominent position held by Baron von Mueller in the scientific world, and especially in Victoria. The motion was briefly seconded by the president, Professor Baldwin Spencer, and carried by acclamation.

A lecturette entitled "Some Notes about Spiders" was then delivered in the upper hall by Mr. C. Frost, F.L.S. In the course of his remarks, which were well illustrated by limelight views, he pointed out the principal groups into which spiders are divided, and gave many interesting particulars as to their habits, method of web-spinning, &c., many of the audience being surprised to learn that spiders should be regarded as friends rather than foes to mankind, owing to their usefulness in keeping insect life in check.

On Friday afternoon Mr. T. S. Hall, M.A., delivered a lecturette entitled "An Australian Ice Age." The lecturer briefly indicated some of the factors in the formation of glaciers, and described the effects of moving ice on a land surface. The glacial beds at Bacchus Marsh and Derrinal were then dealt with, and their characters were fully illustrated by lantern views. The discussion of the age of the beds, their geographical extent, and probable source, brought the proceedings to a close.

In the evening Professor Baldwin Spencer, M.A., gave an illustrated lecturette on "Life in a Central Australian Waterhole" to a numerous audience. He briefly described the characteristic physiographical features of that region, and the situation of the principal permanent and temporary waterholes,

and then gave a brief sketch of the life-histories and habits of their most noteworthy inhabitants.

The lantern used to illustrate the lectures was kindly placed at the disposal of the Club and worked by Mr. J. Searle.

The display of natural history specimens in the main hall was, of course, the principal feature of the conversazione, and was quite up to the standard of previous exhibitions of the Club. Besides the many fine exhibits by the individual members, splendid collections of specimens were on view from the Biological School, Melbourne University, and the Entomological Branch of the Department of Agriculture. Some twenty members exhibited microscopes with objects, which proved a great source of attraction during the evenings.

EXHIBITS.

The following is a list of the contributors, with particulars of their exhibits :—

ASHWORTH, H. P. C., Glenferrie—Mounted Birds and Birds' Skins. Photographs from the Islands in Bass Strait.

BAKER, FRANK L., Auburn—Photo-Micrographs.

BARNARD, F. G. A., Kew—Victorian and British Insects. Birds' Skins from Richmond River. Pair Flying Mice. Victorian Ferns in pots. Portraits of Sir Jos. Banks and Sir Jas. E. Smith, with autograph description of *Datura arborea* by latter, dated 1792.

BEST, D., Hawthorn—Case of Australian Wasps and Hornets. Case of Victorian Butterflies. Twelve cases of Australian Beetles.

BIOLOGICAL DEPARTMENT, Melbourne University—Series of specimens illustrating the more important groups of the animal kingdom.

COCHRANE, Miss S. W. L., Auburn—Paintings of Victorian Orchids.

COLES, A., Melbourne—Queensland Cassowary. Australian Kangaroo. Black Brush Wallaby. Red-necked Wallaby. Striped Rock Wallaby. Case of New Guinea Birds. Shade of Australian Quail. Arctic Fox. Litter of six young Foxes. Wedge-tailed Eagle. White-bellied Sea Eagle. Owls. Sitellas. Grauculus. Bittern. Silver Gulls and young. Collection of Australian Birds' Eggs.

ENTOMOLOGICAL BRANCH, AGRICULTURAL DEPARTMENT—Charts of Insects destructive to vegetation. Cases of Silk-producing Moths, with Life-Histories and Insect Dissections. Plates for Handbook of Destructive Insects. Group of Insectivorous Birds of Victoria.

FIELDER, Rev. W., St. Kilda—Shells of Snails which form the Intermediate Hosts of Fluke Embroyos.

FRENCH, C., F.L.S., Malvern—Two drawers of Foreign Beetles. Five drawers of Australian Butterflies. Five drawers of Australian Moths. Six drawers of Foreign Butterflies and Moths. Four frames of Illustrations of Australian Insects.

FERGUSON, W. H., Albert Park—Aboriginal Stone Implements.

FRENCH, C., jun., South Yarra—Princess of Wales Parrakeet (alive). Blood-stained Cockatoo (alive). Pennant's Parrakeet (alive). Podargus (alive). Also case of Nests and Eggs of Insectivorous Birds of Victoria.

GATLIFF, J. H., Carlton—Cases of Victorian Shells.

GRAYSON, H., St. Kilda—Diffraction Gratings for Spectroscopic Work. Gratings for Monochromatic Illumination with the Microscope. Micrometric and Test Rulings ranging from 5,000 to 120,000 lines per inch.

HALL, R., Box Hill—Plumed Egret, mounted.

HALL, T. S., M.A.—Geological and Palæontological Collection. Gra[illegible] &c.
HILL, W. H. F., Windsor—Two cases of Victorian Lepidoptera.
HILL, GERALD F., Windsor—Two cases of Victorian Hymenoptera (Wa
HILL, BERNARD F., Windsor—Two cases of Victorian Hymenoptera.
HILL, WILFRED F.—Case of colony of Beehive Moths.
KERSHAW, W., Windsor—Three drawers of Foreign Lepidoptera. Th[illegible] drawers of Australian Lepidoptera. Case of Australian and N[illegible] Guinea Birds.
KERSHAW, JAS. A.—Two drawers of Australian Lepidoptera. Case Foreign Lepidoptera.
KITSON, A. E., East Melbourne—Ores of Silver, Lead, Copper, Iron, Tin Zinc, Antimony, Nickel, Manganese, Mercury, Molybdenum, and Tungsten.
LE SOUEF, D., Parkville—Case of Australian Birds' Eggs. Case of Queensland Curios. Live Snakes.
LYELL, G., jun., Gisborne—Four cases of Australian Butterflies and Moths.
MAPLESTONE, C. M., Heidelberg—Drawings of Orchids.
SHEPHERD, G. E., Somerville—Yellow-legged Spoonbill. Blue Reef Heron. Mountain Teal. Sooty Oyster-Catcher. White-breasted Oyster-Catcher. Barred-Rumped Godwit. Hooded Dotterel. Turnstone. Black-chested Pewit. Lewin's Rail. Little Water Crake.
STICKLAND, W., Hawthorn—Drawings of Rotifiers.
STICKLAND, J., Hawthorn—Mounted Seaweeds.
SWEET, G., Brunswick—Geological and Palæontological Collection.
TISDALL, H. T., F.L.S., Toorak—Coloured Drawings of Victorian Fungi.
WISEWOULD, F., Melbourne—Case of Shells.
WATSON, W., & SONS, 78 Swanston Street—Microscopes, and Display of Micro. Specimens. Novelties in Optical Instruments, &c.

Microscopical exhibits were shown by the following:—Mr. H. Bullen, metallic ores and micro-fungi; Mr. E. T. Carter, entomological mounts; Mr. J. Gabriel, polyzoa; Mr. R. Hall, pond life; Mr. W. H. F. Hill, rock sections, with polarized light; Mr. H. R. Hogg, pond life; Mr. W. J. M'Caw, specimens illustrating life-history of the Liver Fluke; Mr. H. O'Neill, biological preparations; Mr. G. J. Page, Foraminifera and Diatomaceæ; Mr. A. O. Sayce, slides illustrating histology of the frog, also blood in circulation, and some living examples of its eggs under development; Mr. J. Shephard, preparations illustrating development of jelly-fish, anemone, and pond life; Mr. W. Stickland, Rotifiers; Mr. J. Stickland, pond life; Mr. W. Stone, pond life; Mr. J. Wilson, insect anatomy.

NOTES ON THE HABITS OF WOOD SWALLOWS.

By ROBERT HALL.

(Read before the Field Naturalists' Club of Victoria, 10th February, 1896.)

IN the Box Hill district two species of the Artamidæ—viz., *Artamus superciliosus*, Gould, and *A. personatus*, Gould—are well represented at the present time (January, 1896). Last season their arrival was noted on 12th December, but this season they appeared much earlier, viz., 25th October, when the grasshoppers were in their babyhood. The insectivorous habits of these birds, besides being worthy of record, have afforded me the opportunity of putting together a few notes as to their mode of life.

Previous to settlement for the season they show considerable knowledge or instinct, and generally seem to choose a locality

for the season insect life is specially abundant. At the same time it is noticeable that a certain number are generally associated with a distinct area. Hawking singly, in pairs, or in a flock constantly assembling upon the grassed ground, they raid. In the latter case they move by "jump" motion. Often does a single bird (but never a silent one) choose a pinnacle some twenty feet high, maybe the upper portion of a tree, and settling itself to the business of the evening, leaves its headquarters in direct pursuit of a dipterous or other winged insect, and returning essays another chase, continuing to repeat the same for a considerable time, soaring downwards and winging its active upward way by a series of rapid flaps. Previous to entering upon the serious portion of life, the birds assemble in flocks amongst the lower portions of the higher leafy vegetation, causing a vocal din such as one would not expect from a group of birds so graceful in their movements, the harsh, sharp and powerful chirps of a hundred birds, continuously repeated, not being as pleasant (at all events somewhat modified) as in the sobered parents of twenty-one days later. I remember a large flock of the swallows taking possession of a cluster of timber in which were a Black Fantail, its mate, nest and eggs, and only occassionally could the little bird be heard. It tried, and generally succeeded, after *they* had retired for the night.

The second of a weekly visit showed their desire for nest-building had in part set in, and the constructions were completed in one or two days. Some were rapid in work, others appeared to play in comparison.

Artamus superciliosus (Gould), White-eyebrowed Wood Swallow.—A clutch of eggs was observed on 8th November, with the birds still in flocks on the 17th of the same month. With this species both sexes incubate. The young of others were on the wing by the 23rd, but before leaving the nests a relic of inheritance was distinctly noticeable in the horizontal and perpendicular motions of the short-plumaged tail, as is perpetual with the day movements of the parents. The fledgeling, when taken from the nest, announced itself by two calls—one imitative of the general note of the mother, though more broken and feeble, and the second of fear, which was the result of being away from its nest fifteen minutes. This bird we endeavoured to domesticate, but without success—it refused to eat. The eggs varied in markings slightly, with a deep or light ground colour—one egg in a set of three had the zone of spots at the narrow end, the other two were normal. They differed on the average only a shade in dimensions, and in the number to a clutch from four to two. Of twelve nests observed three contained four eggs, six three eggs, three two eggs, all well incubated.

The nests at times, though slight in structure, were generally faithfully built of rootlets, or grasses, or more often twigs and grasses, and in many cases artistically arranged, seldom above six feet from the ground, and placed in all manner of places, preference being given to perpendicular slight stems, though nearly as often placed upon the horizontal firm twigs or branchlets of assorted shrubs and bushes. One nest was placed in the socket for a paddock slip panel, a second in a furze or whin hedge, many in bushes of the same, in Leptospermum, others in acacia wattles, and fewer in eucalypts, as far as this district is concerned.

That these two members are here in considerable numbers may be deduced from the fact that forty nests—building, tenanted, and vacated—were observed by the writer on the 16th of December within a mile, and nearly within the straight line lying between its termini. Two orchards, a belt of furze or whin, and an almost dry watercourse had to be passed through—or, rather, the creek was passed over, not so the orchards. The nests were placed in the orchards more numerously than in the legume whin, areas being equal. Plum, pear, apple, and cherry trees received the nesting honours. One nest was placed in a "sweetbriar," low to the ground—that is, about two feet—in the township of Surrey Hills. My chord of generosity was somehow struck, and I placed a piece of basalt in the nest, in order that the birds would be saved more serious distress later on. Next week the nest was gone, and so would have been the eggs but for the stone. This does not cast a reflection on Surrey Hills boys, for they are diligent.

On a previous occasion I referred to the sensitiveness of this bird: its hardihood is now the chief feature, for no less than seven times was a nest in a young elm enclosed within a guard destroyed, this being done to save restless boys from making investigations and damage to the structural beauty of the tree. Each time the nest was bodily taken away, leaving only a remnant, the birds would persist in rebuilding it within the same fork, until the seventh part edifice was destroyed, and I doubt not that they then sought pastures new, for no further attempt was made in that tree.

Artamus personatus (Gould), Masked Wood Swallow.—As with the previous member, it is insectivorous to a nicety, when opportunity occurs showing full interest in an apiary and not despising the odorous pear-slug, according to a neighbour market gardener, who remarked "an odour so powerful that we are obliged, when picking fruit, to keep to windward of greatly infested trees, and leave them to the care of Hellebore and Summer Birds." There is little doubt about the former, but I question any special service by the latter.

Spring sees a struggle in vocal development; its usual rapid,

rasping note is left aside for a moment or two occasionally, and an endeavour to pour forth a bar more of melody for the benefit of a member of the gentler sex of its kin is made. The effort is great, and the result, though comparable to the song of many of the bird-fauna, falls feebly and brokenly upon the ear of one accustomed to better results from such an effort. However, it is an advance decided on the little varied croak that early becomes ordinary.

This species did not appear to build as early as the former, and nature favoured the depositing of two eggs as a clutch in the majority of cases. Of 18 nests personally observed 5 contained each 3 eggs, 11 contained each 2 eggs, 2 contained each 1 egg. The young were, as a whole, well advanced in the eggs, and other nests with plumaged young had two in each.

As is the manner with many other birds so is it so with these, that of flying angrily and boldly at you as you observe the perfect quiet of the young in the nest. The mother bird is more retiring in her fear, and the persistent darting flights almost direct to the intruder devolve upon the male. The interest in watching the movements is about as keen as is in many other families.

On Christmas Eve I observed that two young were about to fly from a nest built in an odd-looking piece of dead timber near the ground, which I had watched for eight days past. One would serve as a cabinet representative specimen, so I withdrew it at 7 p.m. For an hour and a quarter I kept fifty yards away watching other birds, and returning then I found the parents had removed the remaining young swallow, probably for preservation sake.

Meanwhile I had extracted three fresh eggs (the third one laid the day previously) from another nest of this species, and placed therein the young bird mentioned ; the layer of the eggs, returning at once, looked astonished, but immediately and carefully gathered the young bird under its plumage. Continuing this mild experiment, the young feathered bird was now extracted after being there for fifteen minutes, and a member of the white-eyebrowed species, born two days previously, was placed in the nest, and the proprietor female bird returning a second time again gently covered the creature, this time almost a featherless one, as if it belonged to it, and the loss of three eggs was purely a philosophical matter. This young bird was taken through its cradled course of life by the ninth day later, and released on the same day as were the two in the nest from which it was removed. The young of the previous species at 24 hours of age are downy and well stored with vitality. The last movement of one made in methylated spirit was the dropping of the neck and head upon its chest after 20½ minutes had elapsed from its placement in bottle.

The majority of nests were loosely constructed, but where

fibrous roots were with ease available invariably they were used, and the results were compact nests, neatly arranged. The birds gather the constructive material in the vicinity of the place chosen for the nest, and seemingly do not care to move away from it.

A typical example is easily noticed in the case where a fence divides an orchard from a gorse field ; for on the orchard side ten yards from the fence you will find nests constructed wholly of fruit tree fibrous rootlets, while on the gorse side each nest within the same distance is composed of grasses and twigs that can be gathered amongst them. There are, of course, exceptions.

Three characters of combinative material appear to be used, though they pertain possibly more to local influences and may have but little weight in a limited study of the nests of the Artamidæ :—1. In orchards : rootlets of the trees of same, internally fine, but with coarse mantling. 2. In lightly timbered paddocks : grass-stems principally, chlorophyll bearing before completion, with occasionally a few horsehairs. 3. In well-timbered country : twigs of the trees, with a finer internal lining of linear leaves.

The bowls of all the nests are similar in dimensions, but those of the complete structure may vary occasionally to twice the normal measurements. The positions, as with the previous species generally range about six feet, and often enough only two, from the ground. Nests are placed higher in occasional places here, but, with the exception of *Pinus insignis* and a few species of eucalyptus, the rule is "low to mother earth." The two species build promiscuously, favouring a break of low shrubs which is used for this purpose, the nests being placed in prominent positions, each species as a whole keeping together, but intermixed in both cases with several of the other incubating in their midst.

By the middle of December many of each species were preparing homesteads for the third brood, and seldom do they use the nests of a past family for a future one. Late builders were observed in the early portion of this month (January) carrying twigs. After sundown those birds not engaged in the night tasks of caring for the young or eggs congregate in bodies from 10 to 15 close to each other in a tree or shrub convenient to the nests and near the ground. It may be a large fruit tree, a sweetbriar bush, or one of many other vegetable forms.

With both kinds I find an egg is deposited each day, and the clutch hatch out within twenty-four hours of each other on the twelfth day of sitting, and the young of the two species fly upon the eleventh or twelfth day from hatching, subject to a slight variation in a number of broods.

This season having proved a specially favourable one, these notes have been jotted down from observations made in the district lying between Box Hill and Burwood.

ALOGUE OF VICTORIAN HETEROCERA.

By Oswald B. Lower, F.E.S.

Part XX.

Family—ŒCOPHORIDÆ.

PALPARIA. Wing.

667. P. AURATA (*Palparia aurata*, Walk., B. M. Cat., 775; Meyr., Proc. Linn. Soc. N.S.W., 427, 1882).
Gisborne, Armadale, Sale, &c.

*668. P. LAMBERTELLA, Wing (Meyr., Proc. Linn. Soc. N.S.W., 428, 1882).
Gisborne.

*669. P. RECTIORELLA, Walk. (B. M. Cat., 775; *P. aurigena*, *ib.*, 775; *P. confectella*, *ib.*, 776; *P. rectiorella*, Meyr., Proc. Linn. Soc. N.S.W., 430, 1882).
Moe.

670. P. MICRASTRELLA, Meyr. (Proc. Linn. Soc. N.S.W., 433, 1882).
Melbourne, Gisborne.

671. P. EURYPHANELLA, Meyr. (*loc. cit.*, 435).
Warragul, Gippsland.

*672. P. SEMIJUNCTELLA, Walk. (*Tortricopsis semijunctella*, Walk., B. M. Cat., 777; *Palparia semijunctella*, Meyr., Proc. Linn. Soc. N.S.W., 436, 1882).
Melbourne.

673. P. UNCINELLA, Zeller (*Cryptolechia uncinella*, Zeller, Linn. Ent., ix. 355, x. 146, T. i., fig. i.; *Tortricopsis rosabella*, Newm., Tr. Ent. Soc. Lond., iii., N.S., 293; *Palparia uncinella*, Meyr., Proc. Linn. Soc. N.S.W., 437, 1882).
Gisborne, Melbourne, &c.

674. P. PYROPTIS, Meyr. (MSS.)
Melbourne.

*675. P. AULACOIS, Meyr. (Proc. Linn. Soc. N.S.W., 438, 1882).
Geelong.

*676. P. LITHOCOSMA, Meyr. (Proc. Linn. Soc. N.S.W., vol. x., part iv., Appendix, page 63).
Melbourne.

ENCHOCRATES. Meyr.

*677. E. GLAUCOPIS, Meyr. (Proc. Linn. Soc. N.S.W., p. 43, 1882).
Windsor, Melbourne.

*678. E. PICROPHYLLA, Meyr. (*loc. cit.*, vol. x., part iv., page 63).
Windsor.

ECLECTA. Meyr.

LEPIDOTARSA. Meyr.

EOCHROIS. Meyr.

*679. E. CALLIANASSA, Meyr. (*Eochroa callianassa*, Meyr., Proc. Linn. Soc. N.S.W., 450, 1882).
Melbourne.

680. E. LŒTIFERANA, Walk. (*Lophoderus lætiferana*, Walk., B. M. Cat., 336; *Œcophora semifusella ib.*, 696; *Cryptolechia pudorinella, ib.*, 760; *Eochroa lætiferana*, Meyr., Proc. Linn. Soc. N.S.W., 449, 1882).
Melbourne.

681. E. DEJUNCTELLA, Walk. (*Cryptolechia dejunctella*, Walk., B. M. Cat., 1,036; *Eochroa dejunctella*, Meyr., Proc. Linn. Soc. N.S.W., 452, 1882).
Melbourne, Gisborne, Stawell.

*682. E. PULVERULENTA, Meyr. (*Eochroa pulverulenta*, Meyr., Proc. Linn. Soc. N.S.W., 454, 1882).
Melbourne (Botanic Gardens).

*683. E. PROTOPHAES, Meyr. (*loc. cit.*, 457, 1882).
Gisborne, Ararat, Melbourne.

EUPHILTRA. Meyr.

*684. E. EROTICELLA, Meyr. (*loc. cit.*, 458, 1882).
Melbourne.

ZONOPETALA. Meyr.

685. Z. CLEROTA, Meyr. (*loc. cit.*, 461, 1882).
Melbourne.

*686. Z. GLAUCONEPHELA, Meyr. (*loc. cit.*, 462, 1882).
Trafalgar.

687. Z. DECISANA, Walk. (*Conchylis decisana*, Walk., B. M. Cat., 367; *Œcophora retractella, ib.*, 680; *Œcophora mediella, ib.*, 1,033; *Œcophora ustella*, Walk., *loc. cit.*, 678; *Zonopetala decisana*, Meyr., Proc. Lin. Soc. N.S.W., 463, 1882).
Melbourne.

688. Z. ERYTHROSEMA, Meyr. (*loc. cit.*, vol. x., part iv., Appendix, p. 65).
Melbourne.

*689. Z. SYNARTHRA, Meyr. (*loc. cit.*, p. 65, Appendix).
Trafalgar.

HELIOCAUSTA. Meyr.

*690. H. INCEPTELLA, Walk. (*Cryptolechia inceptella*, Walk., B. M. Cat., 759; *Heliocausta inceptella*, Meyr., Proc. Linn. Soc. N.S.W., 469, 1882).
Gisborne, Melbourne, Moe.

691. H. SEVERA, Meyr. (*loc. cit.*, 471, 1882).
Gisborne, Melbourne.

*692. H. MIMICA, Meyr. (*loc. cit.*, vol. ii., Appendix, p. 934, 1887).

693. H. LIMBATA, Meyr. (*loc. cit.*, p. 471, 1882).
Melbourne.

694. H. EPIDESMA, Meyr. (*loc. cit.*, Appendix, 68).
Melbourne.

695. H. HEMITELES, Meyr. (*loc. cit.*, vii., 475, 1882).
Gisborne, Melbourne.

*696. H. ELÆODES, Meyr. (*loc. cit*, 474, 1882).
In railway carriage at Prahran (at light).

697. H. TRIPHÆNATELLA, Walk. (*Cryptolechia triphænatella*, Walk., B. M. Cat., 753; *C. œcophorella*, *ib.*, 760; *Heliocausta triphænatella*, Meyr., Proc. Linn. Soc. N.S.W., 477, 1882).
Melbourne, Daylesford, &c.

*698. H. PARALYRGIS, Meyr. (*loc. cit.*, 479, 1882).
Melbourne, Stawell, &c.

*699. H. EUDOXA, Meyr. (*loc. cit.*, Appendix, 67).
Melbourne, Mornington.

*700. H. PARTHENOPA, Meyr. (*loc. cit.*, 481, 1882).
Ringwood.

*701. H. EUSELMA, Meyr. (*loc. cit.*, 483, 1882).
Brighton, Stawell, &c.

EUCHÆTIS. Meyr.

*702. E. HABROCOSMA, Meyr. (*loc. cit.*, 484, 1882).
Stawell.

*703. E. METALLOTA, Meyr. (*loc. cit.*, 486, 1882).
Melbourne (Albert Park Cricket Ground).

*704. E. RHIZOBOLA, Meyr. (*loc. cit.*, vol. 1887, 937).
Melbourne, Gisborne.

*705. E. IOSPILA, Meyr. (*loc. cit.*, 938, 1887).
Melbourne.

*706. E. HOLOCLERA, Meyr. (*loc. cit.*, 940, 1887).
Stawell.

707. E. SARCOXANTHA, Lower (Tr. Roy. Soc. S A.)

EURYPLACA. Meyr.

*708. E. OCELLIFERA, Meyr. (*loc. cit.*, 488, 1882).
Gisborne, Melbourne, Dandenong Ranges.

709. E. DEMOTICA, Meyr. (*loc. cit.*, 489, 1882).
Gisborne, Frankston, Ringwood, Melbourne.

NYMPHOSTOLA. Meyr.

PROTEODES. Meyr.

(The above two genera are restricted to New Zealand.)

HOPLITICA.

*710 H. SOBRIELLA, Walk. (*Depressaria sobriella*, Walk., B. M. Cat., 565; *Hoplitica sobriella*, Meyr., Proc. Linn. Soc. N.S.W., 495, 1882).
Gisborne, Melbourne, &c.

*711. H. MYODES, Meyr. (*loc. cit.*, 496, 1882).
Melbourne.

*712. H. SERICATA, Meyr. (*loc. cit.*, 498, 1882).
Melbourne.

*713. H. CARNEA, Zeller (*Cryptolechia carnea*, Zeller, Linn. Ent., x., 148; *Hoplitica carnea*, Meyr., Proc. Linn. Soc. N.S.W., 488, 1882).
Gisborne, Randwick, &c.

714. H. REPANDULA, Zeller (*Cryptolechia repandula*, Zeller, Linn. Ent., x., 150, fig. iii.; *Hoplitica repandula*, Meyr., Proc. Linn. Soc. N.S.W., 499, 1882).
Melbourne, Gisborne, Fernshaw.

*715. H. PUDICA, Zeller (*Cryptolechia pudica*, Zeller, Linn. Ent., x., 152; *Hoplitica pudica*, Meyr., Proc. Linn. Soc. N.S.W., 500, 1882).
Melbourne, Gisborne, &c.

*716. H. LEUCERYTHRA, Meyr. (Proc. Linn. Soc. N.S.W., 501, 1882).
Gisborne, Melbourne, &c.

717. H. LIOSARCA, Meyr. (*loc. cit.*, vol. ii., 1887, p. 941).
Melbourne.

718. H. COLONIAS, Meyr. (*loc. cit.*, 942, 1887).
Bairnsdale, Moe.

*719. H. RUFA, Meyr. (*loc. cit.*, 504, 1882).
Gisborne, Melbourne, &c.

720. H. ABSUMPTELLA, Walk. (*Depressaria absumptella*, Walk., B. M. Cat., 567; *Hoplitica absumptella*, Meyr., Proc. Linn. Soc. N.S.W., 505, 1882).
Melbourne, Oakleigh, Gisborne.

721. H. CALLIANTHES, Meyr. (*loc. cit.*, vol. iii., 1888, 1,595).
Fernshaw.

722. H. THYTERIA, Meyr. (*loc. cit.*, 1,596, 1888).
Melbourne.

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FIELD NATURALISTS' CLUB OF VICTORIA.

THE monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 13th July, 1896. The president, Professor Baldwin Spencer, M.A., occupied the chair, and about 70 members and visitors were present.

The President announced that an almost complete set of the periodical *Natural Science* had been presented to the Club's library by Mr. F. G. A. Barnard, and that the Committee had decided in future to add the publication to the list of magazines purchased for the use of the members.

Mr. G. Coghill drew attention to the publication of Warne's "Royal Natural History," which is being republished in weekly parts.

PAPERS.

1. By Mr. J. Gabriel, F.L.S., entitled "Collecting in Riverina During Full Flood."

The author gave an interesting account of a collecting trip to the Riverina District, N.S.W., during the spring, when the country is to a great extent flooded, and recorded much valuable information on the birds of the district between Deniliquin and the Murray. The paper was well illustrated by some fifty splendid limelight views, and also by specimens of the birds' eggs referred to.

Some discussion ensued, in which Messrs A. Coles and C. French took part.

2. By Mr. C. C. Brittlebank, entitled "Notes on the So-called Miocene Deposits of Bacchus Marsh."

The author gave a brief description of the characteristic features of the district, with more detailed explanations and measurements of the sections exposed in the valleys of the rivers and creeks. Carefully prepared drawings of sections were shown to illustrate the paper.

In the discussion which followed, Messrs. G. Sweet, F.G.S., T. S. Hall, M.A., and H. R. Hogg, M.A., took part.

Mr. J. Searle exhibited lantern slide of photograph of mouse taken by Röntgen rays.

NATURAL HISTORY NOTES.

1. By Mr. A. Coles, on "A Supposed New Species of Sandpiper from Western Port, Victoria, probably between the Curlew Sandpiper and the Great Sandpiper."

[This bird has been identified by Mr. A. J. Campbell, F.L.S.,

as the Knot, *Tringa canutus*. His remarks appear on a subsequent page.—Ed. *Victorian Naturalist.*]

2. By Mr. D. M'Alpine, F.C.S.—"Note on a Fungus on a Beetle." The writer described the fungus, which is new to science, as *Botrytis angulata*. It was found by Mr. H. Giles at Trentham, Victoria, on the beetle *Ceratognathus Westwoodi*.

EXHIBITION OF SPECIMENS.

The following were the principal exhibits of the evening:—By Mr. A. Coles.—Weed and water from the Gulf Stream off English coast; specimen of fossil shells from below bed of the Thames, England; also three Sandpipers, referred to in natural history note. By Mr. C. French, F.L.S.—Rare Beetles: *Hypocephalus armatus*, from Cayenne; *Megasoma elephas*, from Costa Rica; *Chalcosoma Atlas*, from Java; also drawings of life-history of *Strongylorhynchus ochraceus*, by Mr. C. C. Brittlebank. By Mr. C. French, jun.—Eggs of Brown Gerygone, Northern Fantail, King Lory, Black-breasted Turnix, Beautiful Parrakeet, from North Queensland; also, rare egg of Crested Hawk, from New South Wales. By Mr. J. Gabriel, F.L.S.—Eggs of the following birds, collected at Riverina, N.S.W., viz.:—Australian Shoveller, Black Duck (clutch, 11 eggs), Australian Teal (clutch, 8 eggs), Wood Duck, Bittern (clutch, 5 eggs), White Ibis (clutch, 4 eggs), Semipalmated Goose, Spotted Bower Bird, Pied Grallina, Black-breasted Plover, Native Companion, Emu (clutch, 9 eggs); also eggs of *Gerygone culiciosra*, a rare species, from Central Australia. By Mr. R. Hall.—Lyre Bird, young (10 days old); eggs, two varieties; and photograph of nest. By Mr. J. A. Kershaw. — *Acrobates pygmæus*, Shaw; Opossum Mouse, with three young, taken from nest composed of gum leaves under bark of large eucalypt, South Gippsland. By Baron von Mueller, K.C.M.G., &c.—Necklace made from seeds of a Wild Banana, sent by Sir William Macgregor, who obtained it from the natives at the Mambare River, New Guinea. By Mr. J. Shephard.—Mounted Charcesium under microscope.

After the usual conversazione the meeting terminated.

EXCURSION TO STUDLEY PARK.

About half a dozen members of the Club took part in the excursion to Studley Park on Saturday, 21st March, 1896, which was devoted to geology, and principally to the examination of the Silurian rocks which are so well exposed in the locality. We met on the Johnston-street Bridge, and on crossing the river turned to the left along a road which has been cut to the Pumping Station just below the falls. This cutting along the steep hillside which forms the left bank of the stream, shows a most instructive section of the older rocks. No fossils were found, and, indeed,

no time was spent in looking for them, as when they do occur in our Upper Silurians they are usually confined to thin bands interbedded with thick series of unfossiliferous rocks. The evidence of the fossils obtained from similar-looking rocks elsewhere about Melbourne has, however, enabled their age to be determined. In consequence of the absence of fossils, we spent a considerable time in examining and discussing the effects of rock folding as shown in the cutting. It is always well to begin at the very beginning, and to make sure of our foundation before erecting the superstructure, so it may be pointed out that the rocks in question were laid down as a series of sheets at the bottom of the sea. That it was a salt, and not a fresh water deposit, we learn from the nature of the fossils before alluded to. On first entering the cutting, it was noticed that thin beds of sandstone alternated with thin beds of shale. This, of course, showed that the conditions of deposition were constantly changing, that the ocean currents were at one time sufficiently rapid to roll along grains of sand and spread them evenly on the bottom, and at the same time too strong to allow the fine mud to settle to any great extent; while at another period of deposition they were so feeble that they could not bring the sand grains from the wasting land surfaces, and the suspended mud slowly sank to the bottom, which it covered with a series of thin uniform sheets.

The numerous spangles of mica in the rock may have been derived from older rocks, which supplied the material of their mass, or may have been subsequently formed in the rock itself. The rocks as we see them to-day are strangely twisted and crumpled. The beds in which they were laid down no longer preserve their horizontal position but are inclined at various angles to the horizon, and are in places broken and faulted where the strain caused by the folding grew too strong for them to withstand. Several of these faultings were noticed, and it was seen that in many cases the walls of the faults were smoothed and scratched by the rock movement which had taken place. The direction of the scratchings, or "slickensides," as they are called, was not vertical but inclined downwards towards the south and up towards the north. This showed that the movement had not taken place vertically but in a north and south direction, with, at the same time, a distinct movement downwards towards the south. The foldings of the rock as exposed to our view might be compared to gigantic sheets of corrugated iron stacked up and looked at endwise, but with this peculiarity, that the stack was not on level ground, but one end of each sheet was considerably lower than the other. This endlong slope of the sheets is known as "pitch," or among the Bendigo miners as "dip." The pitch wherever we noticed it along the cutting was to the south. The effect of pitch on the outcrop on a horizontal surface was

noticed, but would require either actual examples or models to make it clear. The peculiar sinuosities of the outcropping rock, which are due to this pitch, are clearly seen on the road surface and on the hilltop to the northward. One very fine example nearer to Kew has been ruthlessly hidden by the asphalting of the footpath.

On a careful examination it was remarked that the crumplings of the rock which were first seen are merely minor ones on a great fold, the axis of which lies near the western end of the cutting. The axis of the fold, which shows of course the lowest or oldest of the series exposed, is occupied by blue rubbly shales, which have weathered somewhat more readily than the thick bedded sandstones immediately overlying them, so that very little rock is seen cropping out near the axis itself, while on either side a wall of sandstone stands up, the sandstone part of the arch of the fold having disappeared.

In some of the minor crumplings some very interesting points were noticed, which showed in miniature what occurs elsewhere on the large scale. A bed of sandstone is much less compressible than a bed of shale, and when a series of such sandstones and shales are folded by strong lateral pressure there is a tendency for cavities to form along the crest of the arch. Into these regions the shales are forced like rolled out dough, so that in the crest of the arch the bed is perhaps twice as thick as on its flanks. Time would fail us were we to discuss the presence and probable causes of quartz veins such as were seen in the faults and joints, the minerals coating the joints, and the character of the joints themselves, the colour stains due to weathering, and the numerous other points which are so readily illustrated in the field, and which a mere brief description would leave unintelligible.

Two dykes of some rock allied to basalt were seen, but were decomposed to a greasy clay. Our previous trips, however, enabled the members to recognize the clay as probably derived from such a rock when they were questioned as to its nature.

Leaving the cutting we climbed to the top of the hill by Dight's Falls, and saw the great plain formed by the lava flow, and standing out from it like islands the series of hills on which Melbourne stands, the Northcote hill, and the great Silurian area to the westward.

From here we went to the gravel pits near the old toll bar, and a few minutes were spent in discussing the more characteristic features of the deposit. It was pointed out that heavy quartz gravel under the influence of running water would collect at the bottom of a valley, so that what is now a hill top must have in former times been the bed of a stream, or have been near the shore of a sea. The gravel cappings of other hills in and around

Melbourne was called to mind—for instance, that on which Christ Church, Hawthorn, stands; the Northcote hill; the ridge which runs through West Brunswick, Royal Park, North Melbourne, and as far as the Law Courts, which are all capped by gravel beds, which have effectually guarded them from denudation, while the surrounding hills have been greatly lowered or removed altogether. The amount of denudation that this would imply was considerably more than some of the members were prepared for, and I am afraid that some of them remained somewhat sceptical in spite of the arguments employed for their conversion.—T. S. HALL.

THE FLIGHT OF SEA BIRDS.

By H. R. HOGG, M.A.

(Read before Field Naturalists' Club of Victoria, 8th June, 1896.)

AT the meeting of this club on 10th February, 1896, Mr. H. P. C. Ashworth read an interesting paper on the flight of the albatross (printed in the *Victorian Naturalist* for April, 1896, vol. xiii., page 11). However, in spite of his accurate description of the movements of the bird, deduced from observation of the Shy Albatross (*Thalassogeron cautus*, Gould) at their breeding station on the Hunter Group of islands in Bass Strait, he appears to come to no very definite conclusion as to its method of propulsion. I venture, therefore, to add a few notes, in which I hope to be able to make clear to you the principles which my own observations, spread over a good many years and the course of numerous voyages, have led me to believe are those which enable not only the powerful albatross, but many other much smaller birds to keep on the wing for days together consecutively.

The principle is the same from the albatross to the Cape Pigeon (*Daption capensis*) and Stormy Petrel (*Procellaria fregata*), though the smaller the bird the more often it makes use of the ordinary methods of other birds' flight, the reason of which I will try to show you. I include as sea birds those which, having three wing joints, are able to wander long distances from land, as opposed to those dwellers on the coast-line which, having two joints, can only sustain themselves in the air by means of constantly flapping their pinions, and therefore with laboured flight soon tire, and have to rest so constantly that they never go far from shore, and when seen by an ocean voyager are an unerring sign that he is nearing land.

The true sea birds, except during a comparatively short period of the year when they are engaged in the duties of incubation, spend their lives seeking their food over a wide expanse of ocean and more especially affect the colder zones of the unfrozen parts

of the sea. They are, in fact, the scavengers which clear the surface of the water of those impurities which would otherwise arise from floating dead bodies. This obliges them to scour hundreds of miles of sea surface every day, and the muscular power required to enable a frail creature to perform this task would overbalance the other functional developments of its body unless that labour were reduced to a minimum. As we see, these birds do perform their flight in a marvellously easy and graceful style, sailing about for hours at a stretch without any flapping motion of their wings, and clearly with a minimum of fatigue to themselves. This enables them to follow a ship for thousands of miles.

The question, how they manage to propel themselves without striking the air with their wings, whilst, as often as not, following a steamer in the face of a heavy gale, has puzzled many. Their real means of so doing seems to have led to misapprehension among many of our keenest observers and most thoughtful minds. How, then, is this performed? The subject naturally separates itself into three divisions—the bird's means of suspension in the air, its power of rising, and its method of propulsion. Although the other points present many interesting problems, I shall confine myself at present more particularly to their act of propulsion. I will, however, call your attention to just two points in regard to their means of suspension in the air:—(1.) It is clear that a bird's power of hovering at all must result from its weight being insufficient to compress the air underlying its outstretched wings and tail—*i.e.*, the area of the wing and tail surface must be proportionate to the weight of the bird and the density of the air. This evening we will not go into calculation of what area would be required under different conditions, as we have the experimental fact before us that the area provided for the bird by nature is sufficient for the purpose. This requisite expanse of wing in sea birds is provided by their third pinion joint, which allows so much narrower a wing and more command over the action of turning the feathers than is the case with eagles, hawks, and vultures, which have the same power of hovering and sailing with motionless wings, but can rest more often, and, therefore, do not require to husband their resources to the same extent. Birds with a relatively smaller area of wing and tail have continuously to strike and compress the air in order to sustain the weight of their bodies. (2.) Again, a piece of the heaviest metal may be beaten out into so thin a sheet that if the air does not pass through its substance it will float in a horizontal position, because its weight is not sufficiently great to immediately compress the volume of air underlying it. After the lapse, however, of a definitely long instant of time, the air is slightly compressed,

and with compression begins to flow out round the edges of the sheet, which then begins to descend with a gradual increasing velocity. If, however, the sheet be in motion in the direction of its plane it may have moved, during that instant of time, from the column of air it was beginning to compress, on to an adjoining column and off this again before it has had time to actually compress it, and thus sail along hardly losing anything in vertical distance. Similarly a bird that, when hanging motionless in the air, would have to extend its feathers to their greatest expanse, so much so that it looks as if there were a strain on its muscles to keep them out when moving, can glide easily through the air, resting as it were on a cushion, without using any expansive strain, and may even lessen its horizontal area—which it does by turning partly on one side—without compressing the underlying air, and so subsiding, at all.

Now with regard to the bird's means of rising through the air, what can it do? Our thin sheet of metal, or bird, after a little time of suspension over a given point tends to fall. Thus in quite calm air the bird, even to sustain itself, and much more if it wishes to rise, must strike the air with its wings as a fish's tail or a steamer's screw blades strike the water—in order to press them along. Not so, however, if there be a current of air pressing against the bird or sheet of metal, for if either of them be held at an angle to the current of air its weight begins to act as the string of a kite and prevents its being carried backward with the wind; and the current presses against them because of their inertia, resolving itself into two forces—one pushes against the bird or plate and the other along its plane at right angles to the former, thrusting it upwards or downwards as the slope is towards or away from the direction of the current; but the bird or thin sheet moves most readily in the direction of the least resistance and it rises more than it goes backward if it hangs at a smaller angle to the vertical than to the horizontal. Of course, if there be an upward current from the surface of the sea the bird will rise in the air while in a horizontal position, and has no need to place its body on an inclined plane. It has also been shown mathematically that when successive strata of air have each successively greater velocities, as happens when the lower currents are stopped by friction of the earth's surface, the bird can acquire a momentum which helps it to rise, but it is difficult to believe that the bird is dependent on these irregular aids for what it has to do every few minutes every day of its life.

The resultant pressure of the air on the bird's wings and body acts as if the whole were concentrated at a point called the centre of pressure, which, as the bird is symmetrical on either side, lies in a section through the middle of its head, back, and tail,

and as the wings are placed well forward the point on which the pressure acts is well forward in this section. Similarly, its weight acts as if it were all collected at the centre of gravity, situated in the same plane but somewhere about the middle and behind the centre of pressure. Thus the pressure pushes at a point between the head and the centre of gravity. This is what ensures the bird's going head foremost, instead of tail foremost.

If a bird wishes to rise in the air head uppermost it has to turn its face to the wind, but if with the wind behind it, it must turn head downwards and tail uppermost, which it can and does do perfectly well, though it must involve a more difficult feat of balancing. With a wind behind and its head up, the bird would be driven downwards, and therefore has to assume a nearly horizontal position, or one slightly bending downwards. As the bird has to look for its food on the surface of the water, this is the position it actually does retain on the average.

A sea bird, then, without flapping its wings has the power of suspending itself in the air, and it has also the power of rising vertically, or vertically with a slight backward movement, if there be a wind; but how does it do if it wants to move forward against the wind, still without flapping?

I must show you, firstly premising that few birds fly much, if ever for more than a short distance, dead against the wind, but almost invariably cross and recross its direction at suitable angles, seldom even forty-five degrees, and more generally not nearer than at about sixty degrees, to its direction, that when it wishes to go against the wind, if without way on, or near the surface of the water, the bird first simply rises vertically by one of the methods above described, or if there be no wind, makes a few strokes with its wings. It then, turning head downwards, slides down the cushion of air at any desired angle, the momentum of its weight carrying it forward and overcoming the pressure of the wind. As it nears the surface of the water, it again turns upward the plane of its wings, as a diver turns his hands up from his outstretched arms when he wishes to rise to the surface, and is carried on by the same momentum upwards to a level not quite that from which it started, having lost a small vertical space varying with the pressure of the wind against it. It then turns downward, and repeats the process, thus crossing and recrossing the direction of the wind, and either at an interval of several crossings, or at the end of each crossing, recovers the lost vertical distance by one of the methods previously described. This method is the same as that of tobogganing cars, which slide down an incline, and with their momentum go over a smaller hillock, and so on again; but the friction of the air against the slide, as well as the pressure of the air, stops them. A bird has

the pressure of the air only to stop it, the friction of the passing air being comparatively small.

Supposing the bird under the influence of the force of gravity to go 30 or 40 knots an hour, and never nearer than at an angle of 60 degrees to the direction of the wind, it could still keep up with a steamer going 12 knots an hour dead against the wind, and, as many birds can with ease go more nearly 50 or 60 miles an hour, it will be realized that a heavy bird can readily follow any of our ocean steamers on a head to wind course. Although, as I have said, they do not seem to me usually to go head to wind, still, by this process, they could, if sufficiently heavy, quite easily dive right into the wind, rising again vertically at the end of each dive. Even this proceeding, however, would hardly justify Sir Walter Buller's statement, quoted by Mr. Ashworth ("Trans. N.Z. Inst.," vol. xxvi.), that "the flight of the albatross is a rapid, well-sustained motion, ever against the wind, with scarcely any visible movement of the wings." It will be seen that, in my explanation, although a strong wind helps the bird more easily to rise to the height required for its momentum, still a high wind materially affects its rate of progress, and to a light bird the strength of the same wind appears proportionately greater than to a heavy one, in exactly the same way as a large steamer is less affected by a high sea than a smaller one. Thus Stormy Petrels, Whale Birds, &c., when flying rapidly, make more use of their pinions than the larger birds. The wonderful mastery these birds possess over the movements of their bodies while hanging in the air, their graceful balancing and delicate adjustment of the plane of their feathers to the air current, is only equalled among human beings by the movements of an accomplished skater, or of a skilful gymnast, and doubtless has to be acquired by young birds as the result of practice.

REMARKS ON A WILD BANANA OF NEW GUINEA,

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

In the 10th volume of the "Proceedings of the Linnean Society of New South Wales," p. 348 (1885), the late Mr. N. de Miklouho-Maclay alluded to a Musa from New Guinea "with fruits containing very large, irregularly shaped seeds (about 10 mm. long and 11 mm. in diameter), which when ripe are of a brilliant black colour and are greatly used by the natives as ornaments." In the same volume, p. 356, the writer of these remarks offered from personal inspection fuller notes on these seeds, and gave then to this species the name *M. calosperma*, when also an account of the Papuan *M. Maclayi* was given. In a letter, written in Sydney on the 4th September, 1885, the distinguished Russian naturalist mentioned (here translated) "*Musa calosperma* seems to

occur only sparingly on the Maclay-Coast (that part of the north coast, which stretches from Cape Croisilles to Cape King William), but is said to be very frequent near the south-eastern point of New Guinea and on the Louisiade Archipelagos." Towards the end of last year Sir William Macgregor saw 35 miles up on the Mambare-River this same Musa. In reference to this his Excellency writes me under date 15th December, 1895 :—"I had a specimen brought on board the *Merrie England*, where I invited Mr. W. Fitzgerald to study it. He undertook to send you his description of it. I enclose a sketch of the fruit by Mr. Winter. The bunch of fruits would have weighed nearly 1 cwt. It is not edible. The seeds are used for making beads. It is a fine handsome plant."

From Mr. Fitzgerald's notes, forwarded by him from Cooktown on the 7th February, 1896, and now given with some alterations in the organographic words, I extract as essential the following :— "I did not collect the specimens of the Banana, which grow on the Mambare-River. Mr. Butterworth on the request of Sir William Macgregor brought a spike on board. Height 15–25 feet. Stem stout. Leaves 8 to 10 feet in length, 2–3 feet across. Spike (thyrsoid raceme) pendulous, 3½ feet long by the same (in largest) circumference (as regards the fruit masses seen). Bracts broadly ovate (very acute according to Mr. Winter's delineation) 9–12 inches long, bright-green.

Flowers numerous, ¾–1 inch in length, white, the lobes of the calyx firm, linear with sharply recurved margins; corolla-lobes small, membranous; stigma trifid; fruit about 3 inches long by 1½ inches in diameter, outside pale-yellow; pulp whitish, streaked with purple. Seeds 24–28; testa bony, black. Albument mealy, bitter. The fruit is not eaten by the natives, known to them by the name Tubi.

From a necklace, made of these seeds and transmitted by the Lieutenant-Governor, may be added, that the seeds attain the length of half an inch and are often semi-ovate in form. The necklaces are called by the Autochthones gudugudu. Mr. Winter's drawing (of much reduced size) indicates the flowers and fruits forming a total mass of ovate-conic form with crowded bracts.

M. Fitzalani, as here recognized, differs from *M. calosperma* already in the comparative paucity of flowers at least within some of the bracts and in pulpless fruits with much smaller seeds. *M. Hillii*, which through Mr. Berthoud is now known also from the Johnstone-River, is more widely separated by still more gigantic size, by a raceme erect at least during flowering time, as well illustrated in Sir Joseph Hooker's *Botanic Magazine*, 7,401 (1895), by its longer and less acute bracts, by yellowish flowers, by proportionately broader fruits with yellow pulp and smaller seeds.

M. Sesmanni (*Gardeners' Chronicle*, third series, vol. viii., p. 182 [1890], with a xylogram from a photogram by His Excellency Sir John Thurston) belongs also to the series of species with erect inflorescence, but may perhaps be identical with *M. Fehi* of Tahiti and New Caledonia, as suggested in the *Kew Index*. I have not succeeded to identify *M. calosperma* with any of the thirty-five congeners recorded by Mr. Baker in the "Annals of Botany," vol. vii., and in Dyer's *Kew Bulletin* for 1894.

Should on further access to ampler material the Musa, brought under extended notice now, prove specifically distinct from Mr. Maclay's plant, then it is to bear the name of Sir William Macgregor. Attention may yet be drawn at this apt opportunity to a Musa of extraordinary ornamental value, to which Dr. Warburg refers (in Professor Engler's "Kahr-Buecher," xiii., 274), with totally red leaves, cultivated by aborigines in New Britain, but indigenous to the Solomon-Islands. It may only be a variety of some well-known species, but is wanting in Australian gardens like elsewhere yet.

ORNITHOLOGICAL NOTE.—THE KNOT.

At the last (July) meeting of the Field Naturalists' Club I was much interested in seeing a group of three Knots *(Tringa canutus)* exhibited by Mr. A. Coles. A male bird appeared in its full breeding plumage of rich chestnut, and one wonders what the birds were doing on the shores of Western Port, Victoria, in the middle of May, when they should have been commencing domestic duties in Northern Siberia or other arctic regions.

Like many of our migratory sandpipers, &c., the Knot occasionally visits us from these far-off regions to winter with us (*i.e.*, to escape the arctic winter). The Knot was first noticed in Australia near Brisbane, 2nd September, 1862. Since, it has been observed in New South Wales, Victoria, and South Australia. Our National Museum, Melbourne, I believe, possesses examples, and odd birds have been exhibited for sale in the city together with snipe. I was therefore surprised to hear the announcement at the meeting that the bird was unknown, and was not figured in Gould. Splendid figures of the Knot may be seen at the Public Library, in Gould's "Birds of Great Britain," vol. iv., plate 65.

A. J. Campbell.

Armadale, 15th July.

We are pleased to learn that Mr. T. S. Hart, M.A., an enthusiastic member of the Field Naturalists' Club of Victoria, has been appointed Lecturer on Geology and Botany at the School of Mines, Ballarat.

A FUNGUS ON A BEETLE.

By D. M'Alpine.

Botrytis angulata, n. sp.—Angular Botrytis. Dirty-white tufts issuing from interior of body, and forming a continuous mass over various portions of it, but mostly on under surface.

Hyphæ slender, colourless, sparingly branched, septate, average 2 μ. diameter.

Fertile hyphæ forming very minute, chalky-white, globular heads of gonidia (only seen with magnifying glass) about 34–36 μ. diameter; variously branched, dichotomously or at right angles, and ultimate branchlets becoming very much attenuated. The ultimate branchlets are usually zig-zag in shape, ending in a knob and with little projecting points at each angle to which gonidia are attached.

Gonidia spherical, hyaline, regular in size and shape, 1.5–2 μ. diameter.

On *Ceratognathus Westwoodi*, Trentham, Victoria.

This specimen was sent to me by my colleague, Mr. C. French, F.L.S., and was found by Mr. H. Giles. I determined the fungus to be a Botrytis, and on communicating with Professor Saccardo, he considered it to be a new species. The genus Botrytis is subdivided by Saccardo according as the tips of the branchlets are acute (Eubotrytris), or thickened and rather obtuse (Polyactis), or inflated and warty (Phymatotrichum), or obtuse and spiny (Cristularia). As the tips here are thickened and obtuse, without either warts or spines, the species belongs to the Polyactis division. It has a resemblance to *B. tenella*, Sacc., in the size of the spores, which, however, has acute-tipped branchlets. The short, sharp turns of the branchlets, giving them a zig-zag appearance, are very characteristic, hence the specific name. 13th July, 1896.

Double Nest of Black and White Fantail.—I have received the following interesting note with reference to a nest exhibited at a recent meeting of the Field Naturalists' Club (vol. xiii., page 2), which perhaps may be of interest to some members of the Club.—C. French, jun.:—"I thank you very much for the portion of dead branch bearing the two conjoined nests of the Black and White Fantail, the whole forming an interesting nidiological curiosity. The half-overturned nest has been occupied by a brood of young. Probably the same parent birds built the newer home, which contained eggs, as found by Master W. Shepherd. These birds are persistent nest-builders. It is recorded that a pair one season constructed no less than four nests, and deposited eggs therein, which were either destroyed or stolen before the birds succeeded in rearing a family. The Black and White Fantail often rears three families in a season. Once I heard of two broods being reared one after another in the same nest—an unusual thing for Fantails, because they generally construct a new nest for each family.—Yours, &c., A. J. Campbell."

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FIELD NATURALISTS' CLUB OF VICTORIA.

THE ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 10th August, 1896. The president, Professor Baldwin Spencer, M.A., occupied the chair, and some 60 members and visitors were present.

REPORTS.

A report of the excursion to Sandringham on Saturday, 18th July, was read by the leader, Mr. C. French, jun., who stated that a fairly successful outing was experienced, the most notable plants found in flower being *Pterostylis vittata*, *P. longifolia*, and *Eriochilus autumnalis* (the usual flowering season of this orchid being April and May). The curious little plant, *Phyllogloss*um *Drummondi*, was noted in fruit.

The hon. secretary read a report of the practical meeting held on Monday evening, 27th July, when Mr. J. Shephard gave a demonstration of botanical section cutting and staining to a fair attendance of members. Sections of stems of the Wattle, Sheoak, and other native plants were prepared and stained, attention being drawn to the interesting differential staining effects produced.

PAPERS.

1. By Mr. H. T. Tisdall, entitled "Under Eastern Baw-Baw."

The author gave an interesting account of a recent collecting trip in the Walhalla district. His search was principally directed to the cryptogamic flora, and a large number of species of fungi were obtained. The paper was illustrated with coloured drawings by the author.

Some remarks on the paper were made by Messrs. J. G. Luehmann and D. Best.

2. By Mr. R. Hall, entitled "Box Hill Birds in July, 1896."

The author, in a series of interesting notes, dealt principally with the effect of an early spring on the avi-fauna of the district. Some reference was made to the question of the transitional changes of plumage in the male of the Superb Warbler (Blue Wren), *Malurus cyaneus*, Lath., and a series of skins obtained in different seasons during several years was exhibited.

The president, Messrs. C. Frost, A. Coles, G. Coghill, and others took part in the discussion which ensued.

EXHIBITION OF SPECIMENS.

The following were the principal exhibits of the evening :—By Mr. A. Coles.—Specimen of Tiger Snake, 6 feet 10 inches long, killed at Mildura, the largest known Tiger Snake ever killed. By Mr. C. French, F.L.S.—*Cylas formicarius*, a new insect pest introduced from Mauritius. This beetle has by some means been introduced into Queensland, where it is spreading rapidly, and specimens have also been found in Victoria, having been detected in some sweet potatoes imported from Queensland. By Mr. C. French, jun.—Orchid, *Pterostylis concinna*, with two flowers on one stem, collected at Sandringham by Mr. Wauer. By Mr. Haase.—Orchids in flower, viz. : *Pterostylis pedunculata*, *P. longifolia*, *P. curta*, *Acianthus exsertus*, *A. caudatus*, *Chiloglottis diphylla*, and *Cyrtostylis reniformis*, collected by Mr. Paul at Grantville. By Mr. G. E. F. Hill.—Long-tailed Cuckoo, *Eudynamis tartensis*, Tui Tui or Parson Bird, *Phosthemadera Novæ Zealandiæ*, from New Zealand ; also, Red-tailed Tropic Bird, from Chatham Islands. By Mr. A. Mattingley.—Striped Phalanger and Cattle Ticks from Herbert River, Queensland. By Mr. F. Spry.—Silurian Fossils from sewer, Domain-road, South Yarra, obtained 90 feet below surface.

After the usual conversazione the meeting terminated.

ORNITHOLOGICAL NOTES FROM CENTRAL AUSTRALIA.

By G. A. Keartland.

Part I.—Raptores.

(*Read before the Field Naturalists' Club of Victoria, 11th May*, 1896.)

In noticing the various forms of bird life in any part of the globe, it is always advisable to note not only the geological and botanical surroundings, but also the effect of climatic influences. Whilst the cold icy region of the Arctic Circle is undoubtedly the home of Grallatores and Natatores, the complete list of which it is impossible to enumerate, the equally inhospitable dry, sandy portions of Egypt and Australia appear to be the favourite haunts of the Raptores. This thought was emphasized on my mind during the journey of the expedition despatched to Central Australia in 1894 by Mr. W. A. Horn. Frequently when we were travelling for days over dry sandy or stony plains, and scarcely seeing a bird of any species on either the ground or the stunted bushes, high overhead several species of Raptores might be seen soaring at ease, and evidently on the lookout for prey of some kind. The absence of many short-winged birds is accounted for by the scarcity of water and their inability to find suitable food. The distance from shelter may also have an important bearing on this point, but when we consider the immense power of flight,

keenness of vision, and remarkable intelligence of the Raptores, I think a good many questions which may arise are easily settled. It is well known that many forms of reptiles and insects are found in the barren wastes described, and these must form an important item in the *menu* of many kinds of hawks. The lizards which burrow in the sand come out of their holes to bask and sleep in the sun, and then, when favourable opportunities occur, the hawks dash down about 100 yards away and skim along the ground with surprising velocity on their victims, which they seldom fail to secure. The fact that many birds unable to keep up a sustained flight often pause in their journey across these dry places from exhaustion and fall an easy prey to the hawks must also be borne in mind. Although some species may be said to live almost entirely on prey of their own killing, others are equally ready to act as scavangers, and feed on any carcass they can find. If these few introductory remarks are borne in mind they will, no doubt, add to the interest of the following field notes. The priority of place must, of course, be accorded to the

WEDGE-TAILED EAGLE *(Aquila audax).*—Much of the sentimental nonsense of my youthful days was quickly dissipated when I had ample opportunity of witnessing their mode of life. It has often been stated that the eagle, like the lion, will only eat its own victims. The comparison may be a good one, but they are equally indifferent as to what kills the prey if they only get the opportunity of making a meal off it. On one occasion I witnessed a pair of these birds hunting a young wallaby from rock to rock on the side of a range, until at last it was secured and carried off. On mentioning this circumstance to one of my Central Australian friends, he informed me that they were troublesome amongst the young goats, which are kept there in large numbers. On another occasion my attention was attracted to a dead cow by a number of these birds, which kept flying towards a certain spot and then suddenly flying up again. I approached cautiously, and from an elevated spot witnessed a curious sight. Two dingoes, no doubt attracted by the aroma, were making their breakfast off the carcass. The eagles, which were evidently desirous of having their share before the supply was exhausted, kept alighting near the spoil, when the dogs retired, but before the birds could satisfy their needs the dogs drove them off. This was repeated several times. At Heavitree Gap Mr. South directed me to where a dead bullock had been well treated with strychnine a few weeks before, and there the remains of several eagles and dingoes proved the potency of the drug. When gorged with food, the Wedge-tailed Eagle will sit for hours perched on the highest branch he can find until partial digestion has taken place. Although slow in its movements, the Wedge-

tailed Eagle has great power of wing, and can often be seen performing graceful evolutions at a great height for hours at a time.

Whistling Eagle *(Haliastur sphenurus).*—This bird well merits its name, as whether on the wing or at rest it is seldom silent, but keeps up a peculiar whistling note. It is not at all choice in its food. At Stevenson Creek a number of crows gathered around our camp and picked up pieces of fat or mutton chop bones thrown to them. As soon as the crows secured the morsels several Whistling Eagles kept pouncing upon them and depriving them of their spoil. Several of their large stick nests were seen along the course of the rivers, and at every waterhole which we passed a pair or more of these birds were seen.

Little Eagle *(Aquila morphnoides).*—At several points of our journey I thought I saw these birds, but as there was a slight doubt I did not record them. Mr. E. C. Cowle, who seemed very positive about the matter, and described the birds accurately, has since forwarded me one of their eggs, which was taken from a large stick nest in a desert oak tree, from which he flushed the bird. As soon as possible after the departure of the bird a native was sent up to the nest, and found one fresh egg, which Mr. Cowle kindly carried in his bosom for over 100 miles, as he had no other packing appliances, and here it is, a perfect specimen.

Black-breasted Buzzard *(Gypoictinia melanosternon).*—I had only two opportunities of identifying these birds. One was eating a fresh-killed wallaby when it was disturbed by a dingo. On another occasion several were seen flying near our camp and alighting on the ground amongst the porcupine grass. I should like very much to be able to test the accuracy of Gould's account of their method of disturbing the emu from its nest and then breaking and devouring its eggs.

Australian Goshawk *(Astur approximans).*—These birds were several times found, especially where there was any permanent water with vegetation around the margin. Such places not only afford shelter for a number of frogs, &c., on which the Goshawk delights to feed, but also prevent the young waterfowl seeing its approach until it swoops amongst them and seizes a victim from the surface of the water. Their stick nests are somewhat large in proportion to the birds. Mr. Cowle has sent me several clutches of their eggs, some of which are very rough, dull white, with occasional buff stains as though soiled with weak coffee.

Collared Sparrowhawk *(Accipiter cirrhocephalus).*—I had several opportunities of observing these birds. Like the Goshawks, they were always found near water. I found them similar in habit to those met with nearer home. In all that I have dissected, frogs, lizards, insects, and small birds formed their chief food.

They are extremely active and graceful in their flight, and when circling and turning in the sun appear very handsome. I am indebted to Mr. Jas. F. Field for a beautiful pair of their eggs, the ground colour of which is greenish white, with a few small chocolate spots. As this bird is so slight in its structure, and only about 8 ozs. in weight, I was somewhat surprised to hear recently that it can decapitate a wild duck at one blow, and has even been known to kill a Bustard *(Choriotis Australis)*.

Allied Kite *(Milvus affinis)*.—These kites are certainly more indifferent to the presence of man than any hawks I have met with. Their well-known dark brown forms were always met with near stations and stockyards, where they feast on any scraps of meat after cattle are killed. At Henbury, whilst seated on a log busy skinning specimens, several kites kept darting down and carrying off scraps of flesh I cast away. Although shooting was taking place close by, they did not appear in the least alarmed. At last my own gun was brought back, placed beside me, and in a few minutes the finest bird was shot from where I sat. As an instance of the boldness of the Allied Kite I may mention that a little child was sitting on the doorstep of a friend (Mrs. Clarke, Maryvale, Burdekin, Queensland), when a kite swooped down to seize a bone the child was enjoying, and in its effort to secure the spoil left marks on the child's face which she will carry to her grave.

Square-tailed Kite *(Lophoictinia isura)*.—These birds appear to be more migratory than the preceding species. Although I thought I saw them several times, I was unsuccessful in securing specimens. Mr. Cowle, however, has set the matter at rest by sending me one egg of this species, which proved to be addled, and was taken from a nest containing a fully-fledged young one. The latter was killed, its wing sent down for identification, and the remainder formed an epicurean treat for the blackfellow who secured it.

Letter-winged Kite *(Elanus scriptus)*. — These beautiful birds were seen on several occasions searching for lizards or other acceptable food amongst the saltbush and porcupine grass. They generally seemed to hunt in pairs, and when the pangs of hunger were allayed they rested themselves on the highest perch they could find. The peculiar black V-shaped mark under their wings at once arrested attention. I am also indebted to Mr. Cowle for a clutch of their eggs.

Black-shouldered Kite *(Elanus axillaris)*.—These kites were also noticed, but beyond the difference in plumage nothing worthy of note was observed, their habits being similar to the foregoing.

Grey Falcon *(Falco hypoleucus)*. — Several attempts were made to secure these birds, but without success. They were always seen near the ranges, flying slowly along in search of prey

(probably some of the small marsupials). These birds are of a slatey grey color, very strongly built, and furnished with extremely formidable talons and bill. They appear to be very fierce, and to behave exactly in the same manner inland as the Black-cheeked Falcon does near the coast.

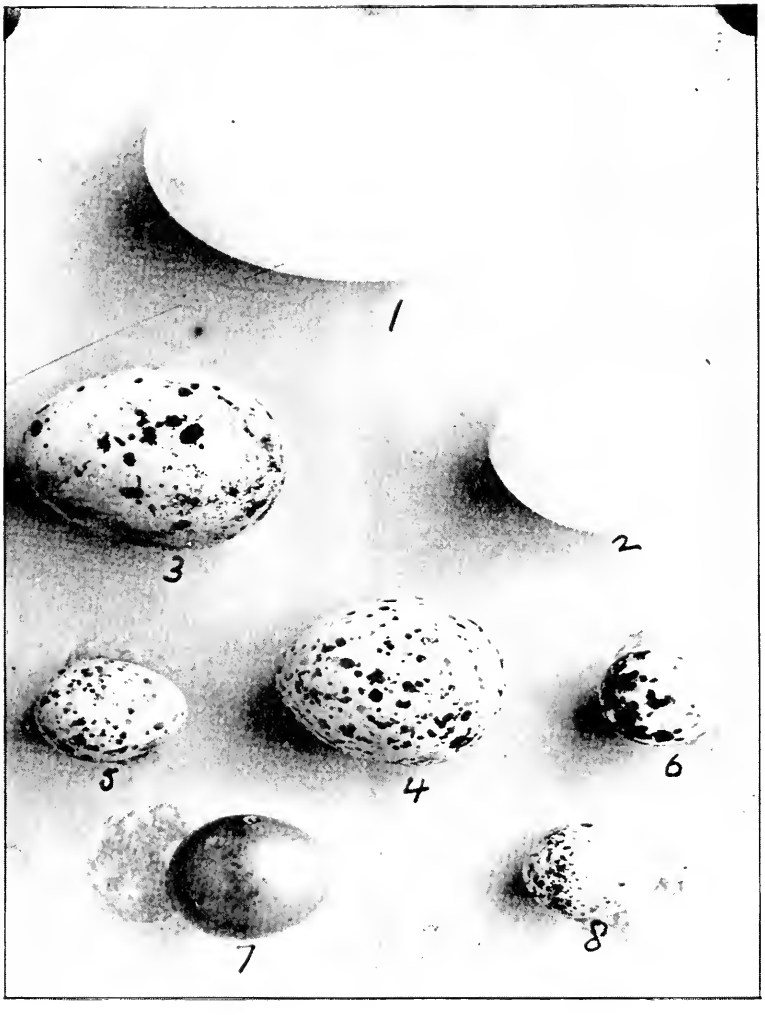
White-fronted Falcon *(Falco lunulatus)*.—This is not only one of our smallest and boldest, but also fiercest hawks. This is the bird which I find is generally alluded to as the sparrowhawk. Strongly built, and furnished with true falcon bill, legs, and talons, I have several times seen them kill and carry off birds heavier than themselves. When hungry they are not at all particular whether it is a finch or a pigeon. Owing to its rapid flight it seems to be able to overtake any other bird on the wing. They were found in many places, but especially at rock pools and waterholes where no doubt food was most plentiful. At one pool a pair dashed into a flock of finches, seized a bird each, flew away, and in five minutes returned, appearing as if by magic, and repeated the operation. They are found throughout Australia, and I have shot them in many places near Melbourne.

Western Brown Hawk *(Hieracidea berigora)*.—These birds were found throughout the trip, and although on several occasions in the spinifex country we could not see a single bird, members of our party fired the grass, which burned readily; small marsupials, lizards, and mice were disturbed by the flames, and a dense smoke arose. In a few minutes these hawks appeared in numbers, and dashed through the smoke, seizing their prey as they darted from one tussock to another. These birds are very careless in their nidification, and seldom build a new nest if an old one can be found. Their eggs are too well known to require description. The plumage of these birds varies considerably with age, so much so that some authorities confuse the two species of Hieracidea, but I am of the same opinion as Mr. North and others, which is that there are two distinct species.

Nankeen Kestrel *(Tinnunculus cenchroides)*.—These pretty little birds were found wherever timber or scrub was seen, but were most numerous near Hermannsburg and Alice Springs. Whether perched on some high stump or branch, or balancing themselves in the air, watching some unwary lizard, their behaviour was precisely the same as that of their friends nearer home. Mr. Cowle has sent me a number of their eggs, which show considerable variation in colour.

Boobook Owl *(Ninox boobook)*.—These well-known owls are most plentiful along the Finke River, but wherever large timber was found they were numerous. At one point of the trip a fine specimen was secured before sunset, as it was busy seeking its prey. Another was shot at midday in a mulga scrub.

Delicate Owl *(Strix delicatula)*.—Although I did not see or obtain a specimen of this bird, at one point in the ranges the



EGGS FROM NORTH QUEENSLAND.

NEGATIVE BY D. LE SOUEF

grass was fired, and the smoke disturbed several of them, which Dr. Stirling identified. I found a few of their feathers, and Messrs. Field and Ross have since forwarded their eggs.

EGGS FROM NORTH QUEENSLAND.

THE accompanying plate represents some eggs from the Bloomfield River district, Northern Queensland, now in the collection of Mr. D. Le Souëf, and which have recently been described by him. The Crescent-marked Oriole and the Yellow-bellied Flycatcher were described before the Royal Society of Victoria in March, 1894, while the descriptions of the others appeared in the *Ibis* for July, 1896. As they do not appear to have yet been figured, they are now reproduced from a photograph by Mr. Le Souëf, as a guide to collectors.

The species represented are as follow :—

1.—Papuan Podargus, *Podargus Papuensis*, Quoy and Gaim.
2.—White-bellied Owlet Nightjar, *Ægotheles leucogaster*, Gld.
3.—Crescent-marked Oriole, *Mimeta flavo-cincta*, Vig. and Horsf.
4.—Swainson's Graucalus, *Graucalus Swainsoni*, Gld.
5.—Yellow-bellied Flycatcher, *Micræca flavigaster*, Gld.
6.—Striated Sittella, *Sittella striata*, Gld.
7.—Lunated Thickhead, *Pachycephala falcata*, Gld.
8.—Obscure Honeyeater, *Myzomela obscura*, Gld.

AN OOLOGISTS' REUNION.

AT the invitation of Mr. A. J. Campbell, about twenty gentlemen interested in oology, including several members of the Field Naturalists' Club, met at Britannia House, South Yarra, on Saturday evening, 15th August, 1896. The decorations of the room and tables were indicative of the nature of the gathering, for a large moss-made nest of the Mountain Thrush, with eggs, fresh from the scrub, occupied a prominent place, while photographs of bird scenes, together with the blooms of golden acacias, pink and white epacris, clematis, and other native flowers, produced a very pleasing effect.

After dinner, the chairman, Mr. D. M'Alpine, Vegetable Pathologist to the Department of Agriculture, briefly referred to the success of Mr. Campbell's efforts in working out the oology of many Australian birds, and hoped that his collection of eggs, which now contained over 500 species, would one day become national property. Mr. Campbell then contributed a paper giving a brief sketch of the progress of Australian oological science, and by way of illustration read that portion of the MS. of his intended work, "Nests and Eggs of Australian Birds," which described the habits, &c., of the Bell Bird of Gippsland.

A pleasant half-hour was then devoted to some optical lantern views shown by Mr. D. Le Souëf, depicting various birds and nests observed by Mr. Campbell on his numerous excursions.

The meeting broke up with many expressions of gratification at the pleasant and profitable evening spent, and hopes for future gatherings of a similar nature.

RECENT PUBLICATIONS.

A Concise Handbook of British Birds. By H. K. Swann, editor of the *Ornithologist*. Fc. 8vo, cloth, 3s. 6d.

We have received from the publishers, John Wheldon and Co., natural history booksellers, London, a copy of this work, which well earns its title. In its 208 pages it contains references to 381 species of British birds, comprised under 206 genera, which are arranged according to the list of the British Ornithological Union (1883), commencing with Turdus (Thrushes), and ending with Fratercula (Puffins). Notwithstanding the compactness and small size of the volume, a vast amount of information respecting each bird is given, comprising habitat, brief description of male and female, size, breeding place, description of eggs, and, with rare birds, notes of various occurrences. Altogether the work seems so useful as a companion in the field that one wishes such a volume existed for Victorian birds.

A List of the Insectivorous Birds of New South Wales. By A. J. North, C.M.Z.S., Ornithologist of the Australian Museum, Sydney. Part I. Sydney: Government Printer.

In the short introduction to the list the author expresses his intention of dividing the birds into three groups — 1st. Those exclusively insectivorous, and, unless otherwise stated, beneficial; 2nd. Those partially insectivorous, also beneficial; 3rd. Those both insectivorous and frugivorous—more or less harmful.

The part under notice deals with a portion, 63 species, of the first group, from the Owlet Nightjar to the White-lored Robin, and contains ten plates, in which nineteen birds are figured, fifteen of which are in colours, thus forming a most useful guide to fruit-growers and others. In passing it may be remarked that our friend the Magpie, *Gymnorrhina tibicen*, is noted as "one of the most useful of all Australian birds to the pastoralist and agriculturist."

References to Gould, or to the author's larger work, "Nests and Eggs of Australian Birds," are given for each species, also the vernacular and local names, while particulars of its mode of life, nesting, and often a brief description of the eggs, should prevent any needless destruction of such useful members of the animal kingdom.

A CATALOGUE OF VICTORIAN HETEROCERA.

By Oswald B. Lower, F.E.S.

Part XXI.

EULECHRIA. Meyr.

723. E. griseola, Zeller (*Cryptolechia griseola*, Zeller, Linn., Ent., x., 151 ; *Eulechria griseola*, Meyr., Proc. Linn. Soc. N.S.W., 512, 1882).

*724. E. cremnodes, Meyr. (*loc. cit.*, 514, 1882).

Gisborne.

725. E. melesella, Newman (*Depressaria melesella*, Newman, Tr. Ent. Soc. Lond., vol. iii., N.S., 291 ; *Eulechria melesella*, Meyr., Proc. Linn. Soc. N.S.W., 516, 1882).

Gisborne, Melbourne.

*726. E. episema, Meyr. (*loc. cit.*, 517, 1882).

Gisborne, Frankston, Melbourne.

*727. E. convictella, Walk. (*Depressaria convictella*, Walk., B. M. Cat., 566 ; *Eulechria convictella*, Meyr., Proc. Linn. Soc. N.S.W., 518, 1882).

Melbourne, Lismore.

728. E. exanimis, Meyr. (*loc. cit.*, 519, 1882).

Melbourne.

729. E. pantelella, Meyr. (*loc. cit.*, 520, 1882).

Melbourne (Spencer-street Railway Station, at light).

*730. E. puellaris, Meyr. (*loc. cit.*, 522, 1882).

731. E. achalinella, Meyr. (*loc. cit.*, 523, 1882).

Gisborne, Melbourne, &c.

732. E. triferella, Walk. (*Ecophora triferella*, Walk., B. M. Cat., 684 ; *Eulechria triferella*, Meyr., Proc. Linn. Soc., N.S.W., 523, 1882).

Melbourne, Mt. Macedon.

*733. E. brachypepla, Meyr. (*loc. cit.*, 524, 1882).

Fernshaw (? Ararat).

*734. E. transversella, Walk. (*Cryptolechia transversella*, Walk., B. M. Cat., 763 ; *Eulechria transversella*, Meyr., Proc. Linn. Soc., N.S.W., 527, 1882).

Melbourne.

*735. E. VARIEGATA, Meyr. (*loc. cit.*, 528, 1882).
Gisborne, Sale.

736. E. POECILELLA, Meyr. (*loc. cit.*, 531, 1882).
Melbourne (South).

737. E. HABROPHANES, Meyr. (*loc. cit.*, 532, 1882).
Melbourne.

738. E. LIVIDELLA, Meyr. (*loc. cit.*, 533, 1882).
Mount Macedon.

*739. E. PHILOTHERMA, Meyr. (*loc. cit.*, 534, 1882).
Gisborne.

*740. E. AMAURA, Meyr. (*loc. cit.*, 538, 1882).
Melbourne.

741. E. ADOXELLA, Meyr. (*loc. cit.*, 540, 1882).
Melbourne.

742. E. XYLOPTERELLA, Walk. (*Gelechia xylopterella*, Walk., B. M. Cat., 650; *Eulechria xylopterella*, Meyr., Proc. Linn. Soc. N.S.W., 543, 1882).
Gisborne, Melbourne, Oakleigh.

*743. E. SICCELLA, Walk. (*Gelechria siccella*, Walk., B. M. Cat., 643; *Eulechria siccella*, Meyr., Proc. Linn. Soc. N.S.W., 544, 1882).
Sale, Springvale.

*744. E. TANYSCIA, Meyr. (*loc. cit.*, 322, 1883).
Dandenong Ranges.

745. E. CAMELÆA, Meyr. (*loc. cit.*, 943, 1887).
Beechworth, Bairnsdale.

746. E. ERIPHILA, Meyr. (*loc. cit.*, 946, 1887).
Without any given locality.

747. E. MALACOPTERA, Meyr. (*loc. cit.*, 948, 1887)
Gisborne, Melbourne, &c.

*748. E. EOCROSSA, Meyr. (*loc. cit.*, 949, 1887).
Melbourne, Horsham (at light).

749. E. GRAPHICA, Meyr. (*loc. cit.*, 951, 1887).
Warragul.

750. E. XANTHOSTEPHANA, Meyr. (*loc. cit.*, 954, 1887).
Gisborne, Melbourne.

751. E. ARCHEPEDA, Meyr. (*loc. cit.*, 960, 1887).

*752. E. ATHLETIS, Meyr. (*loc. cit.*, 961, 1887).

Melbourne.

*753. E. ADELPHODES, Lower (Tr. Roy. Soc. S.A., vol. 1883).

754. E. DRYINODES, Meyr. (Proc. Linn. Soc. N.S.W., 1,565, 1888).

Melbourne.

755. E. ALOPECISTIS, Meyr. (*loc. cit.*, 1,565, 1888).

Melbourne.

LEISTARCHA. Meyr.

*756. L. SCITISSIMELLA, Walk. (*Eulechria scitissimella*, Walk., B. M. Cat., 807; *Leistarcha iobola*, Meyr., Proc. Linn. Soc. N.S.W., 327, 1883).

Gisborne, Albert Park.

ŒNOCHROA. Meyr.

*757. Œ. LACTELLA, Walk. (*Gelechia lactella*, B. M. Cat., 648; *Œnochroa lactella*, Meyr., Proc. Linn. Soc. N.S.W., 328, 1883).

Melbourne.

*758. Œ. ENDOCHLORA, Meyr. (*loc. cit.*, 329, 1883).

Warragul.

*759. Œ. IOBAPHES, Meyr. (*loc. cit.*, 330, 1883).

Melbourne (Spencer-street Railway Station, at light).

760. Œ. DINOSEMA, Meyr. (*loc. cit.*, 1,575, 1885).

761. Œ. THERMOCHROA, Lower (Tr. Roy. Soc., 1896).

Gisborne.

I have since satisfied myself that this species is referable to *Eulechria*.

MACHETIS. Meyr.

PLACOCOSMA. Meyr.

PETALANTHES. Meyr.

762. P. HEXASTERA, Meyr. (*loc. cit.*, 336, 1883).

LINOSTICHA. Meyr.

*763. L. SCRYTHROPA, Meyr. (*loc. cit.*, 339, 1883).
Horsham (at light).

764. L. DICHROA, Lower (Tr. Roy. Soc. S.A.)

765. L. ANADESMA, Meyr. (Proc. Linn. Soc. N.S.W., 1,579, 1885).
Sale.

*766. L. MECHANICA, Meyr. (*loc. cit.*, 1,581. 1885).
Stawell.

*767. L. SUPPLETELLA, Walk. (*Gelechia suppletella*, Walk., 645 ; *Linosticha suppletella*, Meyr., Proc. Linn. Soc. N.S.W., 1,585, 1885).
Gisborne.

TRACHYNTIS. Meyr.

PHRICONYMA. Meyr.

LOCHEUTIS. Meyr.

IOPTERA. Meyr.

*768. I. ARISTOGONA, Meyr. (*loc. cit.*, 345, 1883).
Gisborne.

769. I. DEMICA, Meyr. (*loc. cit.*, 1,589, 1885).
Gisborne, Melbourne.

MACRONEMATA. Meyr.

PHLŒOPOLA. Meyr.

*770. P. ASBOLŒA, Meyr. (*loc. cit.*, 349, 1883).
Warragul.

*771. P. SEMOCAUSTA, Meyr. (*loc. cit.*, 350, 1883).
Melbourne.

772. P. HYPERARCHA, Meyr. (*loc. cit.*, 1,591, 1885).
Warragul, Melbourne.

*773. P. PSEPHOPHORA, Meyr. (*loc. cit*, 354, 1883).
Melbourne.

774. P. TURBATELLA, Walk. (*Cryptolechia turbatella*, Walk., B. M. Cat., 765 ; *Phlœopola turbatella*, Meyr., Proc. Linn. Soc., N.S.W., 353, 1883).
Fernshaw, Melbourne, Windsor, &c.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 14th September, 1896. The president, Professor Baldwin Spencer, M.A., occupied the chair, and some 60 members and visitors were present.

REPORTS.

The hon. librarian reported the receipt of the following donations to the library :—*Natural Science*, vols. ii., iii., iv., v., and vi., from Mr. F. G. A. Barnard ; "Report of Horn Exploring Expedition," parts 2 and 3, from Mr. W. A. Horn ; "Proceedings Linnean Society of New South Wales (second series), vol x., part 4, and 1896, part 1 (with Supplement), from Society ; "Transactions Royal Society of South Australia," vol. xvi., part 3, from Society ; "Transactions Royal Society of Tasmania," 1894–5, from Society ; "Transactions of New Zealand Institute," 1895, from Institute ; "Proceedings Australasian Association for Advancement of Science," Brisbane meeting, 1895, from the Association ; "Annual Report of Trustees, Australian Museum, Sydney," 1895, from Trustees ; "Botany Bulletin, Queensland," No. 13, from the Government Botanist, Brisbane ; "Proceedings Nova Scotian Institute of Science," vol. i. (second series), part 4, from the Institute ; "Proceedings Boston Society of Natural History," vol. xxvi., part 4, from Society ; and "Proceedings Academy of Natural Sciences, Philadelphia," 1895, part 2, from Academy.

The hon. secretary reported that a meeting for practical work was held on Monday evening, 24th August, when Mr. T. S. Hall, M.A., gave a demonstration on the classification and grouping of rocks, with the identification of some of the commoner kinds. There was a good attendance of members, and a most profitable evening was spent, a large number of typical specimens being handed round for study.

A report of the excursion to Clayton on Saturday, 22nd August, was read by the leader, Mr. C. French, jun. An enjoyable afternoon was spent, and among the plants noticed may be mentioned *Acacia oxycedrus*, *Styphelia elliptica*, *Drosera binata*, *Boronia polygalifolia*, *Corysanthes unguiculata*, *Pterostylis pedunculata*, and *Ophioglossum vulgatum*. Some members devoted their attention to pond life, when, amongst other objects, an interesting alga, probably belonging to the family Chroococcus, was noted.

A report of the excursion to Cheltenham on Saturday, 5th September, was furnished by the leader, Mr. C. French, F.L.S., when, accompanied by a party of members of the University Science Club, an extended exploration of the heath-ground towards Cheltenham was made. Spring flowers were in abundance, and a number of plants of *Phylloglossum Drummondi* were collected. A fine patch of the orchid *Lyperanthus nigricans*, in flower, was found, being some three weeks earlier than usually noted. During the afternoon a halt was called and an examination made of the specimens collected, the names, &c., being furnished by the leader.

ELECTION OF MEMBER.

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

PAPERS READ.

1. By Mr. A. E. Kitson, entitled "Geological Notes on the Toombullup Goldfield and Adjacent Country."

The author described the main characteristics of the locality, which is situated about the centre of the county of Delatite, and the methods used in the gold mining. The origin of the gold was somewhat obscure, and the district required further exploration before it could be determined whether it originally occurred in a basaltic or granitic formation. He noted the occurrence of gem-stones, such as sapphires, zircons (hyacinths), Oriental emeralds, and topazes, some of which were large enough to be of commercial value.

During the discussion which ensued Baron von Mueller spoke of his experiences when collecting botanical specimens in the district some forty years previously. Messrs. G. Coghill, T. S. Hall, M.A., H. R. Hogg, M.A., H. T. Tisdall, and G. B. Pritchard also spoke.

2. By Mr. J. H. Wright (communicated by Mr. T. S. Hall, M.A.), entitled "Notes on the Mode of Wood Petrifaction."

The paper referred to a specimen of fossil wood found in a block of ferruginous quartzite at Darlimurla, South Gippsland. On examination under the microscope it was found to consist of silicious casts of the tracheides of a woody tissue. The author then gave some account of how this condition may have been produced.

3. By Lieutenant-Colonel Legge, F.L.S. (hon. member), entitled "Notes on a Sericornis from Kent Group."

The author described a Sericornis collected by the Field Naturalists' Club expedition to the Kent Group, which, having certain differences from *Sericornis frontalis*, might be considered as a sub-species, and proposed for it the name *S. gularis*.

Some discussion ensued, which opened up the question of the

migration of birds between Tasmania and the mainland. Professor Baldwin Spencer, M.A., and Messrs. D. Le Souëf and H. P. C. Ashworth mentioned their observations on the different islands in Bass Strait, which went to show that little, if any, migration takes place.

NATURAL HISTORY NOTES.

1. By Mr. W. H. F. Hill.—"Notes on an Entomogenous Fungus." The writer referred to the life-history of a small parasitic fungus of the type of *Empusa muscæ*, possibly of considerable economic value, since it attacks the larvæ of *Agrotis infusa*, *A. breviuscula*, and several allied species, which are very destructive to cereal crops.

2. By Mr. H. T. Tisdall, F.L.S.—Remarks on a supposed new species of fungus belonging to the Myxomycetes, collected by Mr. C. French, F.L.S., at Narre Warren. Drawings by the writer were shown in illustration of the paper.

EXHIBITION OF SPECIMENS.

The following were the principal exhibits of the evening:—By Mr. G. Coghill—8 species of orchids in flower from Tunstall. By Mr. C. French, F.L.S.—Rare butterflies and Moths: *Attacus Edwardsii* (male and female) and *Nyctapas albocincta* from Assam; *Myrnes Guerini* (varieties), *Arhopala eupolis*, *Pseudodipsas Digglesi*, *Lycænesthes Turneri*, and *Pieris scyllara* (var. *perimale*) from North Queensland. By C. French, jun.—Rare Victorian orchids: *Acianthus caudatus* and *Pterostylis cucullata* (var. *alpina*) from Fernshawe; *Caladenia cærulea* from Anderson's Creek; also *Pterostylis curta*, with two flowers, collected by Mr. Wauer at Yarra Glen. By Mr. T. S. Hall, M.A.—Silicious casts of pitted vessels of a plant under microscope, in illustration of paper by Mr. J. H. Wright. By Mr. A. E. Kitson.—35 geological specimens, in illustration of paper. By Mr. D. Le Souëf.—Lizard, *Phyllurus platurus*, from Queensland. By Baron von Mueller.—*Galium murale*, as an introduced plant from South Europe; *Cryptandra bifida*, new for Victoria, collected at the Wimmera by Mr. F. Reader; *Cyrtostylis reniformis*, with green flowers, collected by Mr. J. Paul at Grantville; also the following plants as new for extra tropic Western Australia:—*Bassia divaricata*, from near Coolgardie, collected by Mr. F. Wehl; *Perotis rara*, traced by Mr. J. Cusack towards Shark's Bay, where he also collected *Lythrum hyssopifolia* and *Vallisneria spiralis*. By Mr. J. Paul.—Orchids from Grantville. By Mr. H. T. Tisdall, F.L.S.—Drawings of a supposed new fungus belonging to Myxomycetes, collected at Narre Warren by Mr. C. French, F.L.S.

After the usual conversazione the meeting terminated.

COLLECTING IN RIVERINA DURING FULL FLOOD.*

By J. Gabriel.

(Read before Field Naturalists' Club of Victoria, 13th July, 1896.)

On 5th September, 1894, my friend Mr. A. J. Campbell and myself found ourselves at Koondrook, prepared to start on a collecting trip and brave the flooded waters of the River Murray. To those who have not seen this fine stream of water, a passing description of its annual rise and fall may be acceptable. During the latter part of summer and through the winter the river flows at its ordinary low level, and the traffic is at a comparative standstill. But as the warm spring approaches, the snow at its sources rapidly melts, and soon the river assumes a different appearance. The water rapidly rising, enables vessels to depart to their many destinations, in some instances many hundred miles distant from Echuca, the usual starting place.

About October and November the river overflows its banks in places—these overflows go to form lagoons. Some of these lagoons extend for many miles in various directions, and about the end of spring their surfaces are carpeted with the exquisite little Water Lily, *Limnanthemum crenatum*, whose rich golden flowers, combined with those of other aquatic plants, form some of Nature's prettiest pictures. Innumerable birds, of many species, flock here to breed—notably the waders and swimmers.

Some few years ago, with another field naturalist, I spent a glorious fortnight in hunting around and through some of these fine sheets of water, and met with encouraging success. We were supplied with a "shakedown" by our mutual friend, Mr. G. H. Morton, who has a large selection at Benjeroop, and whose house is built on the river bank. During our stay our photographic artist was happy in obtaining several interesting typical pictures, notably—A Murray Steamer with Barge of Wool in Tow; Cattle at Dawn; Murray Lobsters—this picture was taken under considerable difficulty, as the "creatures" would not remain still; but two hours' patience won the day, or rather the picture. We took advantage of the harvest season, which gave us two more—Harvesting, and Some of Morton's Children. The river, of course, is teeming with fish, and one afternoon we were successful in obtaining a fine haul.

The following pictures were taken during our wading trips:—Bitterns, *Botaurus poiciloptcrus*; Bittern's Nest; Semipalmated Goose, *Anseras melaleuca*; Nest of Goose; Ibis, white, *Threskiornis strictipennis*; Ibis Rookery; Ibis Nest. All these scenes tend to make things pleasant, but occasionally the annual rise of the Murray is considerably augmented by con-

* The paper was illustrated with a series of forty-seven excellent lantern slides from photographs taken by Mr. A. J. Campbell.

tinuous heavy rains at the mountain sources of the river and its tributaries, and we have floods of more or less magnitude.

During this particular trip the river, a little time before our visit, had overflowed its banks between Tocumwall and Lake Moira, sending a great sheet of water down the Edwards, with its network of Riverina billabongs. The Murray continued to rise, and on our arrival at Koondrook was swirling past in high flood.

While staying over-night at the homely Coffee Palace of Mr. B. Akers we made anxious inquiries as to the condition of the country beyond, through which we had to travel, and were informed that all rivers, creeks, billabongs, &c., were overflowing. A traveller gave us a lively description of his experience while crossing the Wymool. His horse, he says, "turned turtle," broke the saddle girth, and he had to swim down stream after the saddle, and so on. As this was one of the streams that we had to cross, my companion and I exchanged glances and wondered.

By appointment we met Messrs. Neil and Roderick Macauley at Koondrook, and found that they had had to abandon their buggy at the Wakool River and swim the four horses over the Wymool Creek. The horses they brought to Barham, opposite Koondrook, riding bareback a distance of 11 miles.

Early next morning we crossed the Murray with our luggage and collecting material, and our friends soon drove up with a buggy which had been kindly placed at our disposal by another friend. We were not long in making a start, and were fortunate in having the companionship of Mr. J. W. Chanter, who is Stock Inspector for the Barham district, and who thoughtfully arranged an official visit in the direction we purposed taking so as to pilot us through the shallowest places. Splendid fun was soon the order of the day—flood, flood, water, water, flop, flop—occurring, however, so frequently that we soon became accustomed to it. Our course is zig-zag, ever heading in a northerly direction. The box timber is soon passed, and we skirt billabongs and ford lagoons till we get into red-gum country, when we begin to feel a little anxious. The bridge at Eagle Creek is soon crossed, but its approaches are flooded. About four miles on we cross Barber's Creek with a certain amount of delightful dread. We tilt our legs into the air with graceful attitude so as not to get them wet, but find the water only reaches the floor of the buggy. A little further on we were just in time to catch a pretty scene—viz., a small flock of sheep crossing the flood for high ground. Cow Creek now came in sight, where we narrowly escaped a capsize. The two horses suddenly flopped into a hollow, while our buggy took an unpleasant cant, and we were nearly out; however, wet ankles is the only result. We are now driving on a dry pine ridge, and we pull up at a selector's house. The good wife informs us that her husband is waiting at the Wymool to cross us

in his boat. This was one of the many kind provisions which the Macauleys had made for our comfort *en route*. After jumping a wire fence or two with our buggy we arrived at the dreaded Wymool, where we found the selector and his son with boat all ready for us. But a large fire suggested billy tea, which was soon got ready. After lunch we prepared for a famous swim. This was certainly a new experience to us field naturalists. Our luggage was transferred to the boat, which was somewhat leaky, but to us was far more comfortable inside than out. Our friends the Macauleys then swam the four horses across, holding on by their tails, while we braved the flood in the boat. The borrowed buggy is left well on the bank, according to instructions received from the owner, who called for it some four months afterwards. Before leaving we bid good-bye to Mr. Chanter, our kind pilot.

The Wymool Creek and Wakool River run parallel about here, and in a flood like this the streams coalesce and sweep by the regimental gum trees about half a mile broad. Our friends with the horses are soon out of sight, while we in the boat are propelled across the stream by a contrivance called a revolving paddle, worked by a crank (an invention of the selector's).

We found the Macauleys waiting for us with a spanking four-horse team, and after thanking the selector, who was such a friend in need, we merrily proceeded on our way. But for a little time, however, for, after skirting Callaghan Plain, we see ahead of us a broad sheet of water, and are soon flop, flopping through the backwater of the Wakool. This water-travelling, with occasional patches of dry ground, lasts till late in the afternoon. The monotony is relieved at times by the appearance of game, &c. We flush ducks and teal and the beautiful Wood Duck at frequent intervals, and occasionally small flocks of both species of ibis were passed; parrots also of several kinds, while cockatoos, both white and rose, are seen grubbing in the open. Towards evening we enter upon a large plain, and kangaroos, both red and grey species, together with occasional emus, are now frequently passed. Some of these animals stopped to admire our four-horse team, as well they might, for, with all the travelling, our horses were still quite fresh. Darkness was our next experience, and we are benighted in the overflow of the Neimur Creek, but our driver knew his way, and we successfully crossed the bridge, shortly afterwards turning into Neimur Park, to be hospitably entertained for the night by the owner, Mrs. Perrignon, and her two daughters.

Next morning we leave our hospitable friends, and are soon heading on our journey. This means, of course, more flood water at frequent intervals.

At seven miles we break on to a pine ridge, and arrive at Bannockburn—our destination—where we got a hearty Scotch welcome from the Macauley family. Dinner over we lost no time in investigating a Black Duck's nest in a hollow stump in the

Ooroonong Creek, which flows past the house. We found three eggs; these, being handy, we left, so that we could check the period of laying the balance of eggs. But some crows were on the watch too, and on our next visit we found that they also appreciated ducks' eggs. To get to this stump a boat was used, which we named the "Pride of the Ooroonong;" although rather leaky, we found it very useful at times.

A pine ridge opposite next attracted our attention, where we found some of our feathered friends—notably the Red-capped Robin (*Petrœca Goodenovii*) and a rare Gerygone (*Gerygone culicivora*). This pretty bird we met frequently afterwards, but we failed to find any nests. These birds are a Western Australian species, but have been found in Victoria, and it was interesting to find them here also.

The pine ridge near the house was hunted the next day, with no result. In the afternoon, while strolling along the creek bank, a Maned Goose was flushed out of a hollow tree, and the next day we took our first clutch of twelve eggs. To obtain this clutch was at first a puzzle, but one of our friends was equal to the occasion.

Next morning we had a long tramp, but again with poor results. While returning we noticed an Australian Shoveller, *Spatula rhynchotis*. These birds are very shy, and this one was seen sneaking from the creek to the grass crop. One of our friends, at our request, paid a visit to the spot about ten days after we left, and found a clutch of nine eggs, and not very far off a second clutch with eight eggs. These birds are not so dainty and trim with their nests as the Black Duck and Teal. Both of these nests, as usual, were found abominably messy and unpleasant. In the afternoon we were driven to Moulamein, eleven miles distant, where we arrived soon after dark. Our journey, as usual, was varied by many water experiences, but we were now getting used to these, noticing only the waterfowl and mosquitos; the latter were always present, and the former thickly sprinkled the overflows. We passed the night at this, one of the oldest towns in New South Wales. In dance and song we spend a pleasant night, and retire to bed early—in the morning.

Next day on our return journey we found a Teal's nest, prettily placed in a hollow spout of an overhanging dead tree. Standing upon the seat of the buggy, we counted eleven creamy-coloured eggs, which we were cruel enough to take. These eggs, as usual, were beautifully encircled with elastic down. This down we carried home with us, and two hours after being taken it was found to be still quite warm. I gather from this that the eggs never get cold during the temporary absence of the sitting bird.

At Bygannti Creek we have to cross a peculiar structure which is honoured by the name of a bridge. The horses are first unyoked and led over, and the buggy is then hauled over by us

afterwards. On a subsequent occasion Billy Briggs, one of the horses, dropped over the side with all his harness on, but landing in the mud beneath was not hurt.

On our homeward journey we passed a large cotton-bush plain, where we saw the beautiful little White-winged Wren, *Malurus leucopterus*. Later on during our stay we spent the best part of a day in hunting this plain, but our white-winged friends had apparently just paired off, and we only succeeded in finding unfinished nests, several of which were destroyed, apparently by crows. We, however, were fortunate in finding a fine clutch of Black Duck's eggs, *quite away from water*. This clutch was remarkable as being the only one found on the ground during our trip, all others being found in hollow trees. We found many nests without hunting very keenly, but as we had representatives already in our cabinets we took very few home with us. The ducks, Teal, Wood Duck, and swan we found with few exceptions scattered about in pairs, every splash or overflow having its representatives. The beautiful Wood Duck—probably called a duck because it is a goose—frequently attracted our attention, the gorgeous plumage of the male bird shining out with resplendent colours. We found them more sociably inclined than the ducks (perhaps because they are not so good to eat), as we frequently got very close and viewed them at our leisure.

Hearing from a neighbour, Mr. Jackson, of a swan's nest with eggs, we one day went to search it out, and after considerable wading, assisted by two horses and a buggy, we found it ingeniously placed on the leafy part of a fallen gum bough. The top of the nest was about six or eight inches above the water surface. On our approach the birds, true to their shy nature, made off. We took an excellent photograph of the nest, our artist standing in the water to do so; but this is only one of the luxuries of an enthusiastic naturalist whose ardour never damps. The next day a second picture was taken, but on this occasion we were assisted by the boat. On the way back to the homestead we flushed a Teal off its nest, which contained twelve eggs. We also flushed a Tiger Snake swimming in the water, and after bidding him good morning with one of the propelling poles, we left him on a stump to dry for the crows.

The snakes are socially inclined about here, frequently coming into the houses. One night I heard a noise in our bedroom which I attributed to a mouse, but was assured next morning it was a snake, as they were not troubled with mice. This is another naturalists' luxury.

During our stay we hunted very keenly for nests of the Spotted Bower Bird, *Chlamydodera maculata*, but with no success. We found afterwards we were far too early, the two eggs exhibited to-night being found in November afterwards. We were fortunate in finding six of their bowers in full working order. As usual,

NEST OF THE BITTERN (*Botaurus poicilopterus*).

FROM A NEGATIVE BY A. J. CAMPBELL.

they were adorned with a liberal supply of bones, principally the knuckles, ribs, and vertebræ of sheep, broken glass, quondong stones, and other seeds ; in one bower a piece of mirrored glass was found. All the bowers were sheltered under Bursaria bushes, the prickly thorns of which, united with the constant attentions of the mosquitos, made it very difficult to take a picture. On one of the pine ridges, about two miles from the homestead, we found two nests of the Red-capped Robin ; as usual, these were very cunningly hidden, but as the clutches were not completed we left them for a few days. On the journey to take these eggs, a few days afterwards, we took a short cut across the Ooroonong backwater, and as the water rose over the seats of the buggy, consequently we got a wetting. Coming back by another track made matters no better, the horses having to swim, and necessitating a full change of clothing for us when we got to the homestead. In all these struggles through the water our horses seemed to take it as a matter of course, going in without hesitation anywhere when driven. On one occasion two of the Macauley Brothers, for our edification, gave us an illustration of how they cross a stream when out riding. One of the brothers clung to his horse's mane, while the other held on to *his* horse's tail. Care must be taken to get on to the horses' backs immediately they touch ground. The clothing, being tied in a tight bundle, is held by one hand overhead. They laugh at the idea of *riding* across on the horse, as it is not fair to the animal, and is simply dangerous.

We next went for a two days' trip to Mallan, about twenty miles westward from our stopping place, on the Swan Hill—Moulamein route. We were kindly received by Messrs. Neil Macaulay and S. Metcalf at their respective homes, Mr. Metcalf taking us to a mallee fringe which was a perfect aviary of birds. But we were far too early for their nesting season. In this mallee fringe we found other bowers of the Spotted Bower Bird.

On our way back to Bannockburn we took another route, passing through a Polygonum (*Muehlenbeckia Muelleri*) swamp and some box country. These Box trees (*Eucalyptus melliodora*) have all been rung, and have a weird appearance. The ringing is done so as to allow the grass underneath to grow more freely. In the swamp we flushed a Teal off its nest in a snug hollow tree, and later on took from it a clutch of eight beautiful eggs. The swamp is a fine breeding-place for mosquitos, and a lively time we had in going through.

On the following day we paid a visit to a large swamp over the Ooroonong Creek, in hopes of finding a Native Companion's nest ; but, although we heard the birds trumping, we were unsuccessful. While punting our way back we found a nest of the Pied Grallina, *Grallina picata*, containing four pretty eggs.

In this locality, and on the Murray banks, the eggs of these birds are very different to those found nearer Melbourne, being of a rich fleshy tint, like those of the Honey-eaters. One day we drove through the "lignum" swamp to the box country, and succeeded in finding a Buzzard's nest, but to our disgust it contained young only. On returning we chased a flock of twenty-eight Emus, who disdainfully allowed us to approach near to them, and then showed us how they could run. The time for our homeward journey was now approaching. We see by the newspapers that the Murray is still rising, and are told that returning *vid* Koondrook is impracticable, and that the Wymool would not be the only swim on the route. So there is nothing for it but to return *vid* Deniliquin. About fifty-three miles on the way to Deniliquin is Dunvegan, a valuable property owned by two of the Macauley Bros. So we decided to start a day earlier and pay them a visit.

On the morning of 22nd September, after bidding farewell to our good friends, we made an early start, and were soon flop, flopping through the flood waters. After about five or six miles of this we got on to better ground, and, with few exceptions, had good roads to Dunvegan. About two o'clock we halt for billy tea, which was drunk under difficulties, the mosquitos being so attentive, but we made "a smoke," which kept them at a respectful distance. During the day we flushed large numbers of the Crested Bronze-winged Pigeon, *Ochyphaps lophotes*; they were continually rising, with their characteristic whirr, in flocks of 4 to 25. We also noticed a family of the Twelve Apostles, or Grey Struthidea, *Struthidea cinerea*. In this instance the 12 numbered 13. While crossing one of the plains we captured two young Black-breasted Plover, *Sarciophorus pectoralis*. One of these died the following day, but the other lived and thrived in captivity until about a month ago, when it fell a victim to an Armadale rat. A clutch of eggs of this bird is a pretty object, and makes a fine photographic picture. On one of the cross roads leading to the Wakool River we found an incident of Riverina—a waggon loaded with forty bales of wool, which a team of forty bullocks is unable to move. We took the picture and sympathized with the drivers, as night was coming on apace. Darkness is complete when we reach the woolshed of Calimo station. We say, "How do ye do" to a friend, and hurry on, as we have a couple of hours' journey before us, and more flood water to cross. Cooee Creek is reached, and we enter it with a certain amount of dread, but we find the water does not rise to the buggy floor. The following day two of our friends failed to cross this stream; the water had risen so during the interval that it was a dangerous swim. We arrived at Dunvegan about 10 p.m., and found the good folks all abed.

The following morning was spent in hunting for birds and eggs,

but we only succeeded in finding one nest of *Myzantha garrula*, which was not considered rare enough to take. We were shown a tree in the creek which contained a Mountain Duck's (*Casarca tadornoides*) nest about sixty feet from the water. About two months previous to our visit the pair of birds successfully hatched seventeen young ducklings. One morning Mr. J. Macauley was called out by his wife in time to see the young brought out of the nest. The old birds were in the creek below, and gave a call, when out flopped two ducklings from the nest above, spreading their featherless wings to act like parachutes, and they prettily fell to the water. This performance was repeated until the whole seventeen had joined the parent birds. They then all swam away, and were seen no more. While watching this tree we noticed a Teal fly into the same hollow which had contained the Mountain Duck's nest, having probably selected the spot for her nest also.

During the afternooon we went on the hunt for a Native Companion's nest to photograph ; also to hunt kangaroos, &c. We were accompanied by a gun, a horseman, and seven dogs of different descriptions. A Companion's nest was soon found, with one egg ; this we left until next day, in the hopes of the clutch being completed. Immediately after this find we started several large kangaroo. "There they go," say the girls. "Yes, there they go," says our artist, "right through my nest." These were rather too fast for us, and got away. Early next day we found the nest intact, but with one egg only ; so the picture was not taken.

Dunvegan is prettily situated, with a frontage to Colligen Creek, and the good folks had all mustered for the shearing and were at their wits' end to keep the sheep dry, as the flooded waters were rising so rapidly. It is hard to say whether these floods should be viewed as an unmitigated evil or as a benefit. We are informed that the fine feed grass commonly called the Burr Clover will be destroyed for three years ; and as for the water deposit being a benefit, this can be counted as *nil*, for we found the water flowing in all directions in comparatively clear streams. But against this is to be counted the fact that all dams, waterholes, creeks, &c., are filled ready for drier seasons. We found the Nardoo plant, *Marsilea quadrifolia*, growing in abundance in almost all directions where water was to be found.

On 24th September we are favoured with a beautiful morning, and an early start is made for Deniliquin, seventeen miles away, but on account of flood water twenty miles or more. Yallakool Creek is distant about three miles, with water almost the whole way. On our arrival at the creek we are first punted across in a boat ; the buggy is then balanced on the boat, which is pulled along a line of fencing wire fastened from tree to tree. And then the horses (a fine pair of greys) are hunted across. But the

strong current carries them against trees, and there is trouble for a time. But with encouraging shouts they at last get over in safety, after a little anxiety on our part. We find the timber on the opposite bank is full of birds, Magpies, Butcher Birds, Friar Birds, and others vying with each other to produce joyous music. We were now in our element, but, as the water was rising fast, were hurried away, much to our regret. After ploughing through some boggy places and a few rather deep water splashes, we got on to a good road. Here we met with a slight mishap to our buggy, but fencing wire is again handy and the damage soon repaired. On a plain in the distance we notice a pretty clump of trees, whose golden-green foliage, hanging pendent, claims our admiration, and we stop to take our last picture in Riverina—"Under the Myalls." Deniliquin is reached in time to catch the train for Melbourne, where we part well satisfied with our experiences of Riverina during full flood.

The following were the principal birds seen during the trip :—Black-breasted Buzzard, White-rumped Wood Swallow (just arrived), Black-throated Butcher Bird (probably its most southern range), Ground Graucalus, Western Gerygone (*G. culicivora*), Hooded Robin, White-winged Wren (*Malurus*), Xerophila, Rufus-tinted Skylark (just arrived), Spotted Bower Bird, Grey Struthidea, Chestnut-crowned Pomatostomus, Lanceolate Honey-Eater, Yellow-rumped Parrakeet, Crested Bronzewing Pigeon, Emu, Native Companion, White Ibis, Straw-necked Ibis, Pacific Heron, Bittern, Coot, Swan, Ducks (4 species), Crested Grebe.

NOTES ON THE SO-CALLED MIOCENE DEPOSITS OF BACCHUS MARSH.

By C. C. Brittlebank.

(*Read before the Field Naturalists' Club of Victoria, 13th July*, 1896.)

In the Bacchus Marsh district, but principally to the west and north-west, there are extensive deposits of clay, sand, gravel, ferruginous and argillaceous sandstones and quartz conglomerate, the latter being cemented by silica and ferruginous matter.

The officers of the geological survey of Victoria have mapped portions of the above beds under the term Miocene, but in the light of later evidence this is probably incorrect. The writer applies the term Miocene to those beds described by the geologists of the survey under that name.

The area under notice covers about 100 square miles, fifty of which are beyond the limits of the survey. In the above area the various exposed formations are Post Pliocene, Newer Pliocene, Newer Basalt, Older Basalt, Miocene, Glacial Drift, Lower Silurian, Granite.

At one period nearly the whole of the district lying between

the Lerderderg on the north and the Brisbane Ranges on the south has been an extensive basaltic plateau, with a fall of over 1,200 feet from north-west to south-east. Probably the basalt has been poured forth from the volcanic vents to the west of Bacchus Marsh—viz., Mounts Blackwood, Ingliston, Goorong, and Daraweel. A peculiar feature in this flow is that at a point 2½ miles west of Bacchus Marsh it has descended a slope of over 300 feet, and then spread over an area thousands of acres in extent. The officers of the geological survey refer to this as follows :—"It rises abruptly 300 feet from the lower basaltic plain to the high table land, and at this point a good section is exposed. A similar feature must have existed in the Miocene formation prior to the flow of Newer Basalt." This ridge can be traced for about 6½ miles to the south-west. The present drainage system has cut deep gorges, gullies, and wide valleys through the basalt and underlying beds. Sections of the Miocenes are to be seen in the valleys of the Werribee, Parwan, and Pyke's Creek ; on the main Ballarat road, between Bacchus Marsh and Pyke's Creek, and to the south and north of Myrniong. In the valley of the Werribee, west of Bacchus Marsh, a section is exposed for about 4½ miles east and west.

Along this section the Miocenes are composed of white and yellowish-white clays, grits, waterworn quartz gravels, and sandy clays. Through this section are various-shaped masses of ferruginous sandstone, which in some instances contain the casts of leaves—*Laurus Werribeensis*, *Cinnamomum polymorphoides*—together with casts of fruit. Several bands of white clay retain the casts of the abovenamed and various other plants. At the east end of the above section, and west of Bacchus Marsh about two and a half miles, the Miocene beds are probably 300 feet in thickness. From this point west they gradually thin out between the uprising older rocks and the Newer Basalt. The highest point reached by the Miocenes on this section is about 975 feet. Clear sections are of rare occurrence, owing to the thick coating of "talus" derived from the Newer Basalt and the beds under notice. Fortunately miners have driven several tunnels into the hill under the basalt. The sections exposed in these, though small in extent, show that, as the older rocks are approached, the material forming the Miocene beds increases in size. A section in one of the drives shows the following section resting upon glacial drift :—5 feet yellowish-white clay—probably derived from the underlying Glacial Drift ; 2 feet 6 inches heavy boulder wash, 2 feet 6 inches coarse gravel, 3 feet fine sand, 2 feet quartz pebbles and sand, basalt about 90 feet. At the entrance of one of the tunnels a small almost vertical dyke cuts through the Glacial Drift, but does not penetrate the overlying Miocenes.

A section on the north bank of the Werribee, and directly south-east from the Trig. station—known locally as "Hat Island"

or "Tabletop"—shows in the lower portion a bed of impure lignite about 3 feet; 6 feet tough white clay containing numerous plant remains, leaves, fruit, branches, and trunks of trees. These latter are more numerous in the lower bed, and form the chief part of the band of lignite. From the position of the tree trunks it is probable that they were brought together by floods. The upper beds of this section, which is here about 250 feet, are composed of clay, grits, bands of quartz pebble conglomerate, furruginous sandstones, with the usual leaf and fruit casts. Four hundred yards up the river the Miocenes are seen overlying the Older Basalt. The exact point of contact is somewhat obscure. At and for some distance from the junction the Miocenes are greatly altered, leaf and fruit casts being absent. Some of the grits and sandy bands have been converted into quartzites.

Following the junction north-west the Miocenes are greatly disturbed, and present a peculiar patchwork appearance; patches of light and dark red, brown and bright madder are seen on the weathered surfaces. The officers of the geological survey refer to this section as under "intrusive Older Basalt, amygdaloidal and much decomposed. The overlying Miocene clay beds which have here been locally upheaved by this basalt are much indurated where in contact with it, and have a peculiar ferruginous red and brown mottled appearance." Sections to the north-west show dykes of Older Basalt, 17 yards wide, cutting the Glacial Drift. I agree with the officers of the survey as to it being of later age than the Miocenes of this district. At a point 60 chains east from the junction of the Myrniong Creek and Werribee River the Older Basalt distinctly overlies the Miocenes. Striking south and crossing the Werribee River and basaltic plateau on the south, we descend into the valley of the Parwan Creek. This valley is about three miles wide by eight long. Towards the western end it splits up into several narrow gullies, which are bounded by basaltic cliffs from 80 to 100 feet high. Sections along either side of this valley show pure white and yellowish-white clays, conglomerate cemented with silica and ferruginous matter, ferruginous sandstones with the casts of leaves, fruit, &c. In the upper portion of the valley the conglomerate and ferruginous sandstones are absent, white clay and quartz gravel taking their place. Thin bands of impure lignite are also exposed towards the head of the valley. Some of the white clays in contact with the Newer Basalt are greatly altered. In some of these clay beds impressions or casts of a reed or rush-like plant are numerous. In the overlying Newer Basalt a band of bright red clay or ash can be traced for a considerable distance on either side of the valley.

Along this section hundreds of landslips have taken place. Some, acres in extent, have moved down the valley side, and as

these still retain the basaltic cap, they look like huge steps or terraces.

Striking north about six miles the sections on Pyke's Creek are seen; they rest on Silurian and Glacial Drift, and resemble those on the Werribee and Parwan Creeks, viz.: white and yellow clays, sand, ferruginous sandstone, quartz gravel containing gold, and a dense quartz conglomerate. In the white clay a large proportion of common salt is present, so much so that sheep and cattle have, by constantly licking, hollowed out small caves several feet in depth. Many of the pebbles in the quartz gravels have a glass-like polish, probably a secondary deposit of silica. Following the main road east the clay beds thin out, their place being taken by current bedded quartz gravels, sand, and sharp quartz grits. South of Myrniong the beds rest on granite, and have been worked for gold, yielding fair returns to those engaged upon them. Zircon, sapphire, and quartz crystals occur, together with blocks of petrified wood. Between Myrniong and Lyell's Creek typical sections of the Miocenes are exposed in the cuttings on the main road, and also to the west of Lyell's Creek. The general dip of the beds under notice varies from 2° to 14° east, their thickness being not far short of 400 feet. In the area under notice they occur at any level between 300 and 1,900 feet; or, in other words, follow the general surface slope of the older rocks. To the north and north-west of Myrniong the Miocenes thin out considerably. The highest point at which these beds have been observed within this district is on the north-west base of Mount Blackwood, where sharp grits, fine quartz conglomerates, and ferruginous grits occur. Reference has been made to the sudden rise in the basaltic sheet to the west of Bacchus Marsh. Probably we have here an old coast line, or evidence of elevation during Miocene time (?). That a considerable period elapsed between the laying down of the Miocenes and the flow of Newer Basalt is shown by the depth of the old river channels. Some of these have cut through the overlying Miocenes and then into Granite for a depth of over 170 feet. Channels of greater depth are seen, one being about 350 feet.

The depth of the Pliocene (?) river beds, compared with the present drainage system, is about one-half. In several instances the rivers and creeks have cut these old channels at various angles, exposing the old river drift. These latter are generally of dark colour, and contain the remains of numerous plants, which are quite distinct from those found in the Miocenes. Some of the leaf casts in the old river drift resemble the leaves of our present "gum trees." The courses of the old rivers can generally be traced by flat-topped ridges of basalt.

Contrary to what one would expect in a district which has passed through such violent volcanic disturbance, dykes of

Newer Basalt have not been observed cutting through the Miocenes.

The nature of the deposit, together with the vast number of plant remains found in the various strata, and the absence within the area under notice of a marine fauna, stamps the so-called Miocenes of Bacchus Marsh as a freshwater deposit. Probably the material has been brought together by rivers entering a low-lying area occupied by lakes and swampy land. Since the early reference by the officers of the geological survey of Victoria to these beds, several writers have written papers and reports on the so-called Miocene deposits of Bacchus Marsh ; of these, however, I have only had the pleasure of reading Mr. W. H. Ferguson's "Notes on the Occurrence of Limestone at Merrimu." In conclusion, I would draw attention to the finding of chipped flint (?) and quartzite weapons and implements in the Post Pliocene deposits of Bacchus Marsh.

NOTES ON A SERICORNIS FROM KENT GROUP.

By Lieut.-Colonel Legge, F.Z.S., M.B.O.U., &c.

(*Read before the Field Naturalists' Club of Victoria, 14th September*, 1896.)

Several specimens of a Sericornis from Kent Group have been submitted to me by Mr. A. J. Campbell. Three are marked as males, the others being unsexed, while one is supposed to be an immature example. I have compared them with specimens of the Victorian *Sericornis frontalis*, which, however, are unsexed on the labels, though one is presumably a male. The examples from the two localities are very similar. The Kent Group specimens are one-eighth of an inch larger in the wing. The adult birds are darker on the head and have more dark colouring about the face and loral region than *S. frontalis*. The most marked difference, however, is in the throat of the island birds : both the adults are darker ; in one the dark colouration takes the form of a mark instead of stripes as in the bird from the mainland ; in the other the marking is striated in character, yet more confluent than on the mainland species. The white tippings of the primary coverts are much the same in both varieties, but the dark edging is more intense in the Victorian bird. The colouration of the under surface is the same in both. Although the series under consideration is not sufficiently large to enable me to pronounce a decided opinion on the specific distinctions or otherwise of these examples, I am of opinion that the island bird may be considered a sub-species of *S. frontalis*, and would propose the title of *Sericornis gularis* for it. It is, however, probable that a large series from Kent Island might upset this decision. The bird was discovered by the expedition from the Field Naturalists' Club of Victoria which visited these islands in November, 1890.

BARON FERDINAND von MUELLER.

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FIELD NATURALISTS' CLUB OF VICTORIA.

THE ordinary monthly meeting which should have taken place on Monday evening, 12th October, 1896, was postponed, in consequence of the death of Baron Sir F. von Mueller, K.C.M.G., Government Botanist of Victoria, a patron and one of the original members of the Club, who passed away on the previous Saturday at the age of 71.

EXHIBITION OF WILD FLOWERS.

THE exhibition of wild flowers usually held in the early spring by the members of the Field Naturalists' Club took place at the Royal Society's Hall on Monday evening, the 28th September, 1896, when the display of flowers was greatly admired by a large number of the members and their friends.

The exhibitors this year were greatly aided by the cool and pleasant weather experienced while collecting and conveying the flowers to town. To secure their exhibits several of the members traversed large areas of country, and others, notably Baron von Mueller, had enlisted the help of country friends, by which means flowers from such extreme points of Victoria as Nhill, Echuca, and Sale were placed on exhibition.

It is impossible to give anything like a correct list of the flowers exhibited. The names of the contributors, with mention of their most notable flowers, must suffice to give some idea of the display.

BARON VON MUELLER.—From Mr. St. Eloy D'Alton, Nhill—*Boronia cœrulescens*, *Eriostemon sediflorus*, *Eriostemon lepidotus*, var. *stenophyllus*, *Eriostemon obovalis*, *Eriostemon difformis*, *Lasiopetalum Behrii*, *Lasiopetalum Baueri*, *Stackhousia viminea*, *Cassia eremophila*, *Acacia rigens*, *Acacia calamifolia*, *Acacia hakeoides*, *Loudonia Behrii*, *Calycothrix tetragona*, *Thryptomene ciliata*, *Bœckea Behrii*, *Eucalyptus gracilis*, *Eucalyptus incrassata*, *Exocarpus spartea*, *Pimelea stricta*, *Dampiera lanceolata*, *Logania linifolia*, *Prostanthera coccinea*. From Miss Wise, Sale—*Boronia polygalifolia*, var. *anemonifolia*, *Euphrasia Brownii*, *Indigofera Australis*, *Styphelia Australis*, *Correa speciosa* (red flower), *Comesperma volubile*, *Fieldia Australis*.

Mr. G. Coghill.—About 60 species from Tunstall and Mitcham, including *Pterostylis barbata*, *Caladenia Cairnsiana* (two flowers on stem), *C. suaveolens*, *Phylloglossum Drummondi*, *Sphærolobium vimineum*; also about 28 species from Castlemaine, including *Grevillea rosmarinifolia* and *Eriostemon obovalis*.

Mr. J. Paul.—About 60 species from Grantville (Western Port), including *Banksia collina*, *Acianthus caudatus*, *Caladenia Menziesii*, *Chiloglottis Gunnii*, *Prasophyllum patens*.

Messrs. J. C. Neal and H. Giles.—70 species from Nar Nar Goon, including *Pittosporum bicolor*, *Pomaderris apetela*, *Styphelia ericoides*, *Zieria Smithii*, *Grevillea alpina*, &c.

Mr. H. Tisdall.—About 50 species from Eltham, including *Grevillea rosmarinifolia*, *Pterostylis barbata*, *Caladenia Cairnsiana*, &c.

Master C. Shephard.—About 20 species from Brighton, including *Comesperma volubile*.

Mr. R. Hall.—About 12 species from Box Hill, including *Clematis aristata*.

Mr. J. Harris.—About 20 species from Mornington, including *Styphelia Richei*, *Grevillea rosmarinifolia*, *Isopogon ceratophyllus*, &c.

Mr. J. West.—About 50 species from Phillip Island, including a splendid collection of orchids, *Melaleuca ericifolia*, &c.

Mr. G. Shephard.—About 60 species from Somerville, including *Styphelia ericoides*, *Comesperma ericinum* (with white flowers), *Correa speciosa* (with red flowers), &c.

Mr. C. French, F.L.S., and Mr. D. Best.—About 40 species from Cheltenham, including *Lyperanthus nigricans*, *Thelymitra antennifera*, &c., also *Diplarrhena Moraea* from Beaconsfield.

Mr. C. French, jun., and Mr. C. Walter.—About 50 species from Mordialloc, including *Acacia pycnantha*, *Muehlenbeckia adpressa*, *Dillwynia floribunda*, *Podolepis acuminata*, *Caladenia latifolia*, &c.

Mr. C. Frost.—About 50 species from Ringwood and Cheltenham, including *Polypompholyx tenella*, *Utricularia dichotoma*, *Caladenia suaveolens*, &c.

Mr. F. G. A. Barnard.—About 70 species from Upper Beaconsfield, including *Epacris microphylla*, *Plagianthus pulchellus*, *Caladenia suaveolens*, *Pterostylis curta* (almost white), *Sprengelia incarnata*; also *Lhotzkya genetylloides* grown at Kew, and *Acacia acinacea* from Studley Park.

Mr. W. Scott.—About 20 species from New South Wales, including *Dendrobium speciosum*, *Boronia serrulata*, *Telopea speciosissima*, &c.

BARON VON MUELLER.

AMONGST the very numerous societies with which Baron von Mueller was associated, there was probably none in which he was beter known than in our Field Naturalists' Club. From its formation he has been our patron; probably every member has been brought into personal, and many of us into continual contact with him; his name has been a household word amongst us, and his memory will long be held in sincere and affectionate respect. It is hard, indeed, to realize that a younger generation must arise to whom the presence of the Baron, so familiar to us, will only be a tradition.

It is now just fifty years ago since he published the first of the long series of monographs which were to make famous amongst systematic botanists the name of the then unknown student, Ferdinand Mueller.

His father was Commissioner of Customs in the little town of Rostock, and there he was born in 1825, and received his early education, evidently intending from an early age to become a pharmaceutical chemist; in fact, his first employment was as chemist's assistant in the town of Husum in Schleswig-Holstein. From Rostock he went to study at the University of Kiel, where he passed his pharmaceutical examination in 1846, his early studies in which direction will explain the interest which he has always taken in this department.

Meanwhile, however, he had attended the botany lectures of Professor Nolte, and with characteristic energy had set to work studying and collecting in his spare time the plants of the island of Sylt, and in 1846 he presented, as a thesis for the degree of Doctor of Philosophy in the University of Kiel, a paper on *Capsella bursa-pastoris*, the common Shepherd's Purse. In the same year he published in *Flora*, the journal of the Botanical Society of Regensburg, in Bavaria, a more extensive paper on the flora of Schleswig-Holstein, and though he was unable to devote himself as yet entirely to his favourite study, it is evident that his path in life was already clearly marked out for him, and that, wherever he was or whatever occupation he might have to follow, the study of botany would be his main object.

Late in 1846, Dr. Preiss, a friend of the Mueller family, had returned from a visit to Western Australia, and being acquainted with the phthisical tendency of the student and his sisters, had strongly urged their emigration to the more genial climate of the sunny south. Accordingly Dr. Mueller and his sisters set sail, and arrived in Port Adelaide in December, 1847. His capital was limited mainly to his brains, so he had to find something to do, and readily got and accepted employment in the chemist's shop of Heuzenroeder, in Rundle-street. Adelaide was not then what it is now, and one had not to go far afield to get beyond

the reach of civilization. All his spare time was spent in studying the new flora with which he found himself surrounded, and in connection with this work he made expeditions to various parts, then, it must be remembered, difficult of access and peopled with not too friendly natives, such as the Murray scrubs, Guichen Bay, and Mount Brown, the highest point of the Flinders Range, gaining in this way his first insight into the Australian flora, which he was subsequently destined to do so much to elucidate.

Having bought some land in the Bugle Ranges, it was apparently at one time his idea to settle down there and cultivate it. Doubtless he intended to have his home in this spot, and to make, when possible, expeditions in various directions. At any rate, he had already devoted a considerable amount of time and energy to collecting plants and noting facts relative to the flora, his earlier papers being written in conjunction with Dr. Souller, and published in the botanical paper *Linnæa*, issued at Halle, in Germany.

The life on the land did not, however, prove at all attractive, and in a very short time we find him back again in Adelaide, once more engaged in his old occupation.

In 1852, at the time of the gold rush, he was attracted to this colony. Evidently his reputation as a botanist had preceded him, for in the same year Governor Latrobe appointed him Government Botanist to the colony of Victoria, and from that time onward he devoted himself with untiring, and one might almost say with phenomenal, energy to the work of the post, which was described as the investigation of the vegetable resources of the colony, though it may be said without any exaggeration whatever that, whilst Victoria had the honour of claiming him as her botanist, the other colonies shared almost equally in the advantages to be derived from his wide knowledge ; he was in fact, though not in name, Government Botanist of Australia. Not only was his reputation world-wide, but, what is more remarkable, there was probably no township or hamlet in the whole of Australia, from Cape York to Hobart and from Sydney to Perth, in which the name of Baron von Mueller was not known and respected.

When appointed Government Botanist, Mr. Dallachy was Curator of the Botanic Gardens, Dr. Mueller's duties in connection with them consisting in the scientific naming and arrangement of the plants. Subsequently, in 1857, he became head of the Gardens; but, later on again, these were most wisely placed under the charge of Mr. Guilfoyle, Dr. Mueller being thus left free to undertake the more purely scientific work attaching to the Botanical Department—an arrangement which no one will now deny was most wise and of great advantage both to the Gardens and the Department.

At first Dr. Mueller occupied a small, unpretentious cottage which still overlooks the Yarra below Government House, and the three years succeeding his appointment, 1852–55, were with him times of great activity. In search of plants he explored a large part of Victoria, crossing the Alps, where he gave the name to Mount Hotham. As early as 1853 he had been on the top of Mount Buffalo, and the same year found him starting alone from Melbourne, with three horses, to explore what were then the almost untrodden wilds of Gippsland. The sight of him, as he passed through what was then the countrified suburb of Hawthorn, mounted on his favourite pony, and driving bef ore him his pack-horses laden with his collecting material and slender allowance of food, is still vividly remembered by one of the oldest members of our club.

The Mallee district and the Grampians were also traversed by him in search of plants to enrich the national Herbarium, which, under his guidance, and due entirely to his zeal, has become by far the richest in the Southern Hemisphere.

In 1855 he went further afield and joined the veteran explorer, A. C. Gregory, in his expedition across the north-west, on which occasion the Victoria River and other parts were explored. He was one of the four who reached Termination Lake in 1856, and after accompanying Gregory on the return journey to Moreton Bay, he came south again to Melbourne, publishing afterwards the main botanical results in the Linnean Society's journal.

In 1857 he was appointed, as before said, Director of the Botanic Gardens as well as Government Botanist. At this time the zoological collection was located in the Gardens, and it was during his directorship that the alpacas were introduced to the colony.

There now commenced the period of his greatest activity, so far as the publication of works is concerned, and from this date up to the time of his death it may be said that he was always engaged upon some publication dealing with the Australian flora.

One of the earliest of these was the "Plants Indigenous to the Colony of Victoria," whilst between the years 1858 and 1881 eleven parts of the "Fragmenta Phytographiæ Australiæ" were issued; this work curiously being, we believe, the first published in Latin in Australia. Its object was to contain descriptions of new species of plants and observations of importance on others which came under his notice, the whole being intended as a record leading up to a comprehensive flora of Australia, which it was his long-cherished desire to issue. When the time came, however, for carrying the work into execution, it was apparent that it could only be successfully done by someone who had access to the type specimens in Europe, and this being impossible in the case of Dr. Mueller, the work was published by Bentham,

associated with the former. All collections were first examined by him, then sent to London, revised, and finally dealt with by Bentham, the result being the seven classical volumes forming the "Flora Australiensis," published between 1863 and 1878. We quote the following words from Dr. Bentham's introduction to the "Flora":—"When, indeed, it was first contemplated to bring out a general flora of Australia under Government sanction, Dr. Mueller was naturally looked to as the botanist best qualified for undertaking the task of preparing it; and in the hope that it would be entrusted to him he had devoted his utmost energies to collecting the necessary materials. But there was one indispensable step, the examination of European herbaria, where the published types were deposited, which he was unable to take; and it is a signal proof of the generosity of his disposition, and the absence of all selfishness, that when it was proposed to him that the preparation of the "Flora" should be confided to me, on account of the facilities which my position here gave me for the examination of the Australian collections I have mentioned above, he not only gave up his long-cherished projects in my favour, but promised to do all in his power to assist me—a promise which he has fulfilled with the most perfect faith."

Already the value of his work had been recognized, by his election into the Royal Society in 1861, and ten years later he was created a Baron of the Kingdom of Wurtemberg. Honours of various kinds began to reward his efforts, but instead of tempting him to rest upon his laurels, they only seemed to spur him on to further work.

In 1879 he commenced the publication of what is perhaps his most important single contribution to our knowledge of the Australian flora—the "Ten Decades of the Eucalyptographia," a difficult genus, in which naturally he was deeply interested. Not only did the purely scientific side of the work appeal to him, but here as in other work the economic aspect found in him a zealous investigator. It was mainly through his efforts that attention was drawn to the supposed hygienic properties of the trees; and it was through his instrumentality that the Blue Gum—*Eucalyptus globulus*—was introduced into the malarious districts of the old world, whilst he was also much associated with Mr. Bosisto in the investigation of the eucalyptus oils.

From the economic aspect, perhaps his most important work—indeed, it would seem to have been one of his most favourite ones—was that on "Select Extra-Tropical Plants," intended as a guide to plants suitable for industrial cultivation in the colony, and of which between 1871 and 1895 no fewer than eight editions were issued. Of works of economic value may also be mentioned a translation, with original notes, which he caused to be published at his own expense, of Wittstein's "Organic Constituents of

Plants," and also reports by Messrs. Hoffman and Rummel on "Chemical Researches on Vegetable Products of Victoria."

In 1887-88 he published the "Iconography of Australian Species of Acacia and Cognate Genera," consisting of 130 plates, with explanatory matter; in 1886 the work on Myoporineæ was commenced, with 72 plates, and in 1890-91 he published the two volumes on Salsolaceous Plants—a work of considerable economic value, and likely to be still more highly valued when Australia is fully alive to the great economic importance of this part of its flora.

In 1885 he commenced to work, at the instigation especially of the late Dr. F. S. Dobson, a former president of this club, on the "Dichotomous Key to the Victorian Flora." The plan was one which was clearly distasteful to him, and though, as with all his other work, he expended upon it a great amount of conscientious labour, it must be frankly admitted that from the point of view for which it was intended it was not a success; indeed, it may be doubted whether a work on such a plan could be satisfactory beyond a certain and very limited degree. The Baron was pre-eminently an investigator, and not a teacher in the ordinary sense of the word, and with his profound knowledge it is not to be wondered at that he found the dichotomous method almost impossible to utilize in the grouping and identification of species.

Amongst other works may be noticed his papers on the Papuan plants of D'Albertis and Macleay, and, in more recent years, on those collected by Sir Wm. Macgregor in New Guinea, and in the New Hebrides by Mr. Campbell. The works of explorers such as Babbage, M'Douall Stuart, Giles, and J. and A. Forrest, and the report of the Elder expedition, contain valuable lists of the flora of various little known parts of the continent.

For years past collectors from all parts of the continent, many subsidized by himself, but many others, fired by his enthusiasm, working gladly to assist him, have supplied him with material, the results of his work being scattered through various publications, more especially those of the Linnean Society of New South Wales, the Victorian, Tasmanian, and South Australian Royal Societies, and the Field Naturalists' Club of Victoria. One of the finds which pleased him most in recent years was that of the only known Australian Rhododendron (*R. Lochæ*), secured by Mr. Sayer on Mount Bellenden-Kerr, in Queensland.

His invaluable "Systematic Census of Australian Plants," the second edition of which was published in 1889, serves to show the extent of his labours, not only in adding to the known flora, but in elucidating the geographical distribution of all Australian species. Right up to the end he was at work; indeed, his last communication—a note on *Boronia floribunda*—was read at the September meeting of the Linnean Society, N.S.W., only ten days before his death.

Outside the domains of botany he was perhaps most interested in geographical exploration, and for many years was an enthusiastic member and officer of the Victorian Branch of the Geographical Society, in which capacity he was intimately associated with many expeditions, such as, in recent times, those of Giles and the still more recent Elder expeditions, whilst his own explorations were of no mean order. His keen and almost pathetic interest in the fate of Leichardt is well known to everyone with whom he came in contact, while during the past few years, his strongest wish in connection with exploration, and in the attempt to realize which he spent much time and energy, has been to see an Antarctic expedition fitted out by the Australasian colonies.

In 1890 he presided over the first meeting of the Australasian Science Association held in Melbourne, and those who listened to his presidential address, and to whom perhaps he was mostly known as a distinguished botanist, could not help being struck with the breadth of his knowledge and the catholicity of his interests.

He was above all things an ardent student and investigator and an indefatigable worker. For outward appearances, and even for what would be to most men the ordinary comforts of life, he cared absolutely nothing. So long as he could do his work he was content, and though by no means physically robust, the amount of work which he got through was something astounding. His correspondence alone would have been work enough for any ordinary man. In this respect he was most punctilious, and his correspondents always knew that their efforts would be appreciated and promptly acknowledged. Only ill-health would prevent the answering of a letter or the acknowledgment of a specimen.

The last meeting which he attended was the September one of our club, and after so many years during which he has been going in and out amongst us it is hard to realize that "the Baron," as he was always called, has really passed away. At times we have smiled at the quaintness of his speech and manner, but behind this there has been the deep respect and admiration for the man who devoted himself with such wholeheartedness to the work which he carried out so well and so faithfully. The whole of his income and all his means were expended either in private generosity or in the furtherance of science work, and he died a poor man.

In recent years the Royal Society of London honoured him with the award of one of their gold medals, and the French Institute elected him a corresponding member, but none of the honours justly given to him made the least difference in the simple and friendly way in which he used to come in and out amongst as, and it will be many years before we grow accustomed to the absence of the once-familiar figure of the Baron.

W. B. S

UNDER EASTERN BAW BAW: A BOTANICAL TRIP IN THE GIPPSLAND MOUNTAINS.

By Henry Thos. Tisdall.

(Read before the Field Naturalists' Club of Victoria, 10th August, 1896.)

During the midwinter holidays, being bent on a botanical expedition, I determined to revisit Walhalla, the golden city of the Gippsland Mountains. It is situated on a small tributary of the River Thomson, within a few miles of their junction. Leaving the Gippsland railway at Moe, a good team of horses set off merrily for the hills. The first few miles are comparatively level, but we soon came to rising ground. The first hills are evidently old sand hummocks where in far distant ages the sea had full dominion, but they are now covered by a sparse supply of various kinds of low eucalypts, a plentiful undergrowth of scrub, interspersed with broad patches of long coarse grass. Amongst the scrub I noticed a great number of dwarf Banksias, the smaller Grass Trees (*Xanthorrhœa minor*) Native Hop (*Daviesia latifolia*), prickly wattle, &c., while the tussocky grass was enlivened by an immense quantity of white and red heaths (*Epacris impressa*).

As the road is of the most primitive description, it took us several hours to reach the changing place on the River Tyers. With fresh horses we made a gallant start, but the road now becomes much more rugged as we ascend the side of the Moondarra plateau. A great change is noticeable in the scenery; the trees are much larger, and great clumps of Hazel (*Pomaderris apetala*), Blanket Tree (*Senecio Bedfordii*), &c., can be seen at both sides of the road. The plateau itself is evidently the remains of an immense stream of lava, which was thrown out by Mount Baw Baw in ancient times, and covered the country eastward as far as Ostler's Creek, the main body flowing west and south towards Warragul. After passing Jacob's Creek, which separates Upper and Lower Moondarra, the road becomes worse and worse, the rich chocolate soil allowing the wheels to churn it into such a mass of mud that it would be almost impassable in parts only for the corduroy, which is a road formed by placing small tree stems across the road quite close to each other. This kind of road, though it prevents the wheels from sinking, has its own particular drawbacks. For the driver always takes advantage of the corduroy and drives so quickly over the uneven surface that, as a passenger remarked, "it was enough to shake one's eye teeth out." The descent into the valley of the River Thomson is very steep, but in time we got safely down, and, as we were now only five miles from Walhalla, we congratulated ourselves on soon making a speedy end to a rather tiresome journey; but, alas, we reckoned without our host, for it came on to rain, and what

between the wet, the steep inclines, the darkness, and, above all, the wretched state of the road, it took us nearly three hours to get over that short distance. Wet, cold, and wretched, we arrived at our destination at last.

However, a warm welcome and a night's rest cheered me so that I was quite ready to commence operations next day. I visited my old haunts, but found that they were of the past. North, south, east, and west I travelled day after day, with very little success. The truth is that mining and botany are incompatible. The mines require firewood and timber, and the ruthless sawyer and wood-splitter has no veneration or respect for the beauties of nature. Magnificent trees, lovely bushes, and fern-covered glades soon disappear; years of such work have destroyed the environs of Walhalla. Fortunately I fell in with Mr. Thomas, the mining surveyor, who told me of a couple of fern-tree gullies northward from Walhalla which were as yet in their primitive state.

I determined to follow his instructions the following day. As the distance was considerable and had to be made on foot it was necessary to make an early start. Slowly and reluctantly I got up at five o'clock the next morning. It was freezing hard, and, after being used to the mild atmosphere of Melbourne, I felt the cold very much. I started shortly before seven and walked smartly northward, first up the valley and then along the road that wound in a very serpentine manner, now around rocky spurs and anon into shady gullies, up the side of the steep hill. Thoroughly warm and rather tired, I sat down on a stump near the top and gazed back over the scene. Nearly 1,000 feet beneath lay the township, but so covered with mist that the valley seemed to be filled by a vast river. Above the rim of the mist numbers of white cottages could be seen perched on the steep hillsides, while the scrub which had taken the place of the huge trees, long since cut down, looked almost black in contrast with the white billowy vapour beneath. The sun was just rising, and although I was still in deep shade the tips of the Black Diamond and neighbouring hills were brightened by its rays. Altogether it was a scene well worthy of the brush of a good artist. From the top of the hill the scenery was even more beautiful. Generally in Gippsland the view is rather circumscribed, in consequence of the height of the timber, but here there was nothing to obstruct the vision.

The hills in the immediate neighbourhood were quite denuded of trees, and the white river of mist which overhung and marked the basin of the River Thomson could be seen winding along for miles under the base of Baw Baw. The mountain itself rose majestically out of the mist, its summit completely covered with snow; lower down the dazzling white was broken here and there by deep valleys, whilst its base was fringed by a margin of dark, tall trees. The road now passes along the top of the ridge, but

it is very uneven—now rising upward, and then descending into deep saddles. The soil must be very rich, judging from the vegetation. Once past the limits of the sawyer and the wood-splitter, some miles north of Walhalla, and the primitive bush is reached. Far overhead stretch the vast limbs of Messmate (*E. obliqua*), Stringybark (*E. capitillata*), Manna Gum (*E. viminalis*), and the spurious Ironbark (*E. Sieberiana*), with its dark, rough stem and beautiful white limbs, which glisten in the sunlight as if they were made of silver. It is a curious fact that the only variety of the Giant Gum (*E. amygdalina*) is a poor scubby tree, called in the district Peppermint—its timber is very inferior even for fire-wood—whereas, in the gullies of the Moondarra Plateau, which is only separated from Walhalla by the River Thomson, I have seen young trees of this species hardly 18 inches through springing up to nearly 180 feet, and I have measured mature specimens having a circumference of nearly 70 feet. The sawyers also assured me that the timber was of excellent quality. The undergrowth consists principally of acacias and other leguminous plants, *Prostanthera lasiantha*, &c. Amongst the acacias I noticed *Acacia linearis*, and one of our very few wattles which bear true leaves—*A. discolor*. I was anxious to obtain some specimens of *Pomaderris elæthophylla*, but was unsuccessful. It is a very pretty shrub, of grey or silvery appearance, with tiny circular leaves, and when in bud is covered with small racemes like miniature bunches of grapes. It used to be very common on this spur.

A few more miles brought me to a steep sidling path which led down to the now celebrated Bonanza mine. This mine is situated in the bottom of a deep gorge, and the gully I had come so far to visit emptied its waters close to the workings. I need hardly mention that it is a new discovery, or my trip would have been in vain. On entering the gully I found a pretty stream babbling over the white pebbles, and winding through a broad valley (that is, broad for this district). The sides of the stream, and indeed the whole valley, was covered with Wattles, Musk (*Aster argophyllus*), Blanket Tree (*Senecio Bedfordii*), Christmas Tree (*Prostanthera lasiantha*), Hazel (*Pomaderris apetala*), &c., and ferns of various kinds. Amongst these can be seen the stems of huge white gums piercing the green canopy and towering far overhead. Where the stream forces its way through a rocky pass I noticed a splendid specimen of *Todea Africana*, its huge bole, about five feet high and fully three feet in diameter, crowned by a magnificent spread of fronds, bending gracefully near their ends. The upper side of the frond is of a shining green. Unfortunately for me they were not in fruit.

As I worked my way upward I found that the gully narrows considerably, the scrub decreases, and the fern trees,

Dicksonia Antarctica, continue to increase. A short distance from the entrance I found a splendid specimen of *Correa Lawrenciana;* it was nearly twenty feet high, and its long narrow branches spread out on all sides. It was in full bloom; there must have been many thousands of blossoms on it, and hundreds had already fallen off; its flowers were light green. Mr. Luehmann informed me that he had seen specimens of this plant of even larger dimensions on the Upper Murray, and sometimes they bore red flowers. But the most noticeable plants in the gully belong to the cryptogams. In some places the ground was completely covered with the coarser variety of *Lomaria Capensis;* in another place *Lomaria discolor* would flourish to the exclusion of everything else. As I ascended the hills closed in, making in places huge banks of clay or rock. The clay portions were generally dotted all over by the curious reddish-yellow lichens, Bæomyces, whilst the steep rocks bore a plentiful crop of mosses, lichens, Jungermanii, and small fungi. The curious moss, *Cyathaphorum pinnata*, was in fruit, and very plentiful; it almost completely covered the lower parts of tree ferns and fallen logs. Creeping plants of Hypnum were to be seen in every direction. Amongst the Jungermanii, Umbraculum and Chiloschyphus were very common. Fungi were very plentiful. I found a quantity of *Polyporus spumeus* growing tier over tier, fastened like a number of reddish shelves on the base of a white gum. Nearly every rotten log had masses of the white, jelly-like *Tremella albida* growing on it, as well as the orange-coloured Dacrymices; the last-named was generally seen peeping out from small cracks in the wood. On a half-decayed hazel I found a quantity of the lovely little blue agaric *Leptonia lampropus*. This fungus is mentioned by Cooke as being only found in pastures; they are, however, very common in the Dandenong Ranges and other places, but I have never noticed them except on trunks of trees. For the second time I found, on the under side of a fallen log, that curious little green fungus *Chlorosplenium æraginosum*. I got it many years ago at Moondarra, but I made sure that it was a lichen, in consequence of its peculiar colour; however, Cooke has placed it as a fungus.

In the crevice of a rock, which was filled with decayed vegetable matter, I discovered a very pretty group of Marasmius. Amongst patches of ferns the white-stemmed, yellow-topped *Agaricus inopus* rose in groups from half-buried rotten logs. The Earth-Star (*Geaster floriformis*), flourished in great quantities, but it was just at the bursting period, so the specimens obtained were very poor. Another Geaster of a different species was also plentiful, but too far gone for collection. At the base of a large gum I found a few plants of the orange-coloured *Tremella mesenterica*, but it also was too old. Many other fungs were also obtained—

mostly Agarics and Polyporei. From a very tall hazel I remarked great festoons of *Tecoma Australis*, but it was not in bloom. In places hundreds of young plants of Clematis were to be seen. A great nmmber of the fern trees were decorated by the trailing rhizomes and bright green leaves of the so-called Victorian Stag Fern, *Polypodium pustulatum*. Wherever the trunk of a tree fern was somewhat out of the perpendicular—particularly if it bent towards the south—the under side was sure to have masses of long, delicate, filmy ferns (*H. nitens* or *H. Javanicum*) depending from it. I was very anxious to get some young plants of *Grevillea miqueliana*, but was unsuccessful in my search. Nearing the source of the gully the scrub became more and more sparse, until at length ferns and their congeners became the sole occupiers of the valley.

As I had now spent about four hours in the gully, and as the vegetation was getting very thick and awkward to pass, I determined to climb the face of the hill, and found myself after nearly an hour's hard work on the Mt. Useful road, about nine miles north of Walhalla. The beautiful scenery of Eastern Baw Baw and the valleys of the Thomson and Aberfeldy rivers were spread out before me, but I was too tired to admire them, and turned my steps towards the town, where I arrived safely about 5 o'clock, having spent a pretty hard but very interesting and profitable ten hours.

NOTES ON THE MODE OF WOOD PETRIFACTION.

By James H. Wright.

(Communicated by T. S. Hall.)

(Read before Field Naturalists' Club of Victoria, 14th September, 1896.)

On breaking up some quartzite rocks recently I obtained a specimen of petrified wood in a form rarely met with. As this fossil appears to throw some light upon the manner in which the petrifaction of wood is accomplished, I think it merits a description.

When found, the fossil was enclosed in a block of ferruginous quartzite, of an age anterior to that of the Older Volcanic rocks of South Gippsland. The fossil presented the appearance of a portion of the stem or branch of a plant. It was about six inches in length, with a diameter of about half an inch. It looked fairly compact in structure, but when disturbed was found to consist of loose silicious fibres. On submitting these to a microscopic examination they were seen to be silicious casts of the tracheides of a woody tissue.

In these casts the interior of the tracheides has been faithfully portrayed down to the minutest detail, the exact obverse of the bordered pits appearing as disc-like protuberances upon the

surface of the silicious threads. In many instances it is apparent that the cellulose partition separating the opposite pairs of pits was ruptured before silicification took place. The cast on the surface of the thread then appears as that of a double pit, the breakage occurring at the neck, which formed the point of juncture between the pit cast and the fibre opposite to that to which the cast remains attached. A group of fibres, whose relative position has not been disturbed, shows round each thread an open space, corresponding to the walls of the tracheides, and portions of the remains of these walls still adhere to the thread in places.

It is evident from the fibrous condition of the fossil that the process of petrifaction was interrupted prior to the decomposition of the walls of the tracheides. When that stage was reached at which the open vessels had been filled the specimen was evidently buried under the accumulation of silt and gravel, which afterwards formed the rock in which it was found. Subsequent decay removed the organic material of the cell walls, and left the silicious fibres separate and distinct. But it is clear that had the fossil been subjected to similar petrifactive influences after the disappearance of the cell walls, further silicification would have taken place, filling up the spaces formerly occupied by the walls, and converting the fibrous condition of the body into a dense and stony one.

The question arises as to whether this specimen does not represent the initial stage of a process to which all wood that has undergone petrifaction has been subjected. The theory sometimes met with, that in these cases the organic material has been removed atom by atom and replaced by a mineral, has always appeared to me to be inadequate to account for the phenomena. It seems to be more reasonable to suppose that a cast is first taken of the open vessels, and solidity arrived at by the filling in of the interspaces when decomposition of the vegetable matter renders this possible. This explanation will account for that close resemblance to a woody structure that is frequently to be seen in dense stony masses, wherein are represented more or less distinctly the outlines of the ligneous fibres. It will also account for those cases where the solid condition merges into a fibrous one; for it is easy to conceive that the extremities of a specimen which had reached the first stage might be so completely solidified to a certain depth, through partial decomposition of the retained woody matter, that the ends might be effectively sealed up, and the interior fibres protected from further petrifactive action.

NOTES ON AN ENTOMOGENOUS FUNGUS.

These notes refer to the life-history of a small parasitic fungus of possibly considerable economic value, since it attacks the larvæ of *Agrotis infusa*, *A. breviuscula*, *A. munda*, and several allied species, all of them mischievous at all times, and in years of abnormal increase causing the almost complete destruction of cereal crops and grasses, English barley and various fodder grasses being most liable to attack.

They will strip a grass paddock, eating all before them, but in a barley field their attention is directed more especially to a small part of the stalk just below the ear, so that one or two grubs can quickly cut off all the grain-bearing portions of the plant, leaving the almost worthless leaves and stalk untouched.

The fungus makes its appearance amongst these larvæ from June to January, but seems to be more common in June and July than later on in the summer months. It appears to be closely related to the fungus *Empusa muscæ* found on the house-fly.

When a grub is attacked, it usually climbs to near the top of a tall head of grass, and remains there after death, firmly held on by its feet. For some hours the larva is exteriorly unaltered, though on closer inspection a minute white tuft or two may be occasionally seen on the under surface of the thorax. After exposure for a day two in the open air nothing but the dried shrunken skin will be found, empty and brittle, still firmly adherent to the grass stem, and looking like a piece of very narrow black ribbon about an inch long.

In order to observe the intermediate stages the insect when just dead should be kept in a moist atmosphere, supported over a piece of glass to secure the spores. Under these conditions about fifteen hours will suffice for a complete change in the insect's appearance. Its rotund body will have shrunken considerably, and will be covered with a dense mass of fawn-coloured material consisting of short cells from 9 to 15 μ. in diameter, containing rounded globules. The glass for a distance of about a quarter of an inch on each side of the insect will be found thickly covered with spores, smooth, hyaline, pear-shaped to oval, averaging 25 x 15 μ. They preserve their shape and size even when dry mounted for many months.

As an instance of the economic value of this parasite, I may mention that in a paddock near Windsor, in the year 1893, the moths previously mentioned were unusually numerous, and the number of larvæ during the next season was also far in excess of anything previously noted, but were so thoroughly kept in check by the fungus that scarcely any moths could be found next year.

I have records of the occurrence of this fungus on these larvæ at Ararat, Ballarat, Beech Forest, Melbourne, Millbrook, and Woodend.—W. H. F. Hill, Windsor.

NOTE.—ST. HELENA.—As showing the changes which may take place in the flora of a district within a few years, the following extract from an article entitled "Some Curious Facts in Plant Distribution," by W. B. Hemsley, F.R.S., in *Knowledge* for September last, may be of interest. He says:—"I will now take the reader to the historically interesting island of St. Helena, in the Atlantic; a rugged, rocky island, rising nearly 3,000 feet above the sea, and having an area of 28,000 acres. Its isolation is extreme, being upwards of 1,000 miles from the coast of Africa, and nearly 2,000 miles from the nearest point of the American continent. When first discovered it was entirely clothed with forests, but no mammals of any kind inhabited the island. As was customary in those days, hogs and goats were introduced, in order to provide food for chance visitors in the future. The goats especially multiplied to such an extent that they destroyed the vegetation, or at least prevented seedlings from growing up and replacing that removed by decay or felling. The aboriginal vegetation consisted almost entirely of woody plants and ferns, the bulk of the former belonging to the great family *Compositæ*, of which the daisies and asters are familiar examples. It was not until the beginning of the present century that the island was thoroughly botanized, and it is possible that some of the native plants had already disappeared; at all events, many were already very rare. In 1875 an exhaustive account was published of the condition of the then almost entirely displaced native plants, as well as of the plants that had replaced them. At that date less than half a dozen of the sixty-five certainly indigenous species of flowering plants and ferns collected in the island at the beginning of the century were actually extinct; yet, with the exception of a few scattered individuals, the only remnant of the former flora was high up in the central ridge of mountains and in inaccessible parts of the island. Trees that once covered hundreds of acres were reduced to a few individuals; some to a single example. Large areas once covered with vegetation are now bare, in consequence of the rains having washed the soil from the rocks. In other parts the ground has been completely taken possession of by introduced plants from various parts of the world, prominent amongst which are many British species. Our common furze is now the most abundant shrub in the island, affording employment to many natives, who cut it and take it into the town to be used as fuel. Among trees the British oak is one of the most thoroughly naturalized, growing to a great size and producing acorns in profusion; and the Scotch fir and allied species had been planted to the extent of two hundred acres in 1875. Thus has nearly the whole surface of the island been completely altered; and soon, doubtless, most of the original plants of the island will be extinct, for they exist nowhere else in a wild state, and those in cultivation are difficult to preserve."

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FIELD NATURALISTS' CLUB OF VICTORIA.

THE ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 16th November, 1896. Mr. J. Shepherd, one of the vice-presidents, occupied the chair, and some forty members and visitors were present.

THE LATE BARON VON MUELLER.

Before proceeding with the ordinary business of the evening, Mr. D. Best, as one of the founders of the Club, asked to be allowed to say a few words in reference to the very great loss the Club had sustained in the death, on the 10th of October last, of Baron Sir F. von Mueller, at the age of 71, one of the original members of the Club, and one whose help was always freely given to any of the members, especially to those requiring information on botanical matters. He moved—"That this Club desires to have recorded on its minutes its many obligations to, and sincere regret at the loss of, Baron Ferdinand von Mueller, K.C.M.G., Government Botanist, one of its oldest members, and for some years its active and honoured patron; and it further desires that a letter of condolence, with a copy of this resolution, be sent to Mrs. Wehl, of Millicent, South Australia, as his sole surviving sister, and only close relation."

The resolution was seconded by Mr. C. Frost, F.L.S., who endorsed all that Mr. Best had said, and suggested that on the occasion of the next exhibition of wild flowers floral wreaths should be exhibited, to be afterwards placed on Baron von Mueller's grave. Messrs. Luehmann, Barnard, Fielder, and the chairman also spoke in kindly remembrance of the late Baron. The resolution was then put and agreed to in silence, all standing.

CORRESPONDENCE.

The president of the Natural History Society, Brisbane, wrote conveying resolutions adopted by that society with reference to a memorial to the late Baron von Mueller. The matter was referred to the committee for report.

EXCURSION REPORTS.

Reports of recent Club excursions to Mitcham, Sandringham, Ringwood, Dandenong Ranges, and Berwick were furnished by the respective leaders—Messrs. G. Coghill, C. French, jun. (two),

C. Frost, F.L.S., and C. French, F.L.S.—who reported interesting outings, but, as a rule, owing to the extreme dryness of the spring, a great scarcity of noteworthy specimens.

The chairman reported that a practical meeting had been held on 26th October, when Mr. W. Stickland gave a demonstration on "Desmids, their Study and Classification," which proved most instructive to those present.

ELECTION OF MEMBERS.

On a ballot being taken, Miss A. Bell and Dr. C. Ryan were duly elected members of the Club.

PAPERS READ.

1. By Mr. T. S. Hall, M.A., entitled "On Some Recent Work on the Tertiary Rocks near Melbourne."

The author gave a brief historical account of the work that had been done on the Tertiary rocks near Melbourne, and said that Dr. Selwyn's early work in 1854 laid the sure foundations on which his successors had built; he had correctly indicated the sequence of the various beds, and for a part of the area his map is the only one, on a large scale, that we possess. Mention was also made of Aplin and Norman Taylor, Selwyn's earliest assistants. The palæontological work of Sir Frederick M'Coy, and of Professor Tate and others, was touched upon, and the corrections made to the geological maps by Brough Smyth were alluded to.

The geological structure of the metropolitan area, as recently described before the Royal Society of Victoria by Messrs. Hall and Pritchard, was rapidly sketched; and evidence was given for supposing that granite exists over a wide area in the district under the tertiary cover. Counting this granite, which is nowhere exposed, the following sets of rocks occur within ten miles of Melbourne:—1. Estuary beds and raised beaches. 2. Upper volcanic. 3. Marine and freshwater miocene. 4. Marine eocene. 5. Older volcanic. 6. Lower leaf-beds and brown coals. 7. Upper silurian. 8. Granite.

The quarter sheets of the Geological Survey, sections and sketches, were exhibited in illustration of the remarks.

Mr. G. Sweet, F.G.S., questioned the correctness of the conclusions arrived at by Mr. Hall, especially with reference to the sections exposed on the Moonee Ponds Creek, between Ascot Vale and Brunswick.

Mr. J. G. Luehmann, F.L.S., Acting Curator of the Melbourne Herbarium, read the first of a series of articles, entitled "Reliquiæ Muellerianæ: Descriptions of New Australian Plants in the Melbourne Herbarium," in which he described a new Acacia, *A. Tysoni*, from the Upper Murchison River, Western Australia.

NATURAL HISTORY NOTES.

Rev. W. Fielder gave some further particulars with reference to the life-history of the Fluke embryo, which he had noted as remaining in snails in the same stage for more than six months.

EXHIBITS.

By Mr. C. French, F.L.S.—*Amblyornis Macgregori*, n. sp. (male), Macgregor's Bower Bird from New Guinea; *Chlamydodera Orientalis* (female), Large Bower Bird from N. Queensland; also, a snake, *Furina bicucullata*, Two-hooded Furina, from the Mallee, Victoria. By Mr. C. Frost, F.L.S.—Plants from the Wimmera, forwarded by Mr. F. Reader, *Eremophila gibbosifolia* and *Goodenia amplexus*, new for N.W. Victoria; also, *Spergularia media* (introduced). By Mr. J. Gabriel—Nest of White-backed Crow-Shrike, *Gymnorhina leuconota*, partly built of wire, and taken off a stone-wall at Werribee. By Mr. J. G. Luehmann, F.L.S.—*Acacia Tysoni* (n. sp.), from Upper Murchison River, W.A.; *Boronia alata*, Sol., from Endeavour River, Queensland (Persieh); and *B. subsessilis*, Bentham, from near Lake Lefroy, W.A. (J. D. Batt). By Mr. C. M. Maplestone.—Orchids, *Pterostylis curta* (with two flowers on stem), *P. mutica*, and *P. rufa*, from Eltham.

After the usual conversazione the meeting terminated.

BOX HILL BIRDS IN JULY, 1896.

By Robert Hall.

(Read before the Field Naturalists' Club of Victoria, 10th August, 1896.)

While on the weekly rambles, which are so beneficial to one's health, during last month I had occasion to notice that spring signs are early this year, and have been noticeable on many sides. Nature favoured the botanist with its tiny grass-lily (*Wurmbea dioica*) as early as 5th of July, at the quiet, though once prominent, watering place, Altona, and I daresay our botanists could tell us of similar early finds elsewhere.

That beautiful creature of the air, the Welcome Swallow (*Hirundo neoxena*), was again content, on account of a second moderately mild season, to remain with us, although the rainfall and low temperature of last month must have been rather pronounced for it.

In March last the birds assembled in hundreds in Elizabeth-street, City, and I was inclined to conclude one contingent was preparing to make a journey. These birds settled on the projecting mouldings of the third floor of a five-storied building, each uttering a single note, which collectively constituted a din of weak voices. In this month there are three features observable

about these birds. Firstly, that they are combative. One pair for several minutes fought while on the wing ; having ascended to a high altitude a downward chase followed, when they appeared as comet-like objects floating rapidly through the air, chattering all the time. Secondly, that the male is a vocalist with a considerable amount of ability, for if the sun be shining, as you know it often enough does at this time in this bright country of ours, a strain of music continuous for minutes is produced while it rests upon a post or other suitable object. As it now wishes to choose a partner for next month it must needs be busy with the duty of the season. Thirdly, that owing to the amount of moisture regularly falling upon the ground they find part of their sustenance there. As they "float" above the short grass the little body assumes an ovate form, and the tail feathers become lowered. The short legs prohibit them from standing anywhere other than on a flat surface, and it is not unusual to have them pleasantly rise from the asphalt path as you approach. Swallows gather moths and other insects from the grass as they rise, noiselessly hovering within a few inches, and at times appearing motionless.

On the 3rd of the month I was interested in watching fourteen swallows skimming the surface of the local reservoir. This was at 4.45 p.m., and soon the active flock became twenty-three, after which the number quickly reached seventy. The arrivals all came from the south, and still continued until the number totalled about two hundred in thirty minutes from the arrival of the first group. They arrived in companies of from twelve to eighteen. The sun was brightly setting and the weather mild. The scene above the artificial lake was truly a pretty one, with the distant birds of apparently small proportions and light colour, while those in the foreground were large and dark, all gliding in a circular form until one almost imagined the whole scene was in revolution. The flock left at 5.30 p.m., as the light faded, and all occurred as in an instant, and I was left to contemplate, with only a faint idea that they had moved northwards to their usual roosting-place in a group of timber.

The cuckoos as a whole did not leave our shores, and I am inclined to consider this as a sign that we have had a mild autumn and winter. I heard and saw either the Bronze or Narrow-billed Bronze Cuckoo on the 2nd July at Altona, while the first egg of the former was observed in this district on the 22nd in a nest of *Acanthiza pyrrhopygia*, one of the many species of the foster parents of this group. That this Acanthiza should thus early lay its eggs and be so quickly accommodated with a stranger's egg shows further the dependency of the latter and watchfulness bestowed by it. The Acanthiza having changed its month for egg-laying, the cuckoo follows suit. The cuckoo is not yet heard

as it will be when the main body arrives, and when pairing generally sets in. The question arises, What advantage will this cuckoo derive from having remained upon the mainland throughout the winter, and its early laying?

The approach of spring has already affected the Magpie, *Gymnorhina tibicen*, as it has shown a haste in erecting its nest, and one was complete on the 26th June, while that of a second pair was noted on the 23rd July.

The Little Brown Acanthiza, *A. pusilla*, thought it could unobserved, on the 19th, complete its dome structure, and in most cases it could have done so, but in this particular one either it or I had entered upon a domain that we each knew something about, for it has been for years back the resort of my pleasant Sunday afternoons. This nest is therefore under the direct control of the builders, as far as the writer is concerned.

For seasons previous to this one the Magpie Lark, *Grallina picata*, has visited us only in pairs, and then few and far between. They came just before the Wood Swallows retired, and what the latter left the former have been attentive to, preferring those kinds of creeping things that are found in damp places. This so-called Mud Lark is greatly the life of the place, its "pe-wit" always announcing its approach when on the wing. The charm of the bird is best exhibited when gracefully walking by the green banks of the creeks or shallow ponds, but the "faery" form peculiar to it is lost as the gentle creature leaves the earth for higher fields, when its flap and heavy flight are totally different to what one would expect from its manners upon the moist ground, where its black and white plumage affords a most agreeable contrast.

"Blue Bonnets," which you may know better as Superb Warblers or Blue Wrens, *Malurus cyaneus*, are now becoming true to their colours, for on the 18th and 21st I secured three skins of males completing their change, and nearly metamorphosed as far as the feathers are concerned. All that is required is the final burst of blue, which lies in "buds" carefully hidden beneath the earlier matured feathers. This is earlier than in the past three years, according to my limited notes.

Exhibited upon the table this evening are some dozen skins of birds, procured during several seasons, which show the progress of their spring dress. The specimen showing earliest signs was obtained on the 31st, having a blue tail, a few blue coverts about the spurious wing, and a single blue feather at the anterior end of the forehead. Beneath the regular layer of grey feathers in the lumbar region is one of glossy blue-black, quite ready to serve their purpose as soon as the sombre tier above will moult. A second example shows the same characters, but with additional frontal blues. A third has a few blue plumes in addition on the

usual lateral positions on the head. Other specimens show irregular blues in the regions set apart for the full growth of this distinguishing mark in the one sex. There are fully developed and young males abroad now without any reserve.

The imported Starling is a gregarious bird, which has of its own free will lately introduced itself to this district. Slowly, but surely, has it wended its way through Hawthorn from the city, and taken up its lodgings amongst those houses convenient to fields worth while living near. In many respects this sturdy invader is kin to the Minah, and it is only a matter of time when its connection with the *Game Act* will need further consideration. This species assembles in flocks of from fifty to a hundred in number, with a *sentry* posted on a tree top for the welfare of the community.

We have just had two days set apart in order to the complete overthrow of the Sparrow, and this is the memorable event of the month to them. On the first Saturday phosphorized wheat was distributed, which greatly shocked this wily finch, but, like the proverbial cat, it came out of the action unharmed. The following Saturday, however, strychnined grain showed a disastrous result. I caged one little bird that had dined on the phosphorized wheat at 12.30, and by 5.30, with only an hour of spasms, it flew away quite briskly. Sparrows have had many champions of their cause, and we know them to be friendly with city people, but there is an ever returning tale of woe if the name is mentioned beyond the populated centres.

Very strange, I take it to be, was it to see two occupied nests in May of this year, but these are not the only birds that have been erratic in the winter of 1896, for a Welcome Swallow was building on the 20th April, and Mr. C. French, jun., has told me of a nest of the *Geobasileus chryssorhœa* placed in the Botanical Gardens, containing young, as early (or as late) as the first week of June.

Our largest stranger is the Grey Crow-Shrike, *Strepera cuneicaudacuta*, which has been with us in twos or threes since the latter part of summer, but not so near the city on the eastern side for years. Insect food is found below the excreta of cattle, and within or beneath the bark of our larger trees.

The Collared Sparrowhawk, *Accipiter cirrhocephalus* (Vieill.), and the unmatured form of the Australian Goshawk, *Astur approximans*, V. and H., a young friend secured for me in the early part of the month, so that they are still in the locality. A neighbour jokingly compared the flight of the former bird to lightning when it is acting well. Certainly its flight is exceedingly rapid amongst the foliage of the timber, and the amazing rate of flight is well known to the small birds, whom nature has taught to immediately seek the higher atmosphere and broader field for protection if they are pursued while upon the wing. When the

chase begins the sparrow or other lesser bird will work upward as quickly as possible, using all its agility to "dodge," when the hawk frequently resumes its previous course in search of other food not so wary. All my specimens were obtained while hovering above the poultry yard, which shows that they were partial to game.

Unless quite familiar with the stages of both species there is sometimes a shade of difficulty in consigning them to their exact positions. Two characters are very definite. According to Sharpe *Accipiter cirrhocephalus* has the middle toe without claw more than twice the length of the culmen, while *Astur approximans* has the same toe one and one-half times the length of the culmen, and on Dr. Ramsay's authority length of tail, *Accipiter cirrhocephalus*, is 7½ inches, while length of tail, *Astur approximans*, is male 10 inches, female 8½ inches.

The first of the month brought me a female specimen of the Striated Reed Lark, *Calamanthus fuliginosus*, which is unusual for Box Hill. This is the only case in which, to my knowledge, the district has produced this species, and the credit lies with my spaniel, who is ever faithful in procuring birds of this nature. The odour of the bird caused the dog to set it, when it was taken alive; it was then caged, only, however, to die by the morning. If at any time a member would care to study the habits of this bird he may successfully do so west of the mouth of the Kororoit Creek, Williamstown, where they are very plentiful.

GEOLOGICAL NOTES ON THE TOOMBULLUP GOLDFIELD AND ADJACENT COUNTRY.

By A. E. Kitson.

(*Read before Field Naturalists' Club of Victoria, 14th September*, 1896.)

The tract of country embracing the above goldfield lies near the centre of the county of Delatite, in the North-Eastern District, about 40 miles south-east of Benalla. It consists for the greater part of an undulating plateau, chiefly of quartz porphyry, with an average elevation of about 2,000 feet; is bounded on the west by Holland's branch of the Broken River, and on the east by the Fifteen-Mile Creek. Several minor streams, such as Middle, Ryan's, Watchbox, and Sam's Creeks run through it in a northerly direction, the first into the Fifteen-Mile, and the others ultimately into Holland's River. In its lower portion, where it has a westerly course through wide alluvial flats, Ryan's Creek forms the boundary between the trappean area and a belt of indurated silurian rocks, consisting of black and light-coloured slates and sandstones, some of them metamorphosed into lydianite, hornstone, and quartzite by intrusions of granite and porphyry, evidently a northerly continuation of the Toom-

bullup rocks along the divide between Ryan's and Fifteen-Mile Creeks. It is along this ridge that the Benalla to Middle Creek track runs. Ryan's Creek debouches into the flats from a narrow gorge over a series of small falls, which allow the character of the rock to be distinctly seen as a flesh-coloured, reddish-yellow, and greenish-grey quartz porphyry. The first two varieties decompose into a light yellow and white clay, and the last to a distinct brick red, which forms the rich soil of this district. In the darker varieties especially the alteration of the felspar may be clearly noticed, and extends for about a quarter of an inch from the surface. Dispersed through the lighter varieties are small patches of the common (iron-alumina) garnet. These probably exist in the others also, which contain besides small crystals of biotite and radiating clusters of black tourmaline. An interesting feature of all the rock is the peculiar semi-crystallized character of the quartz, many of the pieces terminating in well-defined hexagonal pyramids. For some distance along the divide the rocks are of a markedly fragmental character. The fragments are dark-coloured and embedded in a matrix of fine-grained dark grey and white felspar porphyry. In other places again, as at Puzzle Gully, it may be called a grey granite, since there is a considerable quantity of biotite present, mostly in small crystals. The felspar here is very glassy, and until considerably weathered is not easily distinguished from the quartz.

The auriferous deposits being worked to any extent are at Puzzle Gully, Webb's and Middle Creeks. The former place is an exceedingly interesting one, and embraces a length of some three-quarters of a mile. On the gentle slope from the south into Dogwood Creek, a tributary of Ryan's, there is an extensive series of shafts from 5 to 16 feet deep, following numerous small "leads" varying from 6 inches to 2 feet thick. The general trend of these "leads" is in a north-easterly direction. They contain fairly water-worn pebbles of quartz and the local rock, with occasional large boulders of the latter. Overlying this is a deposit of red loam from 8 to 12 feet thick, with decomposing fragments of the surrounding rocks and also small angular pieces of quartz. The "washdirt," chiefly of quartz fragments and red clay, averages only a few inches in thickness, and lies on a pipe-clay bottom. The gold is coarse, shotty, and little worn, and the whole deposit indicates a very small amount of transportation. While examining one of the shafts, a two and a half pennyweight piece was picked out of the wash and handed up for inspection. It was found on the lower side of a large boulder. Across the creek, on a small rise on the northern slope, are great quantities of gravels almost wholly made up of quartz pebbles, and lying at an elevation little lower than the highest portions of the plateau. This area is held by a co-operative party, who have driven a

tunnel into the hill for 800 feet along the pipeclay "bottom," and have sunk two shafts, one of which was "bottomed" at 95 feet. No opportunity was afforded to get down either shaft, but it appears that in sinking they passed through a surface covering of several feet of red clay, then from 50 to 80 feet of quartz gravels and bands of clay. Some of these gravels are loose, while others consist of a ferruginous conglomerate difficult to work in. Both are stated to be auriferous, and differ from those on the other side by containing gem stones also, such as sapphires, zircons, and topazes. The mining appliances are very simple. All the hauling is done by the windlass, and most of the washing by the dish, though there is a public puddler erected on the creek, which will no doubt be utilized should the tunnel mine be opened up and "blocking out" commenced. The drawback on these workings is the scarcity of water, as the creek is only a small one. The ground is dry, and on the south slope easily worked till approaching the present level of the creek, when it naturally becomes more or less wet. The striking feature of this gully is the remarkable contrast between the deposits on each side of the creek. It is very probable that the miners on the south side are working on a "false bottom," and deeper sinking may disclose the existence of underlying gravels similar to those on the north. This would explain the apparently peculiar geological features of the gully.

Three miles from here, in a direct line east, lie the Webb's Creek workings. They differ greatly from those at Puzzle Gully. The lead is single and well defined, following approximately the course of the present stream, and consequently, owing to the water, mining operations are carried on at a greater disadvantage. Altogether the "lead" has been worked for a distance of about a quarter of a mile. It is from 2 inches to 2 feet thick, consisting principally of pebbles of quartz, granite, quartz porphyry, and schorl rock, overlain by from 5 to 10 feet of stiff bluish white and grey clay, with numerous rounded and sub-angular pieces of these rocks distributed through it. Many of these pebbles are very interesting. At first sight they appear much like a conglomerate, but on close examination are seen to consist almost exclusively of schorl and quartz. The pebbly appearance is due to patches of silica, either absolutely pure or mixed with small crystals of schorl, which impart to it a grey colour. The silica occurs in various states—sometimes as a white powder; again, in the usual hexagonal prisms with pyramids; but more frequently semi-crystallized. The schorl is in hexagonal prisms, chiefly single, but sometimes arranged in radiating clusters. They are thin, and range up to three-quarter inch in length. Other pebbles, again, are almost wholly composed of powdery quartz, with cavities lined with perfectly sharp-edged and colour-

less crystals of the same mineral. The "wash" contains various kinds of gem stones, such as corundum (with its varieties, sapphire and Oriental emerald), topaz, zircon (with its varieties, hyacinth and jargon), besides pleonaste, schorl, rock crystal, and menaccanite. Many of the gems show the crystalline faces distinctly. Among these is a perfect octahedron of pleonaste and a sapphire in the form of a double hexagonal pyramid, broken towards the apices. Many of the sapphires and red zircons (hyacinths) are of good colour, free from flaws, and weigh up to 2½ carats. The Oriental emeralds are in much larger pieces, some of them weighing 5 carats, and are of a light green colour, but a good deal flawed. Even since cutting the gems reduces them by about 75 per cent., it will be seen that there is a commercial value attached to the stones found here. The miners, however, are too busily engaged in getting the gold, and utterly neglect the gems.

The gold in this creek is very fine and scaly, quite unlike that at Puzzle Gully; in fact, some of it is so light as to float away with even a moderate "head" of water. This renders it necessary to use mercury as an amalgamating agent when finally "cleaning up." The method of mining, with one exception, which is by a tunnel, is the "paddock" system, with puddling and box sluicing. Owing to the tenacious character of the clay, derived from the decomposed felspar, which has percolated from above, the washdirt has to be thoroughly puddled and the larger stones carefully cleaned before being put through the boxes, which are longer than usual on account of the extreme lightness of the gold. Only the washdirt is sluiced, the overlying clay being simply thrown to one side. The workings are in a rather oval-shaped, shallow basin, and the sinking gets deeper towards the head of the creek, as far as has yet been proved. The claims at this end are so much troubled with water that in the richest one operations had been suspended owing to want of suitable baling appliances.

The workings on Middle Creek, about half a mile still further to the east, are of the same nature.

Apart from these three creeks very little work has been done in any of the others, excepting Stringybark Creek, where a few miners are still working. It need hardly be doubted that careful prospecting towards the head of many of the streams as yet untried would reveal the presence of other "leads," and more discoveries may confidently be looked forward to if the area is given anything like a fair trial. At the present time the field supports upwards of 120 miners, some of whom are making fair wages and a few doing well. It is computed that altogether about 3,000 ozs. of gold have been obtained.

A few remarks may be made as to the probable origin of the gold. Throughout the whole area are found numerous veins and

small reefs of vitreous and opaque quartz. One reef in particular, about 3 feet wide, outcrops near the source of Cherry-tree Creek. It has a north-west strike, and consists of white, opaque, cellular, and partly ferruginous quartz. Several pieces were cursorily examined, but no gold found. Again, at Webb's Creek a large lump of ferruginous and highly cavernous quartz was noticed, the crystals in the cavities having a silicious coating. It was not at all worn, and evidently came from some reef near.

The origin of the gold is a question of great interest. Whether it has been derived from the reefs running through the main rock masses, from reefs associated with diorite dykes, or been transported from the higher lands at the heads of the main streams, can only be settled by further extended and close observation. Though the scaly character of the gold in Webb's Creek appears to point towards a granitic matrix, still, as reefs of the nature of those noticed have usually proved to be barren, it is not likely that they are the matrices. The character and association of the gold in the southern portion of Puzzle Gully favours the second theory, since the material does not show indication of much attrition. As regards the mass of quartz gravels on the northern side of that gully and the presence of the more valuable gems in Webb's and Middle Creek workings the weight of evidence seems to point to a distant origin. As similar gem stones are found in various parts of the colony and appear to be traceable to older basaltic matrices as mentioned by Mr. (now Professor) Ulrich in his "Contributions to the Mineralogy of Victoria," it is probable that an outlier of this rock exists somewhere nearer the source of the streams.

RELIQUIÆ MUELLERIANÆ:

DESCRIPTIONS OF NEW AUSTRALIAN PLANTS IN THE MELBOURNE HERBARIUM.

By J. G. LUEHMANN, F.L.S., Acting Curator.

(*Read before the Field Naturalists' Club of Victoria, 16th Nov.*, 1896.)

OWING principally to the indefatigable energy of the late lamented Baron von Mueller, the flora of Australia in its main features has become known even from the remotest parts. Only very rarely is a new species now discovered among phanerogamous plants, although a good deal remains to be done to elucidate the variability of species, to complete the description of imperfectly understood plants and to further trace their geographic range. The vast Melbourne herbarium that our late patron brought together contains some still undetermined forms, which among his multifarious duties he could not find time to work up, and I propose to undertake their investigation, and publish the results from time to time in the *Victorian Naturalist.*

This evening I beg to submit a new species of Acacia from the

Upper Murchison River, Western Australia, where it was collected by Mr. Isaac Tyson.

Acacia Tysoni, Luehmann (section, uninerves brevifoliæ).

Branchlets nearly terete, densely tomentose; phyllodia oblong, slightly oblique, with a small hooked point, narrowed at the base, about 1 inch long, 3 to 4 lines broad, ashy-grey, covered with a fine silky pubescence, one-nerved with thickened margins, the lateral veins concealed, without marginal glands. Peduncles solitary, fully as long as the phyllodia, bearing each a globular head of 10 or 12 rather large flowers, mostly 5-merous. Calyx turbinate, glabrous, about one-third as long as the corolla; petals smooth, connate to above the middle. Pod straight, hard, and woody, very turgid (broken, so that the length cannot be stated), about 3 lines broad over the seeds, much contracted between them. Seed nearly 3 lines long, 2 lines broad and almost as thick, but laterally compressed, the funicle short, not folded, thickened into a fleshy aril.

Nearest to *A. Meissneri* and its allies.

On limestone soil in the vicinity of Mount Narryer, Upper Murchison River, Western Australia; Isaac Tyson.

The Extinct Phillip Island Parrot.—A correspondent in the *Zoologist* states that a hitherto unrecorded specimen of the Phillip Island Parrot *(Nestor productus)* has been found in a collection of birds belonging to the city of Birmingham, now kept in the Museum at Aston Hall. As there are only about a dozen specimens of this now extinct bird in existence, any museum possessing one may be considered fortunate. These Nestor Parrots of which the Kaka (*N. meridionalis*) and the Kea *(N. notabilis)* still survive in the unsettled districts of New Zealand, show a considerable resemblance in several points to the birds of prey, and are probably survivals of a primeval race of parrots that existed before the two families had so widely diverged as at present from some common ancestor. A figure of the *Nestor productus* is given by Prof. Newton in his article on birds in the *Encyclopædia Britannica* (9th edition), page 735, where he remarks:—"The last known living specimen, according to information supplied to me by Mr. Gould, was seen by that gentleman in a cage in London about the year 1851." [The Phillip Island after which this bird is named is a small islet near Norfolk Island. Is there a specimen of this parrot in any Australian Museum?—Ed. *Victorian Naturalist.*]

We are pleased to learn that Mr. J. G. Luehmann, F.L.S., who was for nearly thirty years associated with the late Baron von Mueller in the Government Botanist's Department as his principal assistant, has been appointed Curator of the Melbourne Herbarium.

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FIELD NATURALISTS' CLUB OF VICTORIA.

THE ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 14th December, 1896. One of the vice-presidents, Mr. J. Shephard, occupied the chair, and some fifty members were present.

REPORTS.

A report of the Club excursion to Ringwood, on Saturday, 21st November, was read by the leader, Mr. F. G. A. Barnard, who mentioned that a fair collection of beetles had been made, some 12 species of Buprestidæ and about 8 species of Longicorns, including *Hesthesis singulata* and *H. plorata*, being obtained.

Mr. J. Shephard gave a report of the excursion to Heidelberg on Saturday, 12th December, when amongst the specimens collected was a Rotifer which will probably prove to be a new species.

ELECTION OF MEMBERS.

On a ballot being taken Mr. C. F. Belcher, Signor Bragato, Mr. J. C. Neil, Mr. E. Rutter, Mr. J. H. Rutter, and Mr. T. Scott were duly elected members of the Club.

GENERAL BUSINESS.

The chairman drew attention to a framed photograph of the late Baron von Mueller which had been presented to the Club by Mr. C. Frost, F.L.S., and on the motion of Mr. D. Best, seconded by Mr. H. T. Tisdall, a vote of thanks was accorded to Mr. Frost for his valuable gift.

PAPERS.

1. By Mr. R. Hall, entitled "Notes on the Plumage of Robins." The author recorded his observations on the plumage of the Flame-breasted and Scarlet-breasted Robins, giving it as his opinion that these robins do not attain their full plumage for at least two or three years.

In the discussion which took place Mr. A. Coles said he agreed with Mr. Hall's observations.

2. By Mr. O. A. Sayce, entitled "Karyokinetic Cell Divisions, with Examples of Various Stages." The author briefly explained the structure of the cell, pointing out the importance of the

nucleus, and said that there were only three known methods of nuclear division :—1. Direct nuclear division. 2. Endogenous nuclear division (Hertwig); and 3 (which is by far the commonest in animal and vegetable life, viz., Karyokinesis. This was explained in detail, and methods for microscopical demonstration explained, as also suitable material for examination. At the close of the evening micro. slides prepared by the author were shown, which clearly illustrated some of the stages in cell-division.

In the discussion which followed Messrs. H. T. Tisdall, T. S. Hall, M.A., J. Shephard, and G. Coghill took part.

3. By Mr. J. G. Luehmann, F.L.S., entitled "Notes on New Australasian Acacias." The author described two new species of Acacia, *A. palustris* and *A. Cuthbertsoni*, from Western Australia.

NATURAL HISTORY NOTES.

Mr. J. A. Kershaw contributed some notes on the vast numbers of the two large Cicadas, *Cicada mœrens* and *Cyclochila Australasiæ*, now occurring in most districts about Melbourne, especially at Black Flats, near Dandenong.

Mr. T. S. Hall, M.A., called the attention of members to the fact that some fossils had recently been discovered in the pre-Cambrian Rocks of South Australia, being the oldest fossils known in Australia.

EXHIBITS.

The following were the principal exhibits :—By Mr. F. G. A. Barnard.—Coleoptera from Ringwood excursion. By Mr. A. Coles.—Birds' eggs from New Zealand—viz., King Penguin, Crested Penguin, Tufted Penguin, Royal Penguin, and Black-eyebrowed Albatross *(Diomedea melanophys)*. By Mr. C. French, jun. —Eggs of the following rare birds—viz., Little Eagle and Black-backed Superb Warbler, from Central Australia. By Mr. W. H. F. Hill.—Eggs, larvæ, pupæ, and imago of the butterfly *Ialmenus myrsilus*, from near Gordons. By Mr. J. G. Luehmann, F.L.S.—Two species of new Acacias from Western Australia. By Mr. F. Reader, the following plants new for N.W. Victoria :—*Stipa micrantha* and *Cyperus eragrostis*. By Mr. O. A. Sayce.—Microscopic slides, in illustration of paper. By Mr. J. Shephard —Mounted Rotifer from Heidelberg, probably a new species. By Mr. G. E. Shepherd.—White-bellied Sea Eagle, from Lang Lang; Jardine's Harrier, from Somerville; Garrulous Honey-eater (albino), from Bittern; eggs of Little Penguin, from Cat Bay, Victoria; eggs of Yellow-breasted Robin, showing peculiar markings, collected at Somerville; and eggs of Spotted Night-jar, from Queensland.

After the usual conversazione the meeting terminated.

NOTES ON PLUMAGE OF ROBINS.

By Robert Hall.

(Read before Field Naturalists' Club of Victoria, 14th December, 1896.)

The regular "red-breasted" robins arrived at Box Hill this year during the third week of April. Of the two species the Flame-breasted (*Petrœca Leggii*) as a whole were later than the Scarlet-breasted (*P. phœnicia*). During the early part of August the flocks dispersed altogether, leaving the open grounds, and silently performed their parental duties amongst the timber, as if there were no such birds as robins in the district. These robins come here without notice, and male birds of *Petrœca Leggii* to the number of twenty were noticed on the 25th June last. I wish to place before you this evening the question of robins and their plumage, in order that our observers, more so than our collectors, may put aside a portion of their time for its consideration and this class of work generally.

Mr. Gould in his "Birds of Australia," vol. iii., literature to plate 7, has given his ultimatum regarding the maturity of the plumage of the Scarlet-breasted Robin (*P. phœnicia*)—viz., that it is concluded in the first year. The only instance quoted is of a male bird shot during a February in nearly full dress but with signs of youth. To this theory I do not wish to raise any objection, but, to encourage a further research into the matter, I would state that the skin of an unmatured male was received by me on 20th August, 1896, from the Heytesbury Forest, which was certainly not a nestling of this year, and had no further signs of development before its next moult the following year. This bird was shot without any idea of its real value, and is very much like the female of the Flame-breasted Robin to an eye uneducated in this particular groove. The following are its principal characteristics:—Forehead, clear white; the whole length of the dorsal portion, dark-grey, tending to black; throat, similar to back; breast, clearly flushed with red.

As Mr. Gould has quoted his strong opinion upon one bird, and I have ventured to faithfully follow in his footsteps, a question has arisen for somebody's consideration as to how this robin conducts itself throughout a two years' course which it may probably take to complete its suit of feathers.

With the other species, the Flame-breasted Robin, I have been annually impressed for seasons past by the appearance of the female, which is not smitten with a gorgeous beauty, but with one of exceptionally quiet colour. The "British Museum Catalogue," vol. iv., page 167, describes the young male as "similar to old female, but with an orange instead of vermilion breast." To this I would feel disposed to add an intermediate stage, as nothing is said of when this maturity is reached—viz., the female of the first

year is devoid of the colour that appears in what I consider to be a two-year-old bird; there is no orange on the breasts of many birds I have observed closely in July and August, when birds of this genus are breeding and have made their moult. I have found the brown females to be much more numerous than the adult forms, and confirmation of this can generally be made where manure hillocks are placed in gardens or fields adjacent to timber. There is an example upon the table for your inspection. Perhaps some of our members may be in a position to prove that these females moult subsequently to these months, even though the birds have left the open for the covert.

In the same month (August, 1896) I was surprised to find that an apparent female Pink-breasted Robin had for its companions solitude and myself, according to the view I felt inclined to take after a noiseless twenty minutes' watch. This bird certainly chooses a spot where the land lies quiet and the creek is sheltered. I could not understand why a female robin should be so lonely for so long a time, and I would just as soon have watched a Podargus if it had occasionally moved. Upon further investigation I found this bird to be an unmatured young male of last year's brood, with a faint trace of pink on and just above the abdomen; but daylight was needed, the colour being so faint. I take it that this bird had finally moulted for the year, but if not it must have been one of a very late brood. The under portion of the feet was only half as bright as that of a female obtained fourteen days previous. If in the killing of these birds I have offended an observer, the only recompense I can give is this short paper, the loan of the skins, and the dead bodies for dissection, if such is his or her wish, and if any member of our club could make use of a variety of bird bodies I would be glad to occasionally supply specimens for investigation, and by so doing my responsibility in the matter of killing would be greatly reduced.

A Wimmera correspondent, Mr. J. A. Hill, has carefully observed that the Red-capped Robin does not mature until the second year. An undeveloped pair has just bred in his district, the crown of the head and breast showing very pale red in the male, and the same particularly faint in the female. The male is on the table this evening. The same field-observer has carefully noted that the Hooded Robin breeds before signs of maturity appear, and the full livery is not donned in the first year, as with some of the robins—for example, the Yellow-breasted Robin, noted by Gould, and easily observed each year as an instance. In conclusion I would say that these short notes are simply offered with the hope that other members of the Club will give a little consideration to the question, and favour us with their opinions.

RELIQUIÆ MUELLERIANÆ:
DESCRIPTIONS OF NEW AUSTRALIAN PLANTS IN THE NATIONAL HERBARIUM, MELBOURNE.

By J. G. Luehmann, F.L.S., Curator.

(*Read before Field Naturalists' Club of Victoria, 14th December*, 1896.)

Acacia Cuthbertsoni, Luehmann (section, Julifloræ rigidulæ).

A shrub of about 10 feet; branchlets nearly terete, slightly tomentose; phyllodia lanceolate or linear-lanceolate, almost straight, narrowed at both ends, with a small oblique point, coriaceous, 1½ to 2½ inches long, 2 to 4 lines broad, ashy-grey from an extremely fine appressed silky pubescence, with about 5 to 8 sometimes hardly conspicuous veins. Spikes mostly in pairs, shortly pedunculate, cylindrical, about ¾ inch long, not very dense. Flowers mostly 5-merous. Calyx hardly one-quarter as long as the corolla, very thin, with lanceolar slightly ciliate lobes; petals smooth, free to the base. Pod hard and woody, turgid, gently curved, 3 to 4 inches long, ½ inch broad over the seeds, contracted between them. Seeds longitudinal, broadly ovate, 3 to 3½ lines long, turgid; funicle short, thin, the second fold dilated into a boat-shaped aril.

Western Australia, between the rivers Murchison and Gascoyne; W. Cuthbertson. Near Mount Narryer; Isaac Tyson.

The phyllodia are in shape similar to those of *A. Kempeana*, but with less numerous veins; the fruit is quite different.

Acacia palustris, Luehmann (section, Julifloræ stenophyllæ).

Glabrous; branchlets terete, or nearly so. Phyllodia linear-subulate, stout and rigid, terete, pungent, with fine but rather prominent nerves, 3 to 6 inches long. Spikes mostly in pairs, shortly pedunculate, dense, ovoid or oblong, about 3 lines long. Flowers mostly 4-merous. Sepals spathulate, bract-like, about half as long as the corolla. Petals thin, smooth, soon separating. Pod straight, coriaceous, turgid, 4 to 5 inches long, about 4 lines broad over the seeds, much contracted between them. Seeds about 2½ lines long, 2 lines broad, very turgid, laterally flattened, encircled by a conspicuous raised line, attached by a small ovate arillus without any filiform funicle.

Near *A. aciphylla.*

Western Australia, in swampy places on the Upper Murchison River; Isaac Tyson.

NOTES ON THE LIFE-HISTORY OF *IALMENUS MYRSILUS*, Dbl.

(Continued from *Victorian Naturalist*, vol. xii., p. 135.)

Ovum.—As a result of further acquaintance with this insect, Part i. of these notes requires slightly amending as far as the deposition of the ova is concerned. They are laid in batches of from one to four, usually three, on the young outside twigs of the Blackwood, in the angle formed by the leaf and branch. Occasionally they may be found singly on the dead part of a damaged leaf, and more rarely on a large branch.

The young larvæ emerge through an opening cut in the depressed apex of the egg.

Larva.—In the young stage the larva is of a greenish-grey colour, with head and tergum of first segment polished black, cylindrical, with anal segments slightly flattened. A double row of hairs extends along the back, and a single row along the sides.

At a later stage the larva approaches to onisciform, the abdominal and thoracic segments become pencilled with black on whitish or yellow, and a double row of oval yellow spots extends along the back. The last anal segment is black, with a white median band, and the others are mottled reddish brown.

The adult larva is markedly onisciform, the abdominal segments yellowish, pencilled and mottled with black and the yellow spots as before. These are not all of the same size or shape, those on the 3rd, 5th, 8th, and 9th being usually the most marked. The first thoracic tergum is depressed and of a shining black colour, the anal segments more flattened than in the earlier stage, but coloured similarly.

The food-plant of these grubs is the Blackwood, clean free-grown trees of medium size in sheltered spots being preferred. At Beale's Resorvoir, Wallace, the larvæ were found in considerable numbers on quite small bushes, three or four feet high. They rarely seek any other shelter than that afforded by lightly sewing together two leaves along one edge.

The larvæ are always attended by ants—a small black variety which elevates the abdomen and runs about excitedly when disturbed. It seems likely that the presence of these ants is a protection for the larvæ.

The larval stage lasts about a month, from the middle of November to the middle of December.

Localities: Millbrook, Bolwarrah, Werribee River, and Beale's Dam, Wallace.—W. H. F. Hill.

NOTES.

CICADAS.—I would like to draw the attention of those interested to the great numbers of the two large species of Cicada, *Cicada mœrens*, Germ., and *Cyclochila Australasiæ*, Don., now occurring in some of the outlying districts about Melbourne. On Saturday afternoon last (28th), while collecting about Black Flats and Dandenong I was astonished at the enormous numbers of these insects, the males of which kept up such a continuous din (their so-called music) as to be positively deafening. The black species *(Cicada mœrens)*, however, were by far the most plentiful, and I particularly noticed that the two species did not occur in the same paddock. In a paddock at Black Flats the gum saplings were swarming with the green species *(Cyclochila Australasiæ)*, and the continuous ear-splitting whirring noise, which is much louder than that of *C. mœrens*, was so deafening that I was glad to beat a retreat. An interesting description of the sound-producing organs of the Cicada is given by Professor Haswell in P.L.S. N.S.W., vol. i., 2nd series, p. 489.

At Dandenong, while hunting in a large paddock, I was surprised at the swarms of the black species *(C. mœrens)*, which (to put it mildly) were in thousands, and which were flying about the large eucalypts and sheoaks, or resting on the branches, and some occasionally falling to the ground. The peculiar empty pupa cases, with the slit down the back through which the imago had emerged, were sticking in hundreds on the trunks of the trees, and some were noticed from which the imago was just emerging. Many of the insects were disabled, and were immediately claimed by the ants, which soon covered them. At about sunset, when the insects were going to rest, the branches of many of the trees were black with them, and on the sheoaks, where they could more easily be seen, they were resting one above the other right along the branches to the very top. On throwing a stick into some of the trees they flew out like a swarm of bees, making a dreadful whirring noise, and settling again in the neighbouring trees, and still only those which were dislodged by the stick flew out, hundreds of others being seen still clinging to the branches. As, of course, is pretty generally known, the female deposits her eggs in grooves which she cuts in a twig, the young larvæ descending to the ground, into which they burrow to feed on underground roots. The pupæ leave the ground and climb up the trunks of the nearest trees when the imagos are ready to emerge. During the number of years I have been collecting in Victoria I have never before known these insects to appear in such enormous numbers, although they appear commonly every year. I might also mention at the same time seeing a large number of the smaller black species, *Cicada melanopygia*, Germ., which were resting on the young gums, acacias, &c., about sunset, and were then easily captured.—JAS. A. KERSHAW. Windsor, 2nd December, 1896.

RECENT PUBLICATIONS.

A Sketch of the Natural History of Australia, with Some Notes on Sport. By F. G. Aflalo, F.R.G.S., F.L.S., &c. July, 1896. (Macmillan's Colonial Library.) 3s. 6d.

This little volume of about 330 pages, as its name implies, gives an excellent outline sketch of those forms of animal life which are peculiar to our island continent. Though without any pretence to be a scientific handbook, it is well worthy of the attention of workers in natural history, as giving such an excellent grouping of the various creatures dealt with. Thus Mammals are treated of in three parts—the Placentals, Marsupials, and Monotremes. Birds, under Waterfowl, Wading Birds, Perching Birds, Birds of Prey, and Scratchers. Reptiles, under Snakes, Lizards, Crocodiles, Tortoises and Turtles, Batrachians. Fishes, under which heading a chapter is devoted to Angling, principally experiences around Sydney, as Freshwater Fish and Sea Fish. Under Invertebrata we have chapters on Molluscs, Insects, Spiders and Scorpions, Centipedes, Crustacea, and the Ground Floor; while the Glossary contains the meaning of most of the scientific names in the volume. The reader is constantly being directed to works of other authors, either in support of the writer's remarks or to show the absurd characters given to Australian forms of life by early writers. As brief notes about, and the scientific names of most of the species mentioned, are given, the volume is one which will be found of much service to any visitor to our shores who is zoologically inclined. It also contains some thirty illustrations, which have the merit of being well executed.

An Introduction to the Study of Mineralogy for Australian Readers. By F. M. Krausé, F.G.S. 1896. Geo. Robertson and Co., Melbourne. 8vo, cloth, 6s.

This volume of some 350 pages has been designed primarily for use as a text-book for students, but it will also be found extremely useful to mineralogists as a work of reference. It is divided into two parts—viz., Systematic and Descriptive Mineralogy. The first part takes the reader through Crystallography, Physical Properties, Optical Properties, Chemical Properties, Distribution, and Classification. The second part deals with 244 distinct minerals, as well as their more important varieties, giving such particulars as structure, hardness, specific gravity, colour, usual form of occurrence, chemical composition, and distribution, under which is given, firstly, all the principal Australian localities, then the chief occurrences in other parts of the world; and, finally, in the cases of economic minerals, notes on their values and uses. The work includes a copious index of all minerals, &c., mentioned.

A CATALOGUE OF VICTORIAN HETEROCERA.

By Oswald B. Lower, F.E.S.

Part XXII.

775. Phlœopola confusella, Walk. (*Œcophora confusella*, Walk., B. M. Cat., 682; *Phlœopola confusella*, Meyr., Proc. Linn. Soc. N.S.W., 355, 1892).
Melbourne, Gisborne.

*776. P. synchyta, Meyr. (Proc. Linn. Soc. N.S.W., 355, 1892).
Trafalgar.

777. P. banausa, Meyr. (*loc. cit.*, 356, 1892).
Melbourne, Fernshaw.

*778. P. exarcha, Meyr. (*loc. cit.*, 358, 1892).
Melbourne.

779. P. pyrgonota, Meyr. (*loc. cit.*, 1594, 1888).
Melbourne, Gisborne.

*780. P. micropis, Meyr. (*loc. cit.*, 1,593, 1888).
Melbourne.

SPHYRELATA. Meyr.

781. S. indecorella, Walk. (*Cryptolechia indecorella*, Walk., B. M. Cat., 764; *Œcophora amotella*, 16, 1,034; *Sphyrelata indecorella*, Meyr., Proc. Linn. Soc. N.S.W., 362, 1892).
Stawell, Casterton, Melbourne.

PILOPREPES. Meyr.

*782. P. anassa, Meyr. (Proc. Linn. Soc. N.S.W., 1,597, 1888).
Melbourne, Kewell.

*783. P. œmulella, Walk. (*Œcophora œmulella*, Walk., B. M. Cat., 697; *Piloprepes œmulella*, Meyr., Proc. Linn. Soc. N.S.W., 366, 1892).
Richmond.

*784. P. aristocratica, Meyr. (Proc. Linn. Soc. N.S.W., 1,598, 1888).
Fernshaw.

*785. P. antidoxa, Meyr. (Proc. Linn. Soc. N.S.W., 1,599, 1888).

PYRGOPTILA. Meyr.

TRACHYPEPLA. Meyr.

MESOLECTA. Meyr.

*786. M. psacasta, Meyr. (Proc. Linn. Soc. N.S.W., 371, 1892).
Melbourne.

TALANTIS. Meyr.

NEPHOGENES. Meyr.

*787. N. EUNEPHELA, Meyr. (Proc. Linn. Soc. N.S.W., 374, 1892).
Cheltenham.

*788. N. ORESCOA, Meyr. (*loc. cit.*, 376, 1892).
Gisborne.

*789. N. PROTORTHRA, Meyr. (*loc. cit.*, 378, 1892).
Gisborne.

790. N. AXIOTA, Meyr. (*loc. cit.*, 1,604, 1888).
Warragul.

ANTIDICA. Meyr.

791. A. PILIPES, Butler (*Latometus pilipes*, Butler, Ann. Mag. Nat. Hist., 102, 1882; *Antidica eriomorpha*, Meyr., Proc. Linn. Soc., N.S.W., 382, 1892).
Gisborne, Melbourne, &c.

792. A. BARYSOMA, Meyr. (Proc. Linn. Soc. N.S.W., 383, 1892).
Near Melbourne.

PHILOBOTA. Meyr.

793. P. ARABELLA, Newman (*Œcophora arabella*, Newm., Tr. Ent. Soc. Lond., iii., N.S., 296, pl. xviii., 4; *Philobota arabella*, Meyr., Proc. Linn. Soc. N.S.W., No. x.—*Œcophoridæ*, 7).
Gisborne and Melbourne.

*794. P. BIOPHORA, Meyr. (*loc. cit.*, 8).
Melbourne.

795. P. CHRYSOPOTAMA, Meyr. (*loc. cit.*, 10).
Gisborne, Melbourne.

796. P. CATASCIA, Meyr. (*loc. cit.*, 10).
Melbourne, Mt. Macedon.

797. P. ELLENELLA, Newm. (*Œcophora ellenella*, Newm., Tr. Ent. Soc. Lond., iii., N S., 295, pl. xviii., 3; *Philobota ellenella*, Meyr., Proc. Linn. Soc. N.S.W., No. x.—*Œcophoridæ*, 11).
Mt. Alexander.

I have a specimen which I take to be this species from near Bendigo.

798. P. MONOLITHA, Meyr. (*loc. cit.*, 11).
Melbourne.

799. P. CATALAMPRA, Meyr. (*loc. cit.*, 12).
Melbourne.

800. P. AURICEPS, Butler (*Conchylis auriceps*, Butler, Ann. Mag. Nat. Hist. 1882; *Philobota auriceps*, Meyr., Proc. Linn. Soc. N.S.W.—*Œcophoridæ*, No. x., 12).
Gisborne, Melbourne.

*801. P. DECLIVIS, Walk. (*Œcophora declivis*, Walk., B. M. Cat., 687; *Philobota declivis*, Meyr., Proc. Linn. Soc. N.S.W.—*Œcophoridæ*, No. x., 13).
Melbourne.

802. P. MOLLICULELLA, Walk. (*Œcophora molliculella*, Walk., B. M. Cat., 687; *Philobota molliculella*, Meyr., Proc. Linn. Soc. N.S.W.—*Œcophoridæ*, No. x., 14).
Melbourne.

803. P. HYPOCAUSTA, Meyr. (*loc. cit.*, 15).
Melbourne.

*804. P. ARGOTOXA, Meyr. (*loc. cit.*, *Œcophoridæ*, No. xv., 1,608, 1888).
Melbourne.

*805. P. CRYPSICHOLA, Meyr. (*loc. cit.*, *Œcophoridæ*, x., 16).
Gisborne, Melbourne.

806. P. XIPHOSTOLA, Meyr. (*loc. cit.*, 16).
Sale, Melbourne.

*807. P. PHAULOSCOPA, Meyr. (*loc. cit.*, 18).
Melbourne (near Cemetery).

*808. P. CREPERA, Meyr. (*loc. cit.*, 18).
Melbourne.

*809. P. OLYMPIAS, Meyr. (*loc. cit.*, No. xv., 1,610, 1888).
Melbourne.

810. P. ACROPOLA, Meyr. (*loc. cit.*, No. x., 19).
Fernshaw, Mount Macedon.

811. P. ORINOMA, Meyr. (*loc. cit.*, 20).
Mount Macedon.

*812. P. EREBODES, Meyr. (*loc. cit.*, 21).
Gisborne, Melbourne.

813. P. MELODORA, Meyr. (Proc. Linn. Soc. N.S.W.—*Œcophoridæ*, xv., 1,627, 1888).
Fernshaw.

814. P. HERODIELLA, Feld. (*Symmoca herodiella*, Feld., Reis. Nov., pl. cxl., 31; *Philobota herodiella*, Meyr., Proc. Linn. Soc. N.S.W.—*Œcophoridæ*, x., 23).
Fernshaw, Melbourne, Gisborne.

*815. P. GLAUCOPTERA, Meyr. (*loc. cit.*, 24).
Gisborne.

*816. P. PARTITELLA, Walk. (*Œcophora partitella*, Walk., B. M. Cat., 683; *Philobota partitella*, Meyr., Proc. Linn. Soc. N.S.W.—*Œcophoridæ*, x., 25).
Melbourne.

817. P. IPHIGENES, Meyr. (*loc. cit.*, 1,614, 1888).
Fernshaw.

818. P. AGNESELLA, Newman (*Œcophora agnesella*, Newman, Tr. Ent. Soc. Lond., iii., N.S., 297; *Philobota agnesella*, Meyr., Proc. Linn. Soc. N.S.W.—*Œcophoridæ*, x., 27).
Gisborne, Melbourne.

819. P. SQUALIDELLA, Meyr. (*loc. cit.*, 30).
Melbourne, Gisborne.

820. P. PRODUCTELLA, Walk. (*Œcophora productella*, Walk., B. M. Cat., 688; *Œ. griseicostella*, Zeller, Hor. Ros., 1877, 395; *Philobota productella*, Meyr., *loc. cit.*, 30).
Melbourne, Gisborne, &c.

821. P. PRETIOSELLA, Walk. (*Psecadia pretiosella*, Walk., B. M. Cat., 538; *Philobota pretiosella*, Meyr., Proc. Linn. Soc. N.S.W.—*Œcophoridæ*, x., 33).
Melbourne, Gisborne.

*822. P. ANACHORDA, Meyr. (*loc. cit.*, 33).
Melbourne.

823. P. CAMPYLA, Meyr. (*loc cit.*, 1,617, 1888).
Beechworth.

*824. P. BROCHOSEMA, Meyr. (*loc. cit.*, *Œcophoridæ*, x., 34).
Melbourne.

*825. P. IDA, Lower (Tr. Roy. Soc. S.A., 180, 1893).
Healesville.

826. P. INTERLINEATELLA, Walk. (*Œcophora interlineatella*, Walk., B. M. Cat., 692; *Philobota interlineatella*, Meyr., Proc. Linn. Soc. N.S.W.—*Œcophoridæ*, x., 35).
Melbourne.

827. P. BRACTEATELLA, Walk. (*Œcophora bracteatella*, Walk., B. M. Cat., 696; *Philobota bracteatella*, Meyr., Proc. Linn. Soc. N.S.W.—*Œcophoridæ*, x., 36).
Melbourne.

*828. P. TRIJUGELLA, Zeller (*Œcophora trijugella*, Zeller, Hor. Ros., 1877, 391, pl. v., 136; *Philobota trijugella*, Meyr., Proc. Linn. Soc. N.S.W.—*Œcophoridæ*, x., 37).
Melbourne.

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FIELD NATURALISTS' CLUB OF VICTORIA.

THE ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 11th January, 1897. The chair was occupied by Mr. C. Frost, F.L.S., and some fifty members and visitors were present.

PAPERS.

1. By Mr. C. French, jun., entitled "Notes on a Collecting Trip to the Murray and Loddon Rivers." The author gave an account of a recent collecting excursion in the Lake Charm district, and mentioned the principal specimens seen, amongst which was the Bombardier Beetle, *Pheropsophus verticalis*. Altogether about one hundred birds were identified on the trip, and many uncommon plants collected.

In the discussion which took place Messrs. C. Frost, D. Le Souëf, R. Hogg, and D. Best took part.

2. By Mr. G. E. Shepherd, entitled "Notes on the Nidification of Jardine's Campephaga." The author gave an interesting account of his discovery of the nests and eggs of this bird, and exhibited Victorian specimens for the first time.

In the discussion which ensued Messrs. D. Le Souëf and A. Coles took part.

3. By Mr. A. J. Campbell (communicated by Mr. D. Le Souëf), entitled "Description of Nest and Egg of Rifle Bird, *Ptilorhis paradisea*." The author remarked that, although the bird was discovered seventy-one years ago, its eggs had not been taken until November last, in the scrub on the Richmond River, New South Wales, and exhibited the egg and nest, the latter being beautifully lined with cast snakes' skins.

4. By Mr. F. M. Reader (communicated by Mr. C. Frost), entitled "Contributions to the Flora of Victoria, No. 1." The writer described a new Acacia from the Wimmera, which he had named *Acacia glandulicarpa*.

NATURAL HISTORY NOTE.

Mr. C. C. Brittlebank forwarded a note stating that he had observed diatoms in the "red rain" which fell over a large area of Victoria on the 27th of December last, and enclosed a rough sketch of the species noted.

Mr. F. G. A. Barnard said that so far as his observations went the dust was composed of minute crystals, apparently of silica

with ferruginous matter, but Mr. Stickland stated that he had also observed diatoms. Mr. J. Shephard said that from the rough drawings sent the diatoms appeared to be species commonly found in Victoria, and would give no clue as to the origin of the dust.

EXHIBITS.

The following were the principal exhibits of the evening:—By Mr. A. J. Campbell.—Nest and egg of Rifle Bird, *Ptilorhis paradisea*, from New South Wales. By Master A. Campbell.—Nest and egg of Rose-breasted Robin, from Dandenong Ranges. By Mr. A. Coles.—Black-shouldered Kite, *Elanus axillaris;* egg of Australian Rhynchæa, taken from bird; Lizard, *Moloch horridus*, from Western Australia. By Mr. C. French, jun.—Bombardier Beetles, *Pheropsophus verticalis*, from Murray River, Victoria. By Mr. D. Le Souëf.—Nest and eggs of Sordid Friar Bird, *Tropidorhynchus sordidus;* also, nest and eggs of Yellow-tinted Honeyeater, *Ptilotus flavescens*. By Mr. F. M. Reader.—Specimens of new Acacia, in illustration of paper. By Mr. G. E. Shepherd.—Two nests and eggs of Jardine's Campephaga, in illustration of paper; also, nest and eggs of Warty-faced Honeyeater and Orange-winged Sittella, from Western Port.

After the usual conversazione the meeting terminated.

ON THE CHANGE OF PLUMAGE IN SOME EXOTIC FINCHES.—In the *Zoologist* for December, 1896, Dr. A. G. Butler, F.L.S., contributes some notes on the above subject. He says:—"Just now (29th October) I have in my aviary some young Gouldian Finches in the middle of their change from nestling to adult plumage. It must be warm work, for the new feathers come over the old, which do not drop out at the time. One died on 28th October, and I sent it on to Sir William Flower for the Natural History Museum, as it is very interesting to see how it is done. A few of the feathers at the union of the violently contrasting colours seem to alter in tint, the colour growing in the feather itself. This is known to be the case in the crimson colouring of the variety *Porphila mirabilis*, which, when it first acquires its adult plumage, closely resembles *P. Gouldiæ*, but subsequently the black feathers of the head become rusty, red brown, and finally crimson. The little Indian Amaduvale is always changing; I should think it must have half a dozen plumages in a year, but it only moults once. The Fire Weavers *(Pyromelana)* only moult the flank feathers and upper tail coverts, so far as I can judge, at the assumption of the breeding plumage, these feathers being replaced by long soft plumes which cover the short tail. All the other feathers change very gradually at first, and then rapidly, the full colour appearing first along the centre of the shaft, and spreading forwards and laterally."

NOTES ON A COLLECTING TRIP TO THE MURRAY AND LODDON RIVERS.

By C. French, Jun.

(*Read before Field Naturalists' Club of Victoria, 11th January*, 1897.)

Our party, consisting of Messrs. G. E. Shepherd, T. A. Brittlebank, and myself, left Melbourne on Saturday, 31st October, our destination being Murray Meadows, the residence of Mr. G. Morton, an enthusiastic naturalist. The journey was very uninteresting for our purpose till after Macorna had been reached; from thence towards Kerang, close to the railway line, the following birds were noticed, viz.:—Black-backed Crow Shrike, Brown Hawk, White and Straw-necked Ibis, Australian Crane, Wattled Plover, Spoonbill, and ducks of various kinds. Of plants we noticed *Ptilotus exaltatus*, with its conspicuous pink flowers; Bassia, Atriplex, Kochia, and other Salsolaceæ; also several species of Goodenia.

On reaching Kerang we were met at the station by Mr. Morton, who informed us that, owing to the exceptionally dry season, the aquatic birds were not laying; however, we decided to try our luck with the land birds Mr. Morton accompanied us in the train to Lake Charm station, situated about 190 miles north west of Melbourne, where his conveyance met us, and we were driven across to "Murray Meadows," a distance of twelve miles, passing *en route* the beautiful lake from which the railway station takes its name. Here we noticed the following aquatic birds, viz:—Black Swan, Dottrel (of two kinds), several sorts of ducks, Coot, Grebe, Avocets, &c. Our attention was also drawn to the two salt lakes where, we were told, it was probable that eggs of the Orange-fronted Ephthianura might be obtained; also of Bee-eaters and White-winged Superb Warblers.

Our destination reached, we were welcomed by Mrs. Morton, and after having had tea, the remainder of the evening was spent in discussing matters of natural history, especially regarding snakes, Mr. Morton informing us that a person known as "Professor" Davies had the previous season paid a visit to the Murray for the purpose of collecting live snakes, and had obtained a sackful. One evening, the weather being very hot, the "professor" said the snakes were sweating, and in another moment he thrust his hand into the sack and stirred them up, so as to let the air get amongst them. We were also informed that he is often bitten by them, but apparently takes no notice, as the poison has no visible effect on his system. Since our return, Mr. Morton writes that this snake-fancier caught ninety snakes (principally Tigers) in one day, and probably this consignment

will find its way to Melbourne, to create more sensations in the city than in the country.

Next morning, 1st November, an early start was made in the direction of the Loddon River, and the country worked between it and the Murray. Three clutches of White-rumped Wood Swallows' eggs were taken, each with the full complement of four; also several nests of White-winged Superb Warblers with three eggs apiece, this apparently constituting the full clutch. These beautiful little wrens also build their nests amongst the Salicornia bushes on the salt lake. A Restless Flycatcher's nest was found, and on account of its awkward position the eggs were lost in attempting to secure them; a second nest was also found nearly built, and subsequently two eggs were taken from it.

2ND NOVEMBER.—Explored the banks of Loddon River for some miles, keeping to the river and its small tributaries. On the plains between the Murray and Loddon rivers many plants belonging to the order Salsolaceæ were collected, representing the genera Atriplex, Kochia, Bassia, Threlkeldia, Enchylæna, and Rhagodia; fine plants of *Eremophila divaricata*, the pink and the rare white-flowered variety, were found in full bloom. On the banks of the Loddon *Mesembrianthemum australe*, commonly known as "Pig's Face," grew abundantly. The day being hot, the expanded pink flowers formed a wonderful contrast amongst the parched vegetation. Other plants noticed were *Goodenia heteromera*, *G. pinnatifida*, *G. gracilis*, and *Teucrium racemosum*. A Blue-faced Honey-eater's nest was found situated on the top of an old Pomatostomus' nest; we were, however, disappointed to find two young birds recently hatched. A Black-faced Graucalus was flushed from her nest, and two fresh eggs were taken, also one more clutch of White-winged Superb Warblers, with three fresh eggs.

3RD NOVEMBER.—Crossed over the Murray into New South Wales. Dragged our boat into a swamp and poled some distance, finally abandoning the boat and wading into reedbeds to look for Ibis, Bittern, &c. One of the latter birds was flushed, but no nests were found, though we searched diligently for the Reed Warblers', who betrayed their presence by their sweet notes. Four Tiger Snakes were encountered in a short space of time, their usual tendency being displayed by their slipping into the water and wobbling away. The sight of so many snakes amongst the reedbeds caused a distinctly uncomfortable feeling, therefore we struck out for the timber fringing the Murray, killing on our way several of them, about a dozen escaping, which were of the Tiger species. On reaching the river a Black-fronted Dottrel was seen, with a young one recently hatched. It was a most difficult task to discover the young bird, as it resembled the stones and clay on which it rested. Their eggs cannot easily be

found, as the birds smear them frequently with mud of the same colour as the eggs, which they deposit at the margins of the swamps. With difficulty two clutches of White-winged Corcorax's eggs were taken. Several Blue-faced Honey-eaters were seen, and also some Yellow-throated Friar Birds, and one of the latter was observed constructing its nest.

4TH NOVEMBER.—Drove to Salt Lake and caught a couple of Lizards—a Monitor and a Lace Lizard, or Iguana; on the latter were noticed a great many ticks similar to the ones found on Opossums and Native Bears. Bee-eaters were seen in numbers, but they were only just commencing to tunnel, and none had eggs. Orange-fronted Ephthianuras were seen in fairly numerous quantities, but though some hours were spent searching round the edges of this lake amongst the Salicornia bushes, only one nest was taken. This contained three eggs, partly incubated; they, however, were successfully treated. Much to our gratification a nest of the Chestnut-eared Finch was found underneath and attached to a Brown Hawk's nest. It contained six fresh eggs. The hawk's nest was occupied by two or three young ones nearly ready to fly. A Buff-rumped Geobasileus' nest was also found, containing young, as also several White-shouldered Campephagas', and the beautiful Tricoloured Ephthianura was noted. Several interesting plants were collected, amongst which were the following:—*Pittosporum phyllyroides*, *Nitraria Schoberi*, *Sida corrugata*, *Ptilotus obovatus*, *P. exaltatus*, and *Myoporum platycarpum;* the latter, covered with its large bunches of pure white flowers, was a sight not easily to be forgotten. The graceful grass, *Stipa elegantissima*, once common near the lakes, is now exceedingly scarce, owing to the sheep eating the plants off close to the ground.

5TH NOVEMBER.—Another trip was undertaken to the Loddon River, and two clutches of White-rumped Wood Swallows' eggs taken, also two eggs of the rare Swamp Lory, *Platycercus flaveolus*. The Short-billed or Brown-headed Honey-eater was noticed building its nest in a sapling, which also contained the beautiful little nest of the Red-capped Robin. On revisiting these nests prior to our departure, two fresh eggs were taken from each. The Little Acanthiza and White-plumed Honey-eaters were noticed building their nests. A Black-faced Graucalus was observed sitting in an old Grallina's nest, which, being impossible to get, the bird was frightened off and two eggs of the Graucalus were noticed, showing that this bird sometimes avails itself of the Grallina's nest, and saves itself the trouble of making one of its own. The Sordid, White-rumped, and White-eyebrowed Wood Swallows were also found nesting in their cup-shaped structures, one clutch of the White-rumped Wood Swallow's being taken from a nest which had not even been lined. The rest of these nests,

however, from which eggs were taken were well lined with grass, the Sordid and White-eyebrowed Wood Swallows preferring rootlets for this purpose. Many of the Red Gum trees were noticed with the trunks and larger branches gnawed by the Cockatoos at their junctions with other large limbs, and apparently by the action of sun, wind, rain, and exposure decay had set in, and in course of time a bowl was formed, which served for nesting places for cockatoos, parrots, and also the White-rumped Wood Swallows, as several of their nests were taken after seeing the bird disappear in the fork of the tree. Yellow-throated Friar Birds were very noisy, and several nests were discovered in early stages of construction.

6TH NOVEMBER.—Having secured the services of a lad as guide, we followed the course of the Loddon to the Bar Creek. Nothing but water was to be found in this "Bar," and this also was fast disappearing. A *Graucalus mentalis* was noticed and shadowed for some time, and the nest found, one fresh egg being the result. A nest of the Short-billed Smicrornis was taken with its two fresh eggs, also one egg of the Yellow-throated Friar Bird. A Wedge-tailed Eagle's nest was discovered with young ones showing over the edge of the nest. A Black-headed Sittella was observed, and a lot of time spent in watching, but it was finally lost without discovering its nest. A Spiny-cheeked Honey-eater was seen; also the following birds near the river:—Black-fronted Dottrel, New Holland Snipe, Black-tailed Tribonyx—the latter bird reminding one of Bantam fowls. Birds here seemed scarce, however, except near water, where several parrots were flushed from the trees but no nests found. An Iguana was seen exploring a Grallina's nest, evidently in search of eggs, but found lodgings in our collecting bag. A swim in the Murray in returning finished up the day's proceedings.

7TH NOVEMBER.—The day being hot, with indications of an approaching storm, we did not venture far, contenting ourselves digging up a blackfellows' oven in search of relics, with no success.

8TH NOVEMBER.—An early start was made for a trip into Riverina. Two horses were crossed over the Murray—one of the party riding one after landing, with the object of scouting; the other was harnessed to a springcart, but refused to move, straightway lay down, and would not rise till the traces, &c, were undone and the cart pushed out of the way. After a dose of whipcord had been applied, and the animal again yoked, and with more greenhide and coaxing, a start was made at last at a gentle canter. On striking a cornfield some fodder was reaped for the horses, shortly after which, in trying to negotiate an irrigation channel, the springcart was left in the middle, necessitating again unharnessing and dragging out the cart ourselves, assisted

by a stranger who arrived on the scene, an aboriginal calmly surveying us from his steed. We crossed about seven miles of somewhat uninteresting country, relieved by the sight of the best crop of wheat we had seen; and several Quandong Trees, *Santalum acuminatum*, were laden with their pretty red fruit, some of which we gathered to bring home as a memento of our visit. The leaves of the Santalum were covered with a scale insect which Mr. Maskell has named as *Aspidiotus cladii*. It was now past noon and we had reached a nice creek, which, by the way, rejoiced in the suggestive name of Bullock Hide, an article without which all hands voted our horse would have struck long ago. After lunch we explored the timber on the banks of the creek, and saw a pair of Spotted Bower Birds, but did not succeed in finding the nest, though, needless to say, a strong effort was made. Several of their old bowers were noticed, one being placed under a large bush of the Prickly Box, *Bursaria spinosa*. A Brown Tree-Creeper was flushed from a hollow tree, and three eggs secured, being all the eggs taken, though a White Cockatoo was nesting in a large Red Gum, which, however, being a most difficult one to climb, was not attempted. After collecting the following plants—*Atriplex semibaccatum*, *Bassia lanicuspis*, *Swainsona lessertifolia*, *Semeia Morgania*, *Dampiera lanceolata*—a return was now attempted, but our horse again refused, and once more the green hide saved us from having to camp out. On the return Bee-eaters were again noted, but none of their holes contained eggs. The Murray was reached and safely crossed just before dark.

9TH NOVEMBER.—Drove to Lake Charm, getting a fresh pair of horses from Mr. Embelton, who very kindly drove us to the Red Gum Marsh, picking up a guide by the way, and seeing several Red-necked Avocets feeding in Racecourse Lake, shortly after passing which we noticed the beautiful little Fairy Martin nesting under a bridge, and several fresh eggs were secured. The majority of the birds, however, had young. Red Gum Marsh proved a failure as regards aquatic birds' eggs. Whilst Messrs. Shepherd and Brittlebank were exploring the swamp for eggs, I decided (with the help of Mr. Embelton) to look for beetles under the logs at the edge of the swamp, and obtained a good many species, principally belonging to the order Carabidæ. One especially, called the Bombardier, *Pheropsophus verticalis*, struck me as being curious. On capturing this beetle it discharges a report resembling a person striking wax matches, and at the same time a sort of smoke is observable, also a fluid is emitted, which is said to cause a severe irritation should it get on the hands or face. An interesting description of the British Bombardier Beetle, *Brachinus crepitans*, is given by the Rev. J. G. Wood, M.A., in his interesting book "Common British

Insects," and as the Victorian insect is closely allied to the British species, I take the liberty of making the following extract from his book. At page 22 he says :—"When alarmed it throws out a small quantity of this fluid, which immediately volatilizes with a slight explosion when it comes in contact with the atmosphere, and looks very much like the fire of miniature artillery. This curious property is used in defence. This beetle, being a small and comparatively feeble one, is liable to be attacked by the larger Geodephaga, especially by those belonging to the genus Carabus. The lesser insect could have no chance of escape but for its curious weapons of defence. When the Carabus chases the Brachinus the latter waits until the former has nearly reached its prey, and then fires a gun (so to speak) in its face. The effect on the Carabus is ludicrous. The insect seems quite scared at such a repulse, stops, backs away from the tiny blue cloud, and allows its intended prey to reach a place of safety. The volatile fluid which produces such curious effects is secreted in a little sac just within the end of the abdomen ; it is potent enough to discolour the human skin when discharged against it, as many have found who have captured Bombardier Beetles by hand. Even after the death of the beetle the explosions may be produced by pressing the abdomen between the finger and thumb."

On our return from the marsh, Black-capped Sittellas were again seen, but no nests were found. Amongst plants noticed were—*Eucalyptus gracilis*, *Hakea leucoptera*, *Verbena officinalis*, *Cressa cretica*, and *Panicum gracile*.

10TH NOVEMBER.—Started out early and took several nests previously found, and after an early dinner crossed into New South Wales to work some swampy country. Disappointment, however, again awaited us, no nests being taken, though birds were numerous, amongst which the following were conspicuous : —Painted and New Holland Snipe, Dottrel (of four species), Rails (of two species), Bee-eaters, Ibis, Black-tailed Tribonyx, &c.

Altogether upwards of 100 different species of birds were noticed. Plants to the number of about seventy were collected, in flower, which was a very fair collection, considering the dry season. Beetles were fairly numerous, about eighty species being collected. Appended are lists of the specimens obtained on our excursions. In conclusion, I beg to thank my father, Mr. C. French, Messrs. C. Walter and J. G. Luehmann, for kindly furnishing me with the names and other information on the specimens collected ; also, Mr. and Mrs. Morton for their kind hospitality and attention to us while staying at "Murray Meadows."

The following birds were noticed :—

Wedge-tailed Eagle
Whistling Eagle
Brown Hawk
Nankeen Kestrel
Collared Sparrowhawk
Winking Owl
Tawny-shouldered Podargus
Welcome Swallow
Tree Swallow
Fairy Martin
Australian Bee-eater
Great Brown Kingfisher
Sacred Kingfisher
Red-rumped Kingfisher
Sordid Wood Swallow
White-eyebrowed Wood Swallow
White-rumped Wood Swallow
Striated Pardalote
Piping Crow-Shrike
Collared Crow-Shrike
Pied Grallina
Black-faced Graucalus
Varied Graucalus
White-shouldered Campephaga
Rufous-breasted Thickhead
Harmonious Strike Thrush
Frontal Strike Tit
Black Fantail
Restless Flycatcher
Brown Flycatcher
Short-billed Smicrornis
Red-capped Robin
Superb Warbler (Blue Wren)
White-winged Superb Warbler
Little Brown Acanthiza
Striated Acanthiza
Yellow-rumped Geobasileus
Buff-rumped Geobasileus
White-fronted Ephthianura
Orange-fronted Ephthianura
Tricoloured Ephthianura
White-faced Xerophila
Australian Pipit
Rufous-tinted Song Lark
Reed Warbler
Horsfield's Bush Lark
Plain-coloured Finch
Spotted-sided Finch
Chestnut-eared Finch
Spotted Bower-Bird
White-winged Corcorax
White-eyed Crow
Temporal Pomatostomus
White-eyebrowed Pomatostomus
White-plumed Honey-eater
Spiny-cheeked Honey-eater
Friar Bird
Yellow-throated Friar Bird
Short-billed Honey-eater
Garrulous Honey-eater
Brown Tree-Creeper
Orange-winged Sittella
Black-capped Sittella
Great Sulphur-crested Cockatoo
Rose-breasted Cockatoo
Pennant's Parrakeet
Rosehill Parrakeet
Red-rumped Parrakeet
Warbling Grass Parrakeet
Swamp Lory Parrakeet
Parrakeets (5 other species)
Crested Bronze-winged Pigeon
Wattled Plover
Dottrel (4 species)
Red-necked Avocet
Marsh Tringa
New Holland Snipe
Painted Snipe
Straw-necked Ibis
White Ibis
Yellow-legged Spoonbill
Native Companion
Herons (4 species)
Australian Bittern
Black-tailed Tribonyx
Black Swan
Semi-palmated Goose
Ducks (4 species)
Silver Gull
Australian Pelican
Australian Cormorant
Hoary-headed Grebe

PLANTS COLLECTED AT MURRAY AND LODDON RIVERS.

Clematis microphylla
Ranunculus lappaceus
,, parviflorus
Cabomba peltata
Capsella pilosula
Pittosporum phillyroides
Nitraria Schoberi
Lavatera plebeja
Sida corrugata (3 varieties)
Euphorbia Drummondi
Poranthera microphylla
Stellaria palustris
Ptilotus obovatus
,, erubescens
,, exaltatus
Rhagodia nutans
Chenopodium nitrariacum
Atriplex nummularium
,, campanulatum
,, holocarpum
,, semibaccatum
,, vesicarium
Threlkeldia salsuginosa
Bassia sclerolaenoides
,, lanicuspis
Enchylæna tomentosa
Kochia brachyptera
,, villosa
Muehlenbechia adpressa
Swainsona lessertifolia
Cassia eremophila
Melaleuca parviflora
Eucalyptus largiflorens (red fl.)
Hakea leucoptera
Pimelea microcephala
Galium geminifolium
Brachycome trachycarpa
Craspedia Richea (very small form)
Minuria leptophylla
Gnaphalodes uliginosa
Leptorrhynchos pulchellus
Ixiolæna leptolepis
Helipterum corymbiflorum
,, dimorpholepis
Helichrysum obtusifolium
,, lucidum
,, apiculatum
Calocephalus citreus
Myriocephalus rhizocephalus
Heliotropium Curassavicum
Lobelia concolor
Dampiera lanceolata
Goodenia heteromera
,, gracilis
,, pinnatifida
Cressa cretica
Solanum esuriale
Mimulus gracilis
Stemodia Morgania
Mentha Australis
Teucrium racemosum
Verbena officinalis
Myoporum platycarpum
,, humile
Eremophila maculata
,, divaricata
Damasonium Australe
Stipa elegantissima
Panicum gracile
Poa Fordeana
Bromus arenarius

ERRATA.—NOTES ON PLUMAGE OF ROBINS.—On page 115, lines 3 and 4, transpose specific names. In line 16, for "*Phœnicia*" read "*Leggii.*"

DROSERA BINATA.—At the November meeting of the Linnean Society of London Dr. Morris exhibited dried flower-stems of the Australian Twin-leaved Sundew, *Drosera binata*, Labill., received from the Sheffield Botanic Gardens. The stems were 3 ft. 6 in. high, bearing from thirty to fifty large pure white flowers, nearly one inch across.—*Zoologist.*

NOTES ON THE NIDIFICATION OF JARDINE'S CAMPEPHAGA.

By G. E. Shepherd.

(*Read before Field Naturalists' Club of Victoria, 11th January*, 1897.)

During October, 1893, whilst out for a day's collecting on that portion of the Mornington peninsula lying between Mount Eliza and Hastings, I met with a bird hitherto unknown and likewise unobserved by me. I saw but one, which I shot, and had mounted. It proved to be the male of Jardine's Campephaga, *Edoliisoma tenuirostre*. Thinking the bird was merely a straggler, I did not at that time trouble further in the matter. The following season, being again in the locality, I noticed another of these birds (also a male), which I followed for some time without being able to see anything of the female, though I tried hard to find some evidence that the birds nested in the locality. The spring of 1895 found me again on the look-out, and as the male bird was once more in evidence I was convinced that these birds yearly resorted to this secluded spot to breed, but the whole nesting period passed without my being rewarded with even a glance at the female bird—a fact easily accounted for, as apparently she makes little, if any, noise, except that of fear when disturbed, or an occasional soft cluck-like note uttered in an undertone.

Repeated failures did not discourage me, however, and on 20th November last, in company with Mr. A. J. Campbell and his son, I paid a visit to the locality previously mentioned. The country thereabout is undulating and thickly timbered with messmate and peppermint gum, whilst a small creek fringed with ti-tree runs through the centre. This creek, though a goodly-sized torrent during winter, is dry in summer, save where holes have been made by the action of water, which serve to supply bird and other life with that necessary element during dry weather. Following the creek for some distance, and noting several species of birds nesting we suddenly heard the Campephaga giving forth his peculiar note, which has been described by Gould as being a harsh, grating, buzzing tone several times repeated. This, I may say, is always delivered by the bird when at the highest point of the tallest trees. This instance proved to be no exception to this rule, as by following the sound we located the male bird at the extremity of a giant messmate, which he seemed loth to leave, and whilst quietly watching his movements Mr. Campbell, jun., observed the female sitting upon the nest, placed in a horizontal forked branch 50 or 60 feet below where the male bird was perched, and at a height of 30 feet from the ground. On my ascending the tree she showed no inclination to leave until the snapping of a branch startled her off the nest with a rush, and the single egg which it contained was broken. An examination, however, proved it to be partly incubated.

Nine days subsequent to this unfortunate sequel to the first nest I discovered the female again sitting, and in order to make sure of the full clutch I left the nest undisturbed for a further period of three days, when I climbed up. Fearing the bird might again shuffle the egg out of the nest I patted the tree to induce her to leave the nest. She would not shift, however, and when within arm's length of her I reached out my hand, at which she spread out her tail and uplifted her feathers in a menacing manner, and not till my hand almost touched her did she condescend to leave the nest. On flying off she uttered several notes like "cluck, cluck," and was immediately joined by the male, both disappearing among the timber. Her departure revealed one beautiful egg, the nest in this instance being situated at a height of 40 feet, and placed in a Peppermint, *Eucalyptus amygdalina*. I subsequently found another nest in a different locality, which contained one egg with incubation far advanced, hence I think I may fairly claim to have established the fact that one egg constitutes the clutch. As showing the diversity of situation chosen by this bird for nesting purposes, however, I was fortunate enough to find one situated in a small Honeysuckle (Banksia) tree, just 16 feet from the ground. In this instance I also allowed ample time for the bird to complete her laying, but, as previously noted, but one egg was laid.

I have no doubt that the birds build in isolated pairs over a wide area, though I only located the two pairs, separated by something like a distance of two miles. Quiet, unfrequented localities, where the timber is big and tall, with permanent water in the vicinity, is no doubt the spots chosen by these birds for nesting purposes, and they probably migrate northwards as soon as the young are capable of sustained flight.

In the "Records of the Australian Museum," vol. ii., No. 1, page 13, a short account is given by Mr. A. J. North, F.L.S., of the discovery of a nest, which contained but one egg, by Mr. C. C. L. Talbot, on Collaroy station, Broad Sound, 556 miles north-west of Brisbane, during the month of September, 1882, This nest was situated forty feet from the ground, in an ironbark tree, and is, so far as I am aware, the only occasion previously recorded of the discovery of the nest of this bird.

I am exhibiting to-night two nests and two eggs, one from each pair of birds, and the eggs show considerable difference in shape, also in the ground colour when seen in daylight. In conclusion I may state that both birds perform the task of building the nest, as I observed each of them so occupied. The nest will always be a most difficult one to find, owing to the extremely shy and retiring nature of the birds, and from the fact that the female sits so closely that she will not be flushed from the nest by anyone passing ever so near to her on the ground.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 8th February, 1897. The chair was occupied by Mr. J. Shephard, one of the vice-presidents, and some eighty members and visitors were present.

REPORTS.

A report of the excursion to Nar-Nar-Goon on Saturday, 16th January, was forwarded by the leader, Mr. H. Giles. The members attending this excursion were rather successful, some rare beetles being collected, among which were *Chondropygia gulosa*, *Tetralobus Cunninghami*, *Galbodema Mannerheimi*, *Chaodalis Macleayii*, *Schizorrhina Bestii*, and *Tricaula Philipsii*.

A report of the excursion to Ferntree Gully on Foundation Day, 26th January, was read by the leader, Mr. F. G. A. Barnard, who mentioned that the excursion was fairly successful and an enjoyable day was spent. Among the plants obtained were *Cynoglossum latifolium*, *Coprosma Billardieri*, *Dianella Tasmanica*, *Lyonsia straminea*, and *Dipodium punctatum*, as well as several species of ferns. A few beetles were collected, and numbers of the beautiful butterfly, *Papilio Macleayanus*, were seen.

GENERAL BUSINESS.

Mr. F. G. A. Barnard mentioned having received a letter from England, from Mrs. Forbes-Leith, informing him of the death of her husband, one of the original members and latterly an hon. member of the club. It was decided that a letter of sympathy be sent to Mrs. Forbes-Leith.

PAPERS.

By Mr. D. Le Souef, entitled "Notes on a Trip to the Bloomfield River, Queensland." The author gave an interesting account of a trip lately made to the Peter Botte Mountain, near Cooktown, North Queensland. The habits of many of the birds met with, especially the Talegalla, were described, also some of the characteristics of the natives who accompanied him. Bennett's Tree Kangaroos were plentiful, and one of the objects of his visit was to procure some of those on the mountains, in order to determine to which species they belonged. The paper was splendidly illustrated with lantern views from photos. taken by the author.

Some discussion ensued, in which Messrs. Frost, French, Thomas, and Coles took part.

A vote of thanks was accorded Mr. J. Searle for his kindness in providing and managing the lantern.

NATURAL HISTORY NOTES.

Mr. R. Hall read a supplemental list of birds found in the Swan Hill—Kerang district, being the result of several years' observations, and comprising upwards of 50 species of birds in addition to those recorded by Mr. C. French, jun., in his paper read at the January meeting (*Vict. Nat.*, vol. xiii., p. 133). He also read a short note on the mode of attack made upon a Tree Sparrow by the larvæ of a fly which had come under his observation at Myrniong.

Mr. G. E. Shepherd read a note on a pair of Orange-winged Sittellas which he had observed feeding a young Pallid Cuckoo, being the first time he had observed those birds acting as foster parents to the cuckoo.

Mr. E. Anderson announced the discovery of a butterfly, not only previously unrecorded from Victoria, but also probably new to science. The discovery was made near Melbourne, in the course of concerted investigations now being carried on into the life-histories of the rarer Lycænidæ by Messrs. Anderson and Spry. A series of the insect, for which the name of *Lycæna cyrilus*, And. and Spry, MS., is proposed, was exhibited, and it was mentioned that a full description and figures would appear in the Club's magazine at an early date.

EXHIBITS.

The following were the principal exhibits of the evening:—By Mr. E. Anderson.—A new Victorian butterfly, *Lycæna cyrilus*, MS. By Mr. A. Coles.—Straw-necked Ibis, *Geronticus spinicollis*. By Mr. C. French, sen., F.L.S.—Six Australian beetles new to science, viz.:—*Anatasis Muelleri*, Cape York; *Callirhipis Cardwellensis*, North Queensland; *Distichocera Frenchi*, *Aphileus ferox*, Cape York; *Strigoptera Australis*, Mallee, Victoria, and *S. marmorata*, Murray, Victoria. By Mr. C. French, jun.—Eggs of Collared Sparrowhawk, from Central Australia. By Mr. J. Gabriel.—Ferns from the Dandenong Ranges, viz., *Aspidium hispidum* and *Davallia dubia*, var. *cristata*. By Mr. R. Hall.—Skins of eight species of Victorian birds, young and mature. By Rev. J. S. Hart, M.A.—Stones from glacial conglomerate, Carisbrook. By Mr. J. A. Kershaw.—Australian Lepidoptera, including *Antheræa janetta* (showing variation), *Ialmenus eubulus* (light variety), *I. evagoras* (very light variety), and *Agarista casuarinæ* (rare). By Mr. D. Le Souëf—Specimens from North Queensland, in illustration of paper. By Mr. J. G. Luehmann, F.L.S.—A new Eucalyptus, *E. torquata*, from near Coolgardie, W.A., collected by

Mr. W. A. Macpherson. By Mr. F. Reader, F.R.H.S.—*Leptospermum flavescens*, Sm., and *Chorizandra enodis*, Nees., new for the north-west of Victoria. By Mr. G. E. Shepherd.—Pair of Painted Snipe. By Mr. J. Stickland.—Sketches of Diatoms found in deposit left by the recent red rain.

After the usual conversazione the meeting terminated.

THE LATE T. A. FORBES-LEITH.

It is with great regret we record the death, on the 8th December last, at Reigate, Surrey, England, of Mr. T. A. Forbes-Leith, at the age of 62. He was an honorary member of the Field Naturalists' Club of Victoria, and for many years one of its most prominent workers, having been elected a member of the first committee of management in May, 1880. He was twice re-elected to that office, and afterwards for four years filled the position of a vice-president. He visited England in 1887–8, returning to Victoria in 1889, but only remained a few months, and, though a Scotchman by birth, with a long and noble ancestry, from his long residence in the colonies he was a thorough Australian at heart. Family matters, however, required his presence in the old country, and on his final return to England he was in 1890 elected an hon. member of the Club, in recognition of his many services in advancing its interests. At its meetings he contributed several papers on various natural history subjects, the most important being a series of five papers on "The Parrots of Victoria," of which he had an extensive knowledge, which were published in the *Southern Science Record*, vols. ii. and iii. As a regular exhibitor at the monthly meetings and the annual conversaziones, generally of specimens, often unique, relating to his favourite study, ornithology, he will be remembered by many. Ever ready to help a young beginner with advice or information gained during his many collecting trips about the colony, he made many friends. He had amassed a large collection of natural history specimens from all parts of the world, but unfortunately left no directions as to its disposal. He was also possessed of considerable literary ability, and published a volume of "Short Essays" on various subjects, besides being the author of numerous poems.

EXCURSION TO NAR-NAR-GOON.

Saturday, the 16th January, was the day appointed for the excursion to Nar-Nar-Goon, and I much regretted when the train came in to see that the Club was represented by only two members—Messrs. D. Best and G. Mowling. They were met at the station by the local members—the leader and Mr. J. C. Neil—but the latter had to unfortunately leave us almost directly, on account of pressing business. However, his brother, Mr. Cavan

Neil, elected to take his place and share in the day's adventures. About 8 o'clock a.m. a nasty, cold, drizzling rain set in from the south-west, which threatened ill for the day's operations, but after rather more than an hour's duration it ceased, and the sun asserted itself, promising a fine day.

After a brief consultation as to which route to take it was decided to go south towards the vast Koo-Wee-Rup Swamp, but we did not get very far before rain started again for a short time, which made things very unpleasant. However, we persisted in shaking every bit of bloom and likely bush, but found that insects had stowed themselves away in drier quarters for the time, except the spider tribe, whose webs were in evidence everywhere, and I must confess that it is not one of the most pleasant sensations to feel their light, airy scaffolding continually across one's face, let alone clothes, containing, as it so often does, the remains of past banquets of flies, locusts, moths, &c.

After proceeding some distance we came across a large patch of Helichrysum and Leptospermum in bloom, but did not get anything worth noting after a vigorous shaking for some time. Then our first and only capture of the rare Cetonia, *Chondropyga* (*Schizorrhina*) *gulosa* (*Christyi*), was secured on the latter shrub. Soon after we were driven to seek shelter such as it afforded from a neighbouring clump of Peppermint Gums, *Eucalyptus amygdalina*. While there we passed the time in bark-stripping, but did not get many good things. However, we found the fine Longicorn, *Phoracantha tricuspis*, almost ready to emerge from its chamber, and a few of the fine Elater, *Tetralobus Cunninghamii*, were also taken, while hosts of the common bark-dwellers, as Elaters, Cleridæ, Caribs, &c., were left to carry on their domestic arrangements in peace. One specimen was also taken of the singular and curious family of the Paussidæ, *Arthropterus* (sp.) It may not be generally known that this beetle possesses the singular properties of the Bombardier Beetle, described in Mr. C. French's, jun., account of his trip to the Murray, to which I would refer those who have not already heard or read it, but the report of this species is much louder, and distinctly heard as soon as you touch it, while the fluid it discharges is very volatile and nauseous, and if it comes in contact with the fingers it leaves a stain very similar to that made by caustic, and if not wiped off at once is almost as difficult to remove: such is my experience. I am in hopes of shortly finding out the component parts of this gaseous fluid, and, if successful, I will furnish a few notes to the Club, as a medical friend has kindly undertaken to work it out if I can furnish him with live specimens.

After the rain had modified we again sallied forth on our way and shortly captured several beautiful specimens of the rare beetle, *Galbodema Mannerheimi*, in its home retreat. After another

lot of fruitless shaking and walking we were suddenly made acquainted with the scarce and pretty Buprestis, *Cisseis 12-punctata*, which has only been taken in this one narrow strip of land, though the food plant is abundant everywhere in the district, and it has been carefully searched for since the first time of taking it three seasons ago.

Presently one member was seen cramming his bag with what many people would call "firewood." However, we knew it contained larvæ, and of the rare and handsome Longicorn, *Strongylurus cretifer*, to be reared at home. I believe this insect is previously unrecorded for this colony, unless Mr. C. French, F.L.S., to whom I sent a few last season, has done so. Resuming our search, we were rewarded with the two rare Cetonias, *Clorobapta (Schizorrhina) Bestii* and *Tricaulax Philipsii*, in one shake, and needless to say it seemed to add new vigour to that operation, but all we could get were quantities of the two common Schizorrhinas, *S. Australasiæ* and *S. punctata*. Presently, however, another shake revealed the presence of the pretty little Cetonia, *Clithria (Schizorrhina) eucnemis*.

Another heavy drizzle now caused two to seek shelter of neighbouring trees, but our two entomologists braved the rain in hopes of finding something good at home or sheltered in the Leptospermum, and they were rewarded with a few rare Buprestis—*Stigmodera semisuturalis*, *S. Thomsonii*, and *S. Andersonii*; also a pair of the very rare and mimicking Longicorn, *Chaodalis Macleayii*, a rare insect, previously recorded only by Messrs. Best and Kershaw as a Victorian. Captures like these seemed to amply repay us for all the weary walking and shaking with which we spent the next few hours, but we were not very successful in Coleoptera, our best capture being a fine specimen of our largest Clerus, *Natalis Titanus*, only taken once before on a Club excursion to Ferntree Gully, by Mr. Best, or if taken not recorded. We also found a fine lot of larvæ of one of the "Bombyx" moths, *Pinara cana*, and as some of them had already spun their frail cocoons, they were taken charge of for rearing out; a few of the strong, bristly cocoons of another Bombyx, *Darala censors*, were also secured. A few of the latter's caterpillars were covered with numbers of small red parasites, so they were taken, to see if these would cause their death Subsequently I found that they invariably succumbed to the combined attacks of the parasites, and even if they spun up they seemed to die soon after the operation. A number of Tarantulas were also observed covered with these little parasites, and I took two of the finest, male and female, to see if they would die or not, and although I fed them well, on looking in one day I found the good lady banqueting on her lord.

Lepidoptera were not much sought after, but we noted that all the commoner ones were fairly numerous. A few of our best butterflies comprised the Skippers, *Trapezites iacchus* and *T. phigalia* (one worn specimen), the silvery form of *Hesperilla donnysa*, *H. Tasmanicus*, and the very small *Taractrocerca papyria*. The Blues comprised *Chrysophanus aurifer* and *Holochila mœrens*.

Amongst the moths were the following:—Bombyces, *Porthesia obsoleta*, *Spilosoma fulvo-hirta*, *S. obliqua*, and the rarer *S. fuscinula*, the fine *Epidesma chilonaria*, and *E. tryxaria*, *Gastrophora Henricaria* (a worn female), and a few of the beautiful genus Eucloris, viz., *E.* (*Iodis*) *meandraria*, *E. stereota*, and *E. buprestaria*, with several others.

Reptiles were represented by some of the commoner small lizards under the bark or logs we disturbed, of which the most numerous was *Hinulia Quoyi*.

Botany was, I am sorry to say, in want of more attention. Three species of Eucalyptus, *E. amygdalina*, *E. obliqua*, and *E. globulus*, were noted in bloom; the beautiful *Tetratheca ciliata* was observed to be still in flower, as also *Dampieri Australis*. The only orchids noted were *Dipodium punctatum* and two species of Pterostylis.

Notwithstanding the miserable weather experienced, we all agreed that from a collector's point of view the excursion could be considered a success, as though our captures were not numerous they were of considerable rarity.—H. M. Giles.

EXCURSION TO FERNTREE GULLY.

The promise of a hot day greeted those members of the Club who met to take the first train to Ferntree Gully on Tuesday, 26th January (Foundation Day). At Ringwood, the changing station, a wait of half an hour enabled us to count heads and find that there were six Field Naturalists *en route*.

We decided to leave Ferntree Gully proper for the holiday-makers, and started off on the Emerald and Gembrook road, which crosses the gully nearly opposite the park gates. The road, which runs in a south-east direction between the outlying hills of the Dandenongs, is bordered by such shrubs as Cassinias, Bursarias, Acacias, Eucalypts, &c., and we were soon vigorously at work shaking their flowering branches into our open umbrellas. Results, however, were poor: several species of Mordellidæ, Scarabidæ (Cockchafers), with a few Cleridæ and Longicorns, were the principal beetles seen. Continuing along this road we got many pretty glimpses of the ranges on the one side, and of the lower country towards Western Port on the other, and were much pleased with the picturesqueness of the situation of Glen Harrow,

the country nursery of the late Mr. J. C. Cole, situated in a basin on the banks of the Monbulk Creek. A short sketch of the interesting contents of this charming spot appeared in the *Australasian* of Saturday, 6th February.

Descending a rather rough stony hill we came to the Railway Survey Camp on the Monbulk Creek. Here we had been told was a good place to turn northwards into the ranges, and we were fortunate in meeting a resident, who told us there had been a track some twenty years ago up the spur, but we would probably find it rather rough, and leave some of our clothes behind.

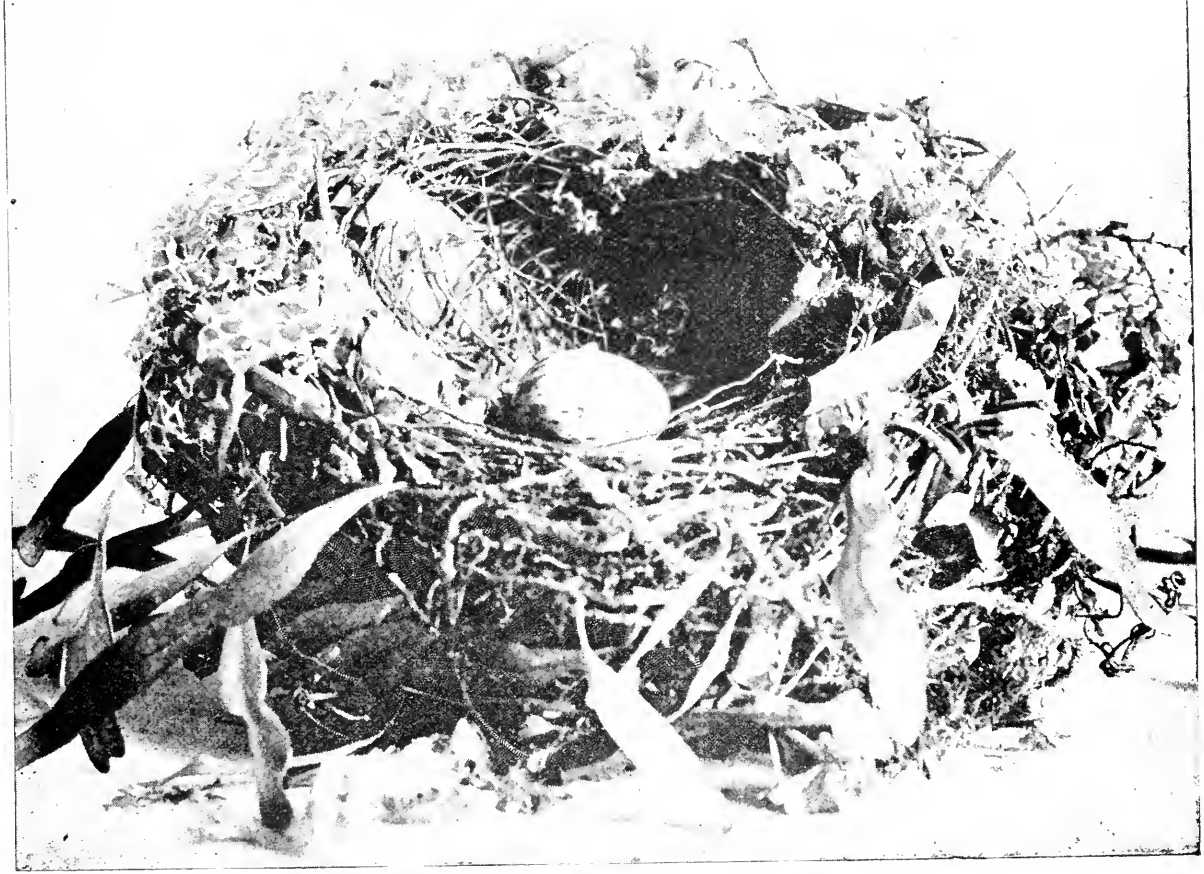
We spent a few minutes on the bank of the creek, and came across *Cynoglossum latifolium*, a small plant with stems covered with hairlets shaped like minute rose thorns. We found the track without difficulty, and working up the hill met with the usual fern-gully vegetation. *Coprosma Billardieri* was noted, with its pretty pink or red fruit, and stems of *Dianella Tasmanica*, a liliaceous plant, were obtained, crowded with beautiful ultramarine-coloured fruit. Presently we emerged on the top of the hill, from which we got a splendid view of the surrounding country, and, finding a track leading in a northerly direction, decided to follow it. The orchid *Dipodium punctatum* was obtained in flower, and more stems of Dianella seen. We were now on a comparatively level table-land. Big timber was plentiful, but without beetles under the bark. Such shrubs as *Senecio Bedfordi*, *Aster argophyllus*, and *Goodia lotifolia* were noted, and in places were festooned with *Clematis aristata*, showing the feathery appendages of the seeds.

Owing to the heat we looked anxiously for a spring, but were disappointed. At last we came to some settlers' houses, and on making inquiries found we were within almost a stone's-throw of the Sassafras Creek, so determined to make for it and lunch among the fern trees. This important proceeding over, some time was devoted to exploring the banks of the creek. The locality, being evidently a well-used crossing-place, was rather open, consequently the vegetation was somewhat knocked about. The stems of the tree-ferns here were of considerable thickness, and the number of abnormal forms was somewhat remarkable—viz., two and three crowns from one stem, stems leaning over then growing straight up, &c. Owing to the progress of the village settlement scheme the country is being opened up, the protecting eucalytpus killed, and consequently the parasitic ferns, such as Polypodiums and Hymenophyllums, did not present such a flourishing appearance as they do in more secluded gullies. Other ferns, such as *Lomaria Capense* (var. *procera*), *Asplenium bulbiferum*, *Pteris incisa*, &c., were obtained. A remarkably fine frond of the latter was noted, being fully five feet high, with a stem $\frac{5}{8}$ of an inch thick. Some Planarians and a land shell were taken under

the fern stems, and some Mountain Trout seen in the stream. Butterflies were rather scarce, *Papilio Macleayanus*, *Pyrameis itea*, and *Xenica Kershawi* being the principal ones seen though not captured. Some fine specimens of the Sassafras, *Atherosperma moschatum*, were growing here.

As we did not know how far we had to travel to reach Ferntree Gully station we did not care to delay too long at the creek, so turned our steps westwards, and climbed a steep hillside, which had at one time been a splendid forest, but is now covered with enormous skeletons of trees. Many of these must have been at least 10 feet in diameter at 6 feet from the ground, and fully 100 feet to the first branch, with a total height of quite 200 feet. We afterwards found that we had lunched only about a mile from the big tree named "The Baron" by Mr. Boyle, of Forest Hill, which he described in the *Argus* some years ago as being 450 feet high and 81 feet in circumference at 4 feet from the ground. These measurements were afterwards corrected by Mr. Perrin, Conservator of Forests, to 220 feet high (top broken) and 48 feet in circumference at 6 feet from the ground (see *Victorian Naturalist*, vol. v., p. 152, and vol. vi., p. 88). Even this size is large enough, I think, to warrant an attempt being made by the Club to see such a tremendous result of Nature's handiwork before it shares the fate of so many of its neighbours, and now that there is a good walking track from Upper Ferntree Gully, might be attempted next spring.

On reaching the top of the hill we struck the track to One Tree Hill, with selectors' houses dotted here and there. It was now very hot, and we were glad to avail ourselves of a drink from a cool spring just below the roadside. Coming to a junction in the track we kept to the left, and presently came to where the road crossed one of the heads of Ferny Creek. Here we halted for some time, and did a little more exploration, but nothing of importance beyond the climber *Lyonsia straminea* was noticed. Some young plants of *Clematis aristata* were removed for home cultivation. After a good ramble we once more got under weigh, and soon reached more open country. Giant trees occurred at frequent intervals, and many splendid Blackwoods were seen. The roadside was bordered with quantities of *Senecio dryadeus*, *Pimelea hypericina*, and *Solanum aviculare*, with its bunches of large green fruit. Further along quantities of *Sambucus Gaudichaudiana*, with its yellowish white currant-like berries were seen and tasted. We now came to the finest prospect of the day. The road first headed a deep gully full of Sassafras, Blackwood, tree ferns, &c., and then turned round the end of a spur, and we overlooked the whole of the Mornington Peninsula. While admiring the view some moths, *Agarista* (sp.), were captured, and an attempt made to secure *Papilio Macleayanus*, but without



NEST OF THE RIFLE BIRD (*Ptilorhis paradisea*).

success. Walking on, in about half a mile we struck the old road from One Tree Hill to the station, and were soon descending as rough a piece of walking as we had encountered all day. This, however, has recently been superseded by a road with an easier gradient, though much longer. After another pause at the gully we made for the station, thus ending a most enjoyable outing, though at times rather warm. Beyond those mentioned few insects were seen. Birds were very scarce; no snakes, and but few lizards were seen.—F. G. A. Barnard.

DESCRIPTION OF THE NEST AND EGG OF THE RIFLE BIRD.

By A. J. Campbell. Communicated by D. Le Souëf.

(*Read before Field Naturalists' Club of Victoria, 11th January*, 1897.)

The discovery of the nest and egg of the Rifle Bird, *Ptilorhis paradisea*, Latham, is of considerable importance. It is 71 years ago since the bird itself was described, and yet only this season have the nest and egg been brought to light. The nest was taken in the Richmond River scrub, on 19th November last, by Messrs. W. T. Bailey and Isaac Foster. It was built in a buoyong sapling, *Tarrietia* (sp.), at a height of about 40 feet from the ground, the nest being placed in an entanglement of vines, which covered the top of the tree. A peculiar feature of the nest was its adornment with shed snake skins, the largest pieces being on the top edge, while a few small bits were in the nest. The nest and egg are exhibited here to-night.

Nest.—Somewhat bulky; outwardly constructed chiefly of green stems and fronds of a climbing fern, with a few other broad leaves at the base, ornamented round the rim with portions of shed snake skins, probably from the Carpet Snake, *Morelia variegata*, lined inside with wire-like rootlets and a few scales of snake's skin at the bottom. Dimensions in inches—over all 8–9 in. by 4 in. in depth; egg cavity 4 in. across by 2 in. deep.

Egg.—In shape, inclined to oval, but more swollen about the upper quarter; shell, fine in texture, surface somewhat uneven, but slightly lustrous; colour, rich fleshy tint, moderately but boldly marked or streaked longitudinally with reddish brown and purplish brown, the markings being more numerous on the apex and upper quarter. Some of the markings have the appearance of having been painted on with a fine brush. The egg resembles in general character the smaller egg of Victoria's Rifle Bird, but is richer in the ground colour, with the markings not so elongated. Dimensions in inches—1.29 x 0.98.

CONTRIBUTIONS TO THE FLORA OF VICTORIA. No. I.

By F. M. Reader. Communicated by C. Frost.

(*Read before Field Naturalists' Club of Victoria, 11th January*, 1897.)

Description of a New Species of Acacia from the North-Western District.

Shortly prior to his demise, Baron von Mueller, the great authority on Australian plants, informed me that this species had been wrongly included in *Acacia obliqua*, Cunn., and advised that ample material should be obtained in order to arrive at a correct and complete elucidation of the species, and after many journeys to the habitat of the plant I have only recently succeeded in acquiring the necessary specimens. The lamented death of Baron von Mueller so suddenly ending his laborious and valuable researches has prevented this new species being described by him. I have therefore considered it necessary and obligatory on my part to prepare an analysis of the plant, and record it as a species new to science.

Acacia glandulicarpa, F. M. Reader.—A decumbent or erect, almost intricately much branched shrub, from about 1 to above 5 feet high; branchlets terete, hoary or scantily beset with appressed shining hairs. Young shoots viscid.

Phyllodia small, from $\frac{1}{8}$–$\frac{3}{8}$ of an inch long, oblique, thick, undulate, and shining; from oblong-obovate to almost rhomboidal; shortly thick-pointed, minutely glandular-dotted, margin entire, thickened; usually 2-veined; veins either prominent, thick, or impressed, forming two shallow furrows, or merely lines. Secondary veins scarcely prominent, somewhat anastomosing. Stipules small, thick, almost deltoid, persistent.

Flower-heads small, 8–20-flowered or more. Peduncles solitary or in pairs, reddish, slender, shorter than or as long as or finally longer than the phyllodia, from $\frac{1}{16}$–$\frac{3}{8}$ of an inch long, spreading or deflexed. Bracts concave, yellowish or brown, almost deltoid-spathular, slightly longer than the calyx, ciliate and beset with whitish shining hairs, with a thick, conspicuous, slightly excurrent nerve.

Calyx yellowish-white, 5-lobed; lobes about as long as the tube, ciliate, somewhat clothed with whitish shining hairs.

Corolla divided into 5 petals; petals glabrous, oblong-ovate, slightly oblique, rather acute, with a broad prominent nerve.

Pods almost straight or curved, constricted between the seeds, narrow or broadly oblong, $\frac{1}{2}$–1 inch long, viscid and covered with glandular-whitish shining hairs.

Seeds dull-black or olivaceous, oblique, obovate-elliptic, depressed, $\frac{3}{16}$ of an inch long.

Funicle short, thin, whitish; strophiole ample, unilaterally extending to the middle of the seed.

The seeds often appear glossy from the viscid exudation adhering to the testa, giving them a polished appearance.

Flowering from July–October. In hilly mallee country, north-west from Dimboola.—F. Reader, 1895.

This species systematically approaches *A. obliqua*, but differs from it in the calyx being lobed, in the phyllodia 2-veined, the pods glandular hairy, and other characteristics. It may easily be confounded with *A. armata*, R. Br., but at once be distinguished from that species by the non-acicular, small stipules.

RELIQUIÆ MUELLERIANÆ:

DESCRIPTIONS OF NEW AUSTRALIAN PLANTS IN THE NATIONAL HERBARIUM, MELBOURNE.

By J. G. Luehmann, F.L.S., Curator.

(*Read before Field Naturalists' Club of Victoria, 8th February*, 1897.)

Eucalyptus torquata, Luehmann.

Leaves petiolate, lanceolate, slightly oblique at the base, about 4 inches long, ½ to ⅔ inch broad, coriaceous, the lateral veins oblique, but hardly visible except under a lens, of a dull greyish-green colour on both sides. Peduncles axillary or lateral, slender, nearly 1 inch long, bearing an umbel of about 7 flowers. Pedicels as long as the peduncle, slender, mostly somewhat quadrangular. Calyx about 4 lines long, the base abruptly dilated into a ring with 7 to 10 prominent vertical ridges, the upper portion turbinate or nearly cylindrical, slightly streaked, the rim narrow. Operculum with a basal protuberance similar to that of the calyx, the upper part forming a narrow cone fully 3 lines long. Stamens all fertile, 4 to 6 lines long, the filaments of a reddish-orange colour; anthers rather large, truncate, and broader on top than at the base, opening by longitudinal parallel slits. Ovulary 5-celled. Fruit not seen.

Western Australia, in the neighbourhood of Coolgardie; W. A. Macpherson.

Although only a single specimen of this species is available I have ventured to submit a description of it on account of the most singular dilatation of the calyx. It seems to have the greatest affinity to *E. incrassata*, especially as regards the anthers. It also bears some resemblance to *E. decurva*, but that species has very small nearly globular anthers.

NOTES.

Mimicry amongst Victorian Birds and Insects.—I would like to draw attention to the interesting peculiarities of protective and deceptive mimicry noticeable in several of our Victorian birds and insects. Professor Drummond has given us a highly interesting account of the habits of an African species of Phasmidæ, which is almost impossible to distinguish from the dry grass amongst which it lives. We have also the results of observations made by A. R. Wallace on some South American

insects; but popular attention, I think, has not been directed to our local examples. Take, for instance, the Tawny-shouldered Podargus. As he sits lengthwise on some dry limb, with eyes closed and beak elevated until it is on the same angle as the body, and the whole bird as motionless as if carved in stone, it is difficult to believe that this ungainly object is anything more than a dry limb broken off, and even a careful observer may be deceived. Another instance is noticeable in the Southern Stone Plover, though not to the same extent as in the Podargus; by choosing a place where its colour harmonizes, together with its habit of keeping rigidly still, and in a peculiar position, it is assimilated to its surroundings to such an extent that it is hardly perceptible. No doubt the Curlew finds its powers of mimicry a great protection, for the Wedge-tailed Eagle is constantly on the alert for its long-legged quarry. But with the different orders of insects this peculiarity is much more strikingly apparent, and of far greater variety. Thus, in the case of one of our large "stick-insects," Phasmidæ, the whole insect, both by reason of colour and shape, bears an amazing resemblance to the small branches and leaflets of the tops of trees, upon which it feeds. Again, some kinds of caterpillars greatly resemble their immediate surroundings, notably those which form themselves into an arch or loop when moving. One of the most perfect instances of mimicry that I have observed in caterpillars is a small grey one, about an inch in length, which is an exact counterpart of a portion of dry "Bull-oak" leaf. When resting on these dried leaves I would defy the keenest-eyed bird to detect its presence, and it was only by seeing these bits of rubbish move that the writer became aware of their real nature. Then, again, we have a small Curculio of a brown colour, with a black spot arranged in a lighter patch at the base of the elytra in such a manner as to form a remarkable likeness to a knot in the branch to which it clings. Of the same nature as this, but with a different object in view, are several small spiders, common in the Mallee districts, and known as "jumpers," from their habit of leaping from point to point, and by which they also secure their prey. The habitat of these spiders is amongst the dried twigs and rubbish on the ground, and when in their favourite attitude on some dry stick, the unwary sand-fly or gnat will approach within an inch or two, unconscious of the presence of its subtle foe, until a sudden, powerful spring and a sharp bite completes the tragedy. Amongst moths, especially the smaller species, there are several which, on account of their colour, and by their ability to fold their wings close to the bark of the trees upon which they rest, are able to render themselves almost invisible. Many other instances might be mentioned in which these peculiar characteristics are exhibited, but perhaps enough has been said to attract the attention of other observers, and lead to the publication of further notes on the subject.—J. C. Goudie, Birchip, Victoria.

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FIELD NATURALISTS' CLUB OF VICTORIA.

THE ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 8th March, 1897. The president, Professor W. Baldwin Spencer, M.A., occupied the chair, and about 70 members and visitors were present, including Mr. J. H. Maiden, F.L.S., Curator of the Botanic Gardens, Sydney.

PAPERS.

1. By Mr. F. M. Reader (communicated by Mr. C. Frost, F.L.S.), entitled "Contributions to the Flora of Victoria, Part II." The author described a new grass belonging to the genus Stipa, which he had named *Stipa acrociliata*. It was collected by himself in the Sandy Desert, Lowan, Victoria, in 1895. In aspect it is quite distinct from any described species.

2. By Mr. A. J. Campbell (communicated by Mr. D. Le Souëf), entitled "Three Rare Nests and Eggs of Australian Birds." The author described the nests and eggs of the Purple-breasted Fruit Pigeon and Red-crowned Fruit Pigeon, from Richmond River, New South Wales; also of Jardine's Campephaga, Victoria.

3. By Mr. D. Le. Souëf, entitled "Notes on a Trip to the Bloomfield River, Queensland." The author gave an interesting account of a trip to the Bloomfield River district, and described his visit to the Hope Islands, near the Barrier Reef, giving a brief sketch of the growth of the coral reefs. He also described a visit to King Plains, where in the lagoons immense numbers of waterfowl were seen. In the same district the disastrous effect of the tick pest was evident on all sides. The paper was illustrated by a series of lantern views from photographs taken by Mr. Le Souëf and kindly shown by Mr. J. Searle. A short discussion ensued, in which Mr. E. J. Thomas and Professor W. Baldwin Spencer took part.

NATURAL HISTORY NOTES.

Mr. R. Hall read a note on a White-faced Xerophila, *X. leucopsis*, which had built its nest in the rolled-up curtain of a waggonette at Lake Boga, in the Swan Hill district, and also a note on the plumage and nidification of the Hooded Robin, giving his observations on the various changes of plumage in these interesting birds.

Mr. C. Frost, F.L.S., mentioned having noticed the Spine-

tailed Swifts at Kew earlier this year than usual. Mr. R. Hall said the birds have arrived several weeks earlier than in previous seasons.

EXHIBITS.

The following were the principal exhibits of the evening:—By Mr. F. G. A. Barnard.—Flowers of *Melaleuca squarrosa*, grown at Kew. By Mr. A. Coles.—Five specimens of the Regent Bird, *Sericulus chrysocephalus*, of different ages, illustrating the progress of development of their plumage from brown to black and yellow; three specimens of the Satin Bower Bird, *Ptilonorhynchus holosiricous*, two males and one female, full plumage and half plumage; also a domestic fowl's egg shaped like a boomerang. By Mr. C. French, jun.—Black Honey-eater and eggs, from Mallee, Victoria. By Mr. J. H. Gatliff.—*Pecten laetus*, *P. laqueata*, from Japan, *P. asperrimus* and *P. laticostatus*, from Victoria. By Mr. R. Hall.—*Xerophila leucopsis*, with nest, and photograph of position; skins of Queensland Finches—viz., *Peophila leucotis*, *P. acuticauda*, *P. Gouldiæ*, *P. cincta*, *Stictoptera Bichenovii*, *Munia castaneithorax*, and skin of Hooded Robin, immature male, from Victoria. By Messrs. George and Gerald Hill.—Collection of destructive insects and their parasites; also collection of injurious fungi, with microscopic slides of their spores. By Mr. J. G. Luehmann, F.L.S.—New eucalypt, *E. corrugata*, from Golden Valley, Western Australia (collected by Mr. W. A. Sayer). By Mr. J. Paul.—Native flowers, including *Epacris impressa* (pink variety), *Cryptostylis longifolia*, and *Prasophyllum intricatum*, collected at Grantville. By Mr. F. M. Reader.—A new grass, *Stipa acrociliata*, in illustration of paper. By Mr. H. T. Tisdall—Seaweeds from Ocean Grove, Victoria, *Cystophora subfarcinata*, *Sargassum muriculatum*, *Seirococcus axillaris*, *Gigartina lanecuta*, *Ptilota coralloidea*, *Caulerpa sculpelliformis*, *Phacelocarpus sessilis*, *Curpomitra cabrerœ*, *Callithamnion verticale*, *Nitophyllum subfulcrum*, *Gelidium glandulifolium*, *Callophyllis Lambertii*, and *Grateloupia Australis*.

After the usual conversazione the meeting terminated.

NOTE ON THE OCCURRENCE OF *EUCALYPTUS MACULATA* IN EAST GIPPSLAND.

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

According to the "Eucalyptographia" of the late Baron von Mueller this eucalypt is recorded from the vicinity of Port Jackson, northwards. Recently, however, Mr. J. H. King, of Buchan, has reported the occurrence of this handsome variety on the eastern slope of a spur from the Tarra Mountain, on the track from Buchan to Orbost, and about 15 miles from the

former place, where it forms a small compact colony of a few acres in extent.

Mr. King procured samples of the fruit and foliage, also with some difficulty a sample of the timber, which was of extreme toughness. A peculiarity of the tree is that the bark forms ridges, to be described as inverted flutings, extending a considerable distance up the boles, which are probably, in the largest examples, about 100 feet up to the branches, and about 3 feet in diameter. The bark is dehiscent from the ground upwards, coming off in "clouts," thus producing markings which have given rise to the local name of "mottled gum," a characteristic and preferable title to that of "spotted gum," used in New South Wales and applied in Victoria to *Eucalyptus goniocalyx*.

Mr. King is not aware of the occurrence of this tree in any other part of the district. The samples collected agreed with the description in the "Eucalyptographia," and also with the type specimens in the "National Herbarium," which Mr. Luehmann was so good as to exhibit, one being from Mount Dromedary, near Bega, N.S.W.

ASCENT OF MT. PETER BOTTE, NORTH QUEENSLAND.

By D. Le Souef.

(*Read before the Field Naturalists' Club of Victoria, 8th February*, 1897.)

I left Melbourne on 3rd October, by the s.s. *Arawatta*, for Cooktown, North Queensland, to endeavour to ascend Mt. Peter Botte (named after the Peter Botte in Mauritius), 50 miles south of that town. We reached our destination on 13th October, and after a delay of two days secured two pack-horses for my luggage, and a man to take charge of same, and started on foot for "Wyalla," on the Bloomfield River, about 40 miles distant. After going along the road for about 5 miles we came to a fine bridge over the Annan River. This stream is tidal here and is a large body of water; it is reported to be the favourite haunt of crocodiles, and many a beast has lost its life in crossing before the bridge was built. The road was dusty, perfectly shadeless, as bush fires had swept over the country, burning all the grass, and also causing all the white, smooth-barked eucalyptus trees to shed their leaves; water was also scarce, and the sun very hot, the coast ranges keeping off most of what little breeze there was. About mid-day we arrived at the Trevetan or Black Mountains, so called because the granite rocks are all covered with black lichen wherever exposed to the weather. These ranges are about a mile long and are composed solely of granite boulders, varying considerably in size, and whatever earth or vegetation may have

once been there, has now all been washed away. In many places it is possible to go for a considerable distance down, working one's way from crevice to crevice, caused by the rocks resting one on the other. Individual rocks scattered about the country were also often covered with the same black lichen. Among the boulders very dark coloured lizards were numerous, but were too nimble to be caught. The Short-eared Rock Wallaby (*Petrogale brachyotis*) was apparently numerous, but very difficult to catch sight of, as they were exceedingly active among the rocks. A skin obtained from this locality is in the Melbourne Museum, kindly sent by Mr. R. Hislop. They remain in shelter during the day, coming out to feed in the open country at night.

Occasionally a group of fig trees and stinging nettles would be found growing on the hillside, the former sending their roots far down to obtain sufficient moisture on which to live, but a parasite fig tree will grow where no other tree would. The nettle trees grow on the mould caused by the dead, decaying leaves of the fig tree.

Proceeding on our way we reached the Ellenvale public-house towards evening, having travelled 22 miles. I walked, but my companion rode. About sunset numbers of sulphur-crested cockatoos assembled on a tall eucalyptus tree, which grew close by, to roost, and from their lofty perch they overlooked a China-man's garden and maize crop, and the owner had to get up very early to be there before the birds commenced to sample his produce. A flock of about thirty Banks's Black Cockatoos roosted on another tree about a hundred yards away, and I heard them uttering their curious cry at various times during the night. The Spectacled Flying Fox was also seen passing overhead, on its way to some feeding ground. In the beforementioned China-man's garden the various vegetables grew to perfection, despite the tropical climate, but, being situated on the banks of the Annan River, there was a good water supply.

Next day we resumed our way, and found the road much more hilly and with more timber, and at one place passed through a belt of scrub and enjoyed the coolness of the deep shade. Here the mound of a Megapode was noticed, of considerable dimensions, being about fourteen feet wide at the base by six feet high ; but the birds had not commenced to lay. Further on we passed the junction of two streams—one was beautifully clear, but the other very muddy, which was caused by the tin-mining carried on near its source. We passed a tin-miner busy washing away a small portion of the side of the hill, and the water-race he had constructed was 3 miles long. Some portions of the track were very hilly, and when scrambling up a sheep incline I passed by a pair of Black-breasted Turnix (*T. melanogaster*), which were exceedingly tame, and let me approach within a foot

of them before they slowly walked away, without apparently any alarm. On going through a small belt of scrub by a creek we passed underneath a Quondong tree, and there were quantities of the bright blue ripe fruit lying on the ground. These trees grow either near running water or at the bottom of a gully, where their roots can get plenty of moisture. The colour of the Victorian Quondong when ripe is red, and one rare variety white. When near the Trevetan Mountains I was told of a spring from which the water flowed during the daytime, but not at night, which seems to vary from the general rule, which is the opposite. When passing through a small stream we disturbed a green water-snake, which quickly took refuge under a stone in the deeper part of the water: these reptiles were seen on several occasions. The tracks of many small mammals and lizards were visible, imprinted on the dusty road; but during the whole distance we only saw the trail of one snake, and that a small one. We arrived at our destination during the afternoon.

Two days after a start was made for Peter Botte. I was accompanied by Mr. Frank Hislop, Mr. Anderson, and six natives. Leaving "Wyalla" during the afternoon, we camped at the Bloomfield River, 6 miles off, for the night, and an early start was then made in a cutter down the coast to Cowie's Creek, about 10 miles distant, but as wind and tide were against us it was well towards evening before we reached it; our natives had gone overland, and arrived there first. We camped for the night on the beach, at a spot evidently much used by the natives, judging by the heaps of broken shellfish and Zamia nuts. During the evening we fished in the creek, which, like all these streams, is tidal for some distance up; but, although mullet and other fish were plentiful, especially when the tide was coming in, we found they were very shy at being caught. Early next morning we started on foot to Emmagen Creek, about 3 miles on, from which point we intended striking inland. Our boatman sailed his craft round to the same place with our luggage; but, as he had a strong head wind, which meant a wet and unpleasant time for those on board, we decided on walking, being told it would not take long; but if we had known how steep the road was we would have probably stuck to the cutter. Our track soon left the sea coast, and we had to climb some very steep inclines, and the grass being dry and slippery made it more difficult. We arrived at our destination about ten o'clock, after a very trying tramp; but the cutter did not put in an appearance until late in the afternoon. This place had been used as a camp before by timber-getters, and we camped for the night in an old humpy, thatched with grass; our natives sleeping alongside the entrance, in a separate mia-mia—they, as usual, lying round the fire, which they kept burning throughout the night.

In the creek were large logs of cedar and other timber awaiting transhipment. They were fastened together with chains, and long strands of lawyer cane were fixed on to the chains and fastened on to the bank, to prevent their being shifted by the incoming and outgoing tide. A good deal of cedar comes from the scrub in this district. They are cut during the dry season and brought to the sea-coast by bullock teams, when they are towed up to the sawmills on the Bloomfield River; but, of course, it can only be done in fine weather, and with a fair breeze. When a log is very green, and barely floats, a large log of lighter weight has to be fastened to it, which acts as a float. In the evening we watched the Torres Straits Pigeons, *Carpophaga spilorrhoa*, flying out to the islands on the Barrier Reef to roost, the islands being about 20 miles away. Hermit crabs were numerous in all kinds of shells, of various sizes, which they had usurped—I think the crab generally makes use of empty dead shells that they find on the beach; but good shells were very scarce, much more so than I expected, and it was quite the exception to find a good one; on the islands of the Barrier Reef they were more plentiful. We again fished at sundown, but with little success. There are supposed to be crocodiles in these streams, in the deep water overshaded with mangrove and other trees, but we saw no traces of them; sharks, however, came in with the tide, probably following the shoals of fish, mullet being the most plentiful. Early next morning we apportioned each one his load, and after breakfast started off in single file. Our guide and another had to lightly clear the way for those following. The track for the first mile led through open country and patches of scrub, and occasionally along the rocky bed of some creek, but after a time we entered thick scrub, which continued all the rest of the way to Peter Botte.

A halt was made for lunch alongside a mountain stream, and we soon had a fire lighted, and were all glad of a spell, as the road was very rough, and the steep mountains we had to climb were very exhausting. After a time another start was made, and we reached our first camping ground during the afternoon. The natives made our humpy of Fan Palm leaves—first a framework was formed of light saplings bent over and fastened together, and then the large leaves of the palm laid on; these made a rain-proof dwelling, and all those of the natives in this district were made in the same way, but covered with whatever they could get nearest at hand, either the leaves of the Fan Palm, Lawyer Palms, grass, or bark. The size depended on the number of inmates; but the natives here make their dwellings considerably larger than those at Cardwell. For myself, previous experience has taught me that the most comfortable thing to sleep in when camping out is a hammock, as one is then comparatively free

from insects, &c., &c. Our camp here was 500 feet above sea level. Fan Palms grew luxuriantly, and were very beautiful. A male Victoria Rifle Bird frequently called out in our immediate vicinity, and was far from shy. Allied and other Fruit Pigeons were occasionally heard, and a Sulphur-crested Cockatoo was shot while feeding in a high tree over our camp. The loud note of Quoy's Butcher Bird, *Cracticus Quoyii*, was often heard, but the bird seldom seen. Tracks of domesticated pigs gone wild were noticed on several occasions. It gets darker in the scrub under the thick canopy of leaves much sooner than in the open country, and as the shades of evening drew on the notes of the day birds gradually ceased and other calls took their place—occasionally a kind of hooting, probably of one of the larger owls, then the note of the Boobook Owl, *Ninox boobook*, the shrill loud cry of the Megapode, *Megapodius tumulus*, which roosts near the top of some high scrub tree and frequently calls out. The Cicadæ also commenced their shrill note, having been quite quiet during the day ; crickets and frogs added their quota to the noise. Large brown moths flit by, and humming moths fly rapidly past. When the twilight has passed away the darkness grows intense, and then almost all sounds cease, except perhaps the squealing of Flying Foxes, *Pteropus conspicillatus*, as they quarrel over some fruit they may be feeding on. Fire-flies also flit about, showing off their bright light. Later on, when the moon rose, a few sounds were again heard.

The next day being Sunday we remained in camp, and it was exceedingly interesting, sitting quietly alone in the scrub, away from the sounds of the camp, and listening to the various notes of the birds, many of them being very melodious, and also watching their habits as they came within view. We often discovered where the Fruit Pigeons were feeding by hearing the fruit-stones dropping on the leaves below, especially if they fell on those of the Fan Palm; and when a shower passed over the noise of the falling rain on these leaves could be heard a considerable distance. Our camp was situated on the banks of a small creek, stones being plentiful in its bed—in fact, you could not find one that was not stony. A good many scorpions were found under logs, and small black ants were exceedingly numerous, but we were thankful there were no green ones or mosquitos. During the day the natives shot a Tree Kangaroo for food, and caught a young one, but we could not take it with us ; the former was soon cooked and eaten. In the rotten logs an earthworm was plentiful, which, on being touched, commenced a series of violent wriggles, and if held, generally ended by its coming in half. Planarian worms were occasionally seen, and a few land shells, but the latter were generally in places of security, either under

logs or stones or in hollow branches, waiting for the wet season to set in, for at this time of the year the ground in the scrub was very dry, except on the mountain tops, where passing clouds kept it moist. Close to the camp grew a group of Fan Palms; they were very beautiful, reflecting the light from their large shining green leaves, which were about three feet in diameter, and up some of the tall trees the Lawyer Palm had climbed, many of their strong vines being over 150 feet in length. At the edge of the scrub a number of Stinging Nettle shrubs were growing, and very pretty they looked, with their large, soft-looking dark green leaves. I have often heard it stated by others that, if passing through or close to a clump of these plants the leaves of which have been disturbed by passing cattle or otherwise, a fine powder seems to get into the nose and eyes, causing considerable and unpleasant irritation.

At seven o'clock on Monday morning we started off again, but left some of our luggage behind, as there was more than we could conveniently carry. We made it as secure as possible, as a Dingo had been heard howling during the previous night, and we did not want him to get at it. Our track lay up steep mountain sides, all the more difficult from our each having a good load to carry, which only left one hand free; sometimes we had to climb from rock to rock up a watercourse, then again on narrow ridges, which were generally covered with loose stones, creepers, roots, &c.

At last we reached the narrow saddle of the range we were climbing, and found it 2,400 feet high and 1,900 feet above our last camping place. The trees were all very stunted, and tree and other ferns plentiful. Everything was dewy from the passing clouds, and the vegetation luxuriant. On climbing to the top of a Fig tree we obtained an extensive and beautiful view. Fan Palms were absent; they do not seem to grow here at the altitude of 600 feet, but other kinds were plentiful. The fallen timber, and also stones, were generally covered with mosses of different kinds, and various land shells were noticed. We saw numerous traces of Bennett's Tree Kangaroo, *Dendrologus Bennettianus*, and observed Victoria Rifle Birds, *Ptilorhis Victoriæ*, Queensland Cat Birds, *Ailuræedus maculosus*, Noisy Pittas, *Pitta strepitans*, var. *simillima*, Spalding's Orthonyx, *Orthonyx Spaldingi*, Shrike Thrushes, Tallegallas, *Tallegallus Lathami*, Quoy's Butcher Bird, Sulphur-crested Cockatoos, Superb and other Fruit Pigeons. We had lunch on the banks of a mountain stream, at the elevation of 2,000 feet. The scrub was very dense, and often difficult to get through, Lawyer Palms being, unfortunately for us, plentiful, and some of their canes were very long, trailing on the dark-coloured ground like long, green snakes, and very slippery to tread on. In some places the ground was covered with loose stones, small

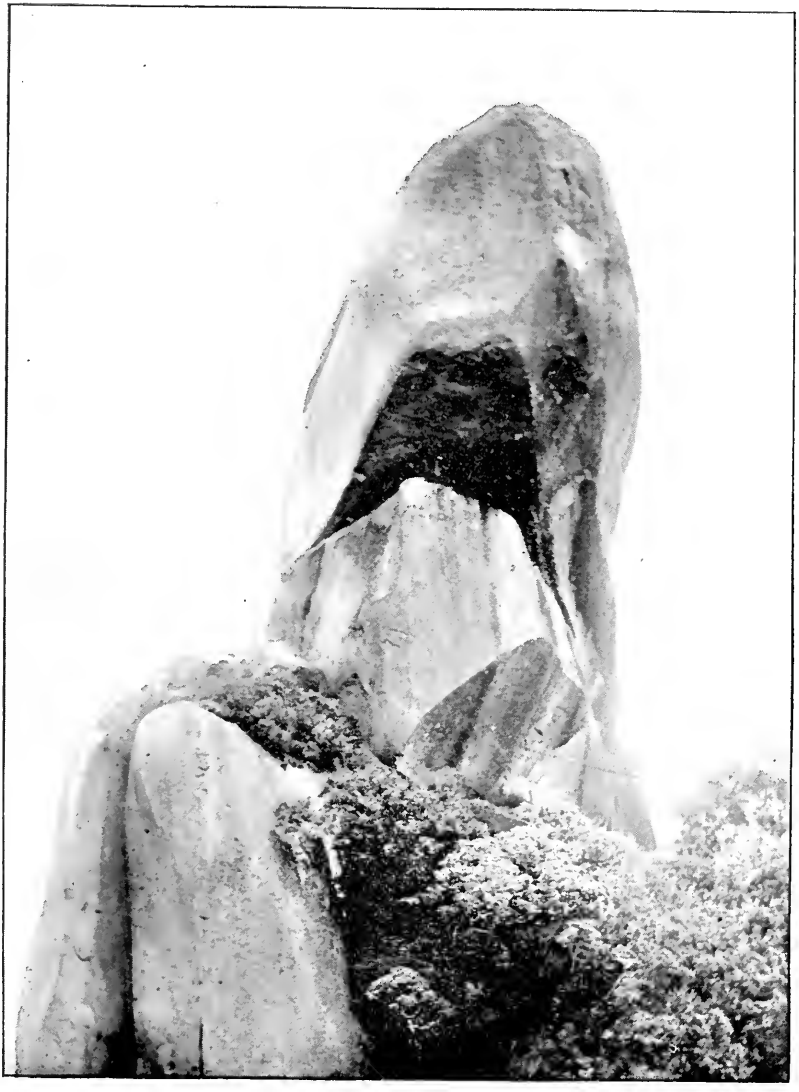
ferns and roots, the surface soil having evidently been washed away, and had left a network of roots and stones exposed, many being covered with moss; but it was very rough to walk over. Lycopodium also occasionally covered the ground. Close to our camping place were some high granite rocks, almost covered with orchids, ferns, creepers, and moss. Orchids of various kinds were also noticed on many of the trees. On having rested we started again, and after about two hours' walking and stumbling through thick scrub, and crossing three streams, we arrived at our camp, which was well situated at the base of a huge granite boulder, about 20 feet high, 40 feet long, and 15 feet wide, and on the top were growing Fig trees and other shrubs, and in the neighbourhood were found many similar large isolated granite boulders, showing that the soil is being gradually washed away.

Our height above sea level was 2,000 feet. We soon had our tent fixed up and fires burning. The natives preferred sleeping round their fires, under the shelter of the rock, to building a humpy. I have often read about natives being early risers, but those I have come in contact with are certainly not so, as a picture taken of the camp at 8 a.m. will show. I think hunger was the principal inducement for them to get up. Within twenty yards of our tent was the mound or nest of a Tallegalla, very picturesquely situated at the foot of a big Kauri Pine and a palm, but the birds had not yet commenced laying in it. Several other mounds were found in the neighbourhood, and the natives going out soon brought back a supply of eggs, and also a Bennett's Tree Kangaroo they had shot. Before cooking it they beat it with the back of a tomahawk and broke most of its bones, especially the legs and arms. They then threw it on the fire as it was, and singeing off the hair, left it for a short time on the fire. They then opened it and removed the entrails, which were thrown away, but the paunch, being emptied, was not wasted, and, with the liver, was placed on the fire to cook. The hind feet and the tail were next cut off and placed on the fire. The rest of the body was then placed on its back on a previously prepared fire, which when first made up had a lot of stones placed on it and when the fire had burned down, and the stones nearly red-hot, a place on them was scraped out on which to place the kangaroo, the upper surface of the meat being also covered with the heated stones; it was then left until cooked. When the amount to be cooked is small it is often covered with green leaves, which help to keep the steam and heat in and cook the meat more quickly. When the feet were sufficiently cooked they pulled off the bare skin of the cushion and breaking the toes one by one, eat the flesh and fat that may be there. The tail they cut off bit by bit at the joints and eat what they can get. When the wallaby is sufficiently cooked they cut it up and divide it between them. What they

cannot eat then is put on one side until they are hungry again. Birds and other things they kill are cooked in the same way, but if they are very hungry they won't trouble about the stones. It was astonishing how much meat they could get through at one meal. What food they got themselves they counted as extra, as they always expected us to give them the usual quantity at meal time. I used to wonder why the natives shifted their camp so often; but I don't now, as, although we were only in ours three days, the amount of evil-smelling refuse that the natives had thrown away close to the camp was considerable, and the odour was perceptible on the third day before the camp even came in sight, and being in thick scrub, there was not much breeze to carry it off, and flies and ants were attracted in numbers. If we had had several dogs, instead of only one, it might not have been so bad. The small black ants were very plentiful—too much so for us—but we found no green ants above 500 feet; but down near the sea-coast they were, practically speaking, everywhere, both in the scrub and open country. Early next morning we were awakened by the notes of the different birds. Quoy's Butcher Bird seems to commence first. Many of the calls were very curious, as, for instance, Newton's Bower-Bird, *Prionodura Newtoniana*, makes a noise exactly like a frog does when being caught. Then, again, the Queensland Cat-bird, Orthonyx, and the Pitta all have strange cries. A Pheasant-tail Pigeon, *Macropygia phasianella*, was shot in a tree over our heads, and was plucked and eaten by the blacks within fourteen minutes of being shot.

After breakfast a start was made for Peter Botte, about a mile distant. We could only obtain a view of it from our camp by climbing up a tree and so getting above the surrounding scrub; but our old guide led the way, marking a track as he went along. We soon crossed one romantic-looking stream, the bed being full of big boulders, and the water cold and clear, but no fish were seen in it. After a time we suddenly came on about two acres of solid bare granite rock, covered with black lichen; it was a great relief to get out of the scrub and to be able to get a more distant view. On ascending to the upper portion we caught sight of Peter Botte, seemingly quite close, with its higher peak enveloped in clouds. In the hollows in the rock a grassy-looking plant grew very thickly; it clung to the rock, and being very tough, was difficult to get off; the ends of its narrow leaves were very sharp and prickly, but we did not find that out until my companion sat down on its soft-looking surface to rest—but he did not stay there long. There was a beautiful ground orchid in flower, its petals being deep pink, covered with black spots, and in the hollows between the rocks patches of coral fern and several other plants grew, which I noticed were similar to those in Gippsland, Victoria.

On passing on we found a valley between ourselves and our



SUMMIT OF MOUNT PETER BOTTE, NORTH QUEENSLAND.

FROM NEGATIVE BY D. LE SOUEF

goal, and it was a good hour's stiff walk and climb before we got to the foot of it. When looking at these hills from a distance, they, being all covered with scrub, look smooth and easy to travel over, but in point of fact their surface is mostly covered with masses of rock, especially in the bed of any mountain stream, which washes the soil away to the depths of twenty feet or more, and we had a good deal of difficulty in working our way up one of these streams, having to crawl through holes, clamber along edges, jump over deep crevices, &c., and were thankful at last to reach the foot of the big rock which we had come so far to ascend. Only one of our natives, Blucher, would attempt to ascend with us, but when he had got half-way up the smaller point he went down again to join the others, and they soon shouted up to us that they were going back to the camp, which they did, marking a track for us to follow. On our ascending a scrub-covered rift we found ourselves between the two tops of the mountain, and ascending the smaller (native name Ginpure, meaning younger sister), up a crack in the rock, in which some small tough shrubs were growing, we reached the top. My half-plate camera was often a source of difficulty in climbing. We were here well rewarded for our exertion by the magnificent view we had of the large, solid, bell-shaped mass of grey granite rock which constituted the top of Peter Botte (native name Alpaboolal, meaning big top, or Barbar, meaning elder sister). It was leaning well over towards us, and we saw within three feet of the top and clinging to the bare rock an orchid growing, with masses of white flowers and with white and yellow butterflies flying about it. We had an extensive panorama of the surrounding country, and very beautiful it was—green, soft-looking, scrub-covered mountains and hills everywhere, in various shades of colour, and passing clouds bathing parts in shadow as they sailed along.

On looking out towards the Barrier Reef, we could discern the white sand patches of the exposed reefs and islands, the bright sunlight making them appear very distinct, but the horizon was so far off that we could not make out the difference between it and the clouds, and the white reefs on first sight looked as if they were themselves the clouds above the horizon. The Barrier Reef was about thirty miles from where we were, but we could make out the intricate channels and the various islands, but not the edge of the reef itself, probably being obscured by mist from breaking water. We could just discern "Wyalla" in the distance, the place from which we had started, but a big bush fire intervening prevented us from seeing it very clearly. We found a little stunted vegetation growing in the shelter of the loose rocks lying about, but there was practically no soil to sustain anything. One shrub which grows into a tree on suitable soil was about two

feet high, but its long scarlet flowers were pretty among the dark foliage, and its wood was very strong. After having taken photographs we descended again to the top of the before-mentioned rift, and found a natural bridge formed by two blocks of stone having fallen down and jammed in a crevice, which enabled us to get on to the base of the larger summit, and as this was the only means of access we were glad to make use of it. Then by the aid of some small bushes we pulled ourselves up and scrambled through stunted vegetation round the base; when we looked up, we had a sense of feeling very small, with the large mass of rock overhanging us. As we passed along we found some places very awkward to negotiate; we had to squeeze through narrow crevices, then again scramble through small holes, or go carefully, clinging on to the shrubs near the edge. When we had got nearly round to the leaning side we thought our progress barred, but by dint of careful climbing we were enabled to get up a narrow crevice, where some flat pieces of rock had been detached, probably by frost, and the edge they left gave us a sufficient but uncertain foothold. One had to go well ahead of the other, for fear of detaching any portion of the rock, which would probably have been to the detriment of the one following. We now soon reached the highest point we could get to—a small platform of bare rock, with some big blocks of stone lying close to the central rock and overhanging the forest some 300 feet below. From this point we had an extensive view of the adjoining country. An intervening rugged cloud-capped range prevented our seeing Port Douglas, a few miles to the south. We found it quite impossible to ascend any further, and our present height was a little over 3,000 feet. We obtained a good view of the top, which consisted of an enormous block of granite, perpendicular on one side and hanging over on the other. On the top was a detached fragment, around the edges of which a little vegetation grew.

As the day was well advanced, we started on our return, and followed the track the natives had made for us. We had not gone far before we saw and heard a Tooth-billed Bower Bird, *Scenopœus dentirostris*, and shortly after came on its playground. It cannot be called a bower, as the bird merely scratches the dead leaves and rubbish off a piece of ground measuring about 3 feet by 2 feet, on which it places a few green leaves, with their upper surface on the ground and their backs exposed to view, which, of course, made them more conspicuous, being of a lighter colour. They were not placed in any regular order any more than being about the same distance apart, namely, about 4 inches, and the number of leaves varied in the different playgrounds from 8 and upwards. I examined over a dozen different grounds, and did not find any trace of berries, shells, &c., but simply the green leaves, and they were always fresh, and seemed as if picked daily.

The place chosen was generally under a bush or thick vegetation, and the birds seemed to be fond of frequenting their ground and uttering their clear liquid notes, which can hardly be called a song; and when a bird was heard warbling in the thicket we were almost sure of finding a playing ground at the place where we had heard the bird. The loud call of Spalding's Orthonyx was also several times heard, and occasionally we got a glimpse of them as they hurried away, keeping on the ground as much as possible, and dodging behind the rocks. We always knew when we were in the locality of these birds by seeing the dead leaves, by which the surface was more or less covered, scraped up and scattered about as they hunted for their insect food. They often seem to go about in companies, and occasionally about a dozen birds would collect together on a rock and go through all sorts of antics, uttering at the same time curious sounds, and on being disturbed they would all scuttle away in different directions. Several unfinished nests were found, either built on the ground or on a rock, up against some object. They were large domed structures of stick and leaves, lined plentifully with green moss. They lay one white egg. The male Coachwhip Bird, *Psophodes crepitans*, was heard uttering its note. His mate was probably nesting, and therefore could not finish up with her "twite-twite," which otherwise she generally does. The note varies slightly from the southern form. We saw traces of the Tree Kangaroo, and also of the Tiger Cat, and passed a Scrub Turkey (Tallegalla) mound, but there were no eggs yet. The track back to the clear space on the rocks, that the natives had travelled along and marked, was at times difficult to follow, especially among the big boulders, and we had to pass through some curious places. Once our only means of progress was through a long crevice between some rocks, and there was just about room to move along, and at one part sideways. We then came to a place where we could not trace any track, but found after a time that the natives had climbed down to a small hole between two big boulders, and wriggled through it into an opening which enabled them to get on. We went the same way, but I could not get through that hole in a hurry, and generally got stuck when half way.

Next day we took another journey to the mountain, but without any natives, and climbed up to the same spot we had reached the day previous. On the various broken rocks and boulders round the base of the centre cone were many orchids of different kinds, but mostly small, and the air was laden with the perfume of flowers; Lycopodium, a small fern, also grew in the crevices. When looking down on the scrub below us the air seemed full of melody of the calls of various birds. It was surprising how far up the sound of their notes travelled. The Lesser White Goshawk,

Astur Novæ-Hollandiæ, sub-sp. *leucosomus*, was noticed sailing along on the look-out for some unfortunate bird. Sulphur-crested Cockatoos were also conspicuous against the dark green as they flew over the scrub. The various shades of green made the scrub look very pretty, especially with the tops of the graceful palms and the ferns showing through ; the latter have very thin stems with a hard exterior, and are rarely straight, and grow to the height of thirty feet. Pigeons seem fond of building their fragile nests on their slender crowns. The Victorian tree ferns have thick stems, and are mostly straight, and have far larger crowns than these.

Very few insects were noticed. The small black ant was very plentiful, also a much larger black variety which carries its abdomen turned up over its back. It has long legs, the lower half of which is yellow. The insect can travel very fast when disturbed, but made no attempt to bite one—like the green ant, for instance. One kind of lizard was seen, and only one snake during the whole of our trip, and that a native reported to have seen going under a rock, which from his description was probably a Black Snake, *Pseudechys porphyriacus*. In a small patch of scrub well up the mountain side a pair of Newton's Bower-Birds were noticed and one secured, but the male was in immature plumage. We did not see any of their wonderful bowers.

The perfume of some of the flowers on the scrub trees was very sweet, and one small orchid had its petal on a curious hinge, which enabled the said petal to move backward and forward as the breeze moved the flower. On our way back we passed under a tree laden with white sweet-scented flowers. The honey-eaters were very busy securing the honey with thin brush-tipped tongues ; one or two were shot for identification, but the others were little disturbed by the sound of the gun. The fallen birds were often difficult to find among the rocks, unless one saw exactly where they fell. A honey-eater was also noticed busy having a bath in a pool of water which was held in a shallow hollow in the fork of a tree, about 30 feet from the ground. It was curious to notice how the roots of some of the trees grew downwards round the rocks, and as they grew spread out into a regular network, clinging on to the face of the boulder. Sometimes they reached the soil, but at other times the distance was too great. The shade caused by the dense foliage of the trees above enabled many plants to obtain sufficient moisture on the rocks with little soil, that otherwise would have been burnt up and destroyed. The effect is occasionally noticed where a large tree has fallen and so made an opening for the sun to penetrate. Several times we noticed what I would term rats' feeding-places, where they had gathered together the hard-shelled native almonds and other nuts, and made a little heap of their empty husks, generally alongside

the root of a tree. A similar habit was noticed with regard to the Noisy Pitta, which lives largely on snails, and it seems to have its favourite stone for breaking them on, somewhat similar to the European Song Thrush, and heaps of broken land shells were sure to be found there.

On our return to camp we found the six natives who had promised to go out collecting all day had, practically speaking, done nothing except getting a few Scrub Turkey eggs for themselves, and not only that, but one lazy individual, named Blucher, had persuaded the others that they had been away long enough, and they had therefore determined to return on the fourth day, instead of staying ten as we had agreed upon. As the men had been paid beforehand we had no hold over them, and perforce had to return when they did, as we could not carry our luggage down without their assistance. During the night we heard what was probably the Rufous Owl (*Ninox rufa*) hooting. Our dog got excited, and ran a short distance into the scrub barking on two or three occasions, and the natives declared that he smelt a Dingo, but we did not hear or see one. I burnt some magnesium ribbon, and let the flare light up the scrub to amuse and assure the natives. A rat kept gnawing at our damper during the early part of the night, and ran over one of my companions' faces in the darkness, so one of us quietly got a short stick ready, poising it over where the sound came from, and I then lighted the magnesium ribbon, which showed the rat's whereabouts, and before he recovered from his astonishment he was killed, and was found to be the long-haired species, *Hapalotis hirsutus*. We made our fire-shovel, spoons, plates, and candlestick out of bark. The number of different kinds of trees was considerable, many being hard and others soft wood. Some splendid examples of kauri pine grew close by, and on picking up some branches of a dead scrub tree, which had fallen probably many years before, we found it exceedingly hard and perfectly sound, and on putting them on the fire they burnt readily and brightly, emitting black smoke, which smelt exactly like pitch when burning, and at the end of the branches the heat of the fire caused a substance to exude from a small cavity in the centre which was quite black and had all the appearance and consistency of pitch, and whenever we wanted to have a bright fire we had only to put on a few of these sticks. When burnt they left a white ash. I brought a sample of the wood with me, but could not find a living tree that I could identify with the dead one, although probably they were plentiful enough; it is locally known as the Kerosene Tree. Softwood trees on dying are very soon riddled with holes by larvæ of the large black and other beetles. The natives are very fond of this larvæ, and cut up softwood decaying tops in the hope of finding some, but the hardwood

trees last for years, and do not seem to be attacked by insects in the same way.

Our last day was spent in collecting in the neighbourhood of the camp. In a creek near by the deep note of a frog was often heard, and again the shrill notes of a smaller kind. Tadpoles were seen in the shallow holes. In a beautiful Sago Palm on the bank of a creek, a Cat Bird had its nest with two young ones. And in the clear water the long green vines of the Lawyer Palm were often noticed trailing. Crested Pigeons, *Sopholaimus antarcticus*, were seen on several occasions, and two secured. A curious cobweb was observed on a large rotten log: the spider had a tunnel into the soft wood, the sides of which were well lined with cobweb, and using that as a centre, had made a closely constructed web radiating all round against the log. The natives brought in two Bennett's Tree Kangaroos they had shot, and one of them, a male, had one of its ears completely bitten off, which the natives said had been done by a Tiger Cat, but the chances are that if a Tiger Cat could manage to chew the ear off it would certainly have had to kill the animal first, as the kangaroo would not be likely to sit quietly under the operation. It puzzled me a good deal to find how it was done and what did it; but on leaving "Wyalla" for Melbourne, two Tree Kangaroos were placed in a box together—one an old male, the other a female—and it was not long before the female got hold of the ear of the male and chewed it until very little was left, and also scratched his face about a good deal, so that it is very evident that in a state of nature they do the same thing. The old male seemed to bear it very patiently, but why the female should have that habit, or why the male should let them do it, I cannot explain, unless it be a sign of affection. During the evening the blacks cooked their wallabies, and also a Tallegalla, and eat the bird and one of the wallabies, the other being given to our old guide, who put it on one side until hungry.

Next morning an early start was made, walking in single file as usual. Merrgo, our dog, found several Scrub Turkeys, or Tallegallas, for us, and we passed two mounds. The male bird seems to make their nesting mound entirely by himself, jealously keeping the hens away, and if they attempt to scratch holes in the mound before he considers it ready he beats them off unmercifully. The birds we saw at the mounds were males; they are generally in its neighbourhood, and keep it in repair. They have stronger legs and feet than the hen birds. These actions I have noticed by watching the birds in captivity. Their mounds are composed principally of leaves and a few sticks, but very little soil, not more than would naturally cling to the leaves as they were being gathered together. Sixteen eggs seem to be a full clutch. Mr. Hislop informed me that in dry weather the eggs have a greater quantity of leaves over them than in wet. In

passing over a creek with pools of clear water, we noticed many crustaceans, and their principal occupation seemed to be in keeping out of one another's way, especially the smaller ones away from the bigger ; some of them had lost their large claw, probably in fighting. We passed a high tree in which a flock of Shining Calornis, *Calornis metallica*, were nesting. The ground below was, as usual, covered with nutmeg seeds, but remembering my former experience with the ticks I did not go under it. Blue and other butterflies were seen flitting about the open spaces over the creeks.

We arrived at our previous camp at midday, being able to travel faster down hill, and found all our goods intact, and after an hour's rest started off again for the coast with all our luggage, and were well laden, and arrived at Emmergen Creek before sundown, after a hard day's journey and rough and often difficult climbing, which I have no desire to undertake again. Four of the natives started off again towards the Bloomfield River, to a blacks' camp some distance off, but of course they took no luggage, as we had arranged for the cutter to come round for us and our belongings. I noticed that the soles of the feet of the blacks was nearly white. We felt a few sandflies, which were absent from the higher country. When I was some little distance from the camp five men carrying their swags came up to me and commenced talking in Italian. They couldn't muster one sentence in English between them, and would not talk French. They said they were travelling overland to Cape York and were Italians. I brought them on to our camp, which my companions did not appreciate, as they at once took them to be French convicts just landed, and such they afterwards proved to be, so we sent our black boy on with them to where there was fresh water, so that they could camp there, but on going over later in the evening I found that they had not done so. Our old guide, who had had a cooked Tree Kangaroo given him at our highest camp, but was not sufficiently hungry to eat it, kept it for his breakfast, but not having the necessary appetite then, and not liking to waste it, he brought it down to this camp, carrying it principally, when in the open country, on his head. The day was very hot and flies troublesome, and his looked-forward-to meal was getting high and lively. In the evening he ate the food we gave him, and once more put his kangaroo on the roof of his humpy to keep for his breakfast ; but it couldn't last for ever, and finally he had to regretfully leave it behind uneaten.

During the evening a small shark was caught in the creek, and our old native went out wading in the shallow sea, as the tide was very far out, and speared three fish. I took some photographs here of the Mangrove trees, to show the wonderful way

they have of securing a roothold on the sand and mud, and the various ways their roots grow: not only do they drop their long-pointed single seed into the sand or mud below, into which if it sticks it would grow like a cutting, but they send down long roots from various branches high up, which when they reach the ground take root, and are an additional source of strength to enable the tree to withstand the force of the incoming tide and strong winds, as they often grow a long way out from the shore, and only have the surface of the sand exposed for a short time at low tide; their roots also grow in a loop-like fashion, the upper portion being out of the ground at varying distances from two feet downwards, and they soon form a regular network round the tree, which is then well able to withstand the storms by which it may be assailed. On several occasions we heard the Flinders Cuckoo, *Eudynamis cyanocephala*, uttering its call during the night, keeping the Megapodes company, and it was generally to be seen among the tops of the trees feeding on fruit.

Next day I started for "Wyalla" on foot, with the guide, the others remaining for the cutter, which was due next day. The distance was 20 miles, and many portions of the road very steep, and the small loose stones often made walking very difficult. We did not see any signs of the supposed New Caledonian escapees, but we found afterwards that they were following close on our tracks, but keeping out of sight. Many of the views we obtained from some of the high hills we traversed were very extensive and beautiful. We flushed a Long-tailed Nightjar from the ground close to the track, and found it was sitting on its two eggs, no nest being made. The country passed over was open forest, and not much timber, what there was being small, and very little protection from the burning sun. A Sulphur-crested Cockatoo, *Cacatua galerita*, was disturbed from the hollow of a tree, where it probably had its nest. These birds are fairly plentiful all over the district, both in the scrub and open forest country, and were busy nesting at this time of the year. They often fly very high when passing from one place to another. When going through a belt of scrub near the Bloomfield River we heard a frog calling out just off the track, and on my going up to see the cause found a snake had caught it by the hind leg; when it saw me close by, it let go the frog and hurriedly departed, the frog not forgetting to do the same, only in an opposite direction. When the snake let go, and seemed to be coming our way in a hurry, the old guide, with a yell, gave two or three quick, vigorous jumps to get out of the way; but the snake was harmless, and just as anxious to get out of his way as he was of it. A tree where some Shining Calornis were nesting was passed, and the noise they made could be heard for a considerable distance; viewed from afar, they looked like a swarm of bees

round their nests. We crossed over the Thompson River, but, being the dry season, there was not much water in it. At one place on the side of our track, which led down a very steep hill, a big bullock had slipped and fallen down, but a small tree had arrested it in its course down hill; but the poor beast, not having strength to rise from the difficult position in which it had fallen, had died where it lay. On the bank of the Bloomfield River was a small but well-kept coffee plantation; the trees appeared to be thriving and free from disease. The guide remained at the river, while I, after being ferried across, walked on to "Wyalla," arriving there about four o'clock p.m.

CONTRIBUTIONS TO THE FLORA OF VICTORIA.

No. II.

By F. M. Reader. Communicated by C. Frost, F.L.S.

(*Read before Field Naturalists' Club of Victoria, 8th March*, 1897.)

Stipa acrociliata, sp. nov., F. M. Reader.

An elegant, tall, rather slender, perennial grass. Rootstock creeping, thickened; rootlets densely invested with greyish or brown fibrils.

Culms from about 1½–5 feet high, smooth, striate, and furrowed, occasionally proliferous at the nodes and geniculate towards the base. Culms and leaves frequently glaucous.

Leaves flat, often involute when dry, from ⅛–⅜ of an inch wide, the lower upwards to 2 feet long, the upper gradually shorter; margin and lower side scabrous.

Ligule broad, ¼ inch long, jagged, without ciliæ.

Panicle frequently of a purplish colour, long, erect, shining, from under 1 foot to 20 inches long, finally much spreading. Branches verticillate, long, capillary, scabrous.

Spikelets usually truncate at the base, ¼–½ inch long, on short or long capillary pedicels.

Empty glumes, with usually three unequal teeth, ciliolate towards the summit; teeth crested with minute ciliæ.

Outer empty glume ½ inch long, moderately and gradually attenuated, strongly three-veined; central vein ciliolate at the back, secondary veins only slightly ciliolate.

Inner glume shorter, ⅜ inch long, blunt, strongly three or four-veined.

Flowering glume invested with greyish appressed or somewhat spreading hairs, with a circle of short hairs at the base.

Awn capillary, from 2–3 inches long, tortuous below, slightly bent below the middle, beset with short hairs to the bent, scabrous above.

Palea shorter than the glume, broad linear, two-veined, ciliolate at the back and summit.

Lodicules narrow. Grain loose, narrow ⅛ inch long.

Flowering October, November.—Sandy desert, Lowan shire. 1895, F. Reader.

The late Baron v. Mueller provisionally named this species *Stipa Readeri*, pending an examination and close comparison with some West Australian species.

In aspect it is quite different from any other species and the tallest of all of them.

The section of the genus Stipa, with the flowering glumes silky-hairy and the elongated and non-ciliated ligule, to which this species belongs, comprise the West Australian *S. compressa*, *S. Drummondii*, *S. pycnostachya* and the well-known *S. setacea*, the latter occurring in all the colonies.

From these *S. acrociliata* may be readily discerned by its height, its broad and flat, long, lower leaves, and the characteristic peculiarities of its glumes.

RELIQUIÆ MUELLERIANÆ: DESCRIPTIONS OF NEW AUSTRALIAN PLANTS IN THE NATIONAL HERBARIUM, MELBOURNE.

By J. G. Luehmann, F.L.S., Curator.

(*Read before Field Naturalists' Club of Victoria, 8th March*, 1897.)

Eucalyptus corrugata, Luehmann.

A tree attaining about 30 ft. in height, with a smooth ashy-grey bark. Leaves on rather long petioles, mostly narrow-lanceolar, slightly falcate, narrowed at the base, acuminate, 3 in. to 4 in. long, ⅓ in. to rarely ⅔ in. broad, rather thick, dark green and very shining on both sides, black-dotted, the lateral veins rather numerous and spreading, but hardly visible without a lens, the marginal vein close to the edge. Peduncles axillary or lateral, nearly terete, about half an inch long, bearing an umbel of 3 to 5 shortly pedicellate flowers. Calyx-tube hemispherical, with 6 to 8 very prominent ridges, about ½ in. across, brownish, shining. Operculum hemispherical, with ridges similar to those of the calyx. Stamens mostly inflected in bud; anthers oblong, opening by parallel longitudinal slits. Fruit hemispherical, not much larger than the flowering calyx, mostly 4-celled, nearly flat-topped, the valves shortly protruding.

Golden Valley, in the interior of Western Australia, W. A. Sayer.

This species is evidently allied to *E. incrassata*, but none of the forms of that species have such high ridges nor the same hemispheric shape of the calyx and corolla. *E. pachyphylla*, which has also prominent ribs, can be easily distinguished by the broader dull-coloured leaves, as well as other characters.

VOL. XIII.—NO. 1. APRIL, 1896.

The Victorian Naturalist:

THE JOURNAL AND MAGAZINE

— OF —

The Field Naturalists' Club of Victoria.

PUBLISHED MAY 7, 1896.

Editor: F. G. A. BARNARD, Esq.

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

CONTENTS.

PRICE SIXPENCE.

Agents for Europe:

DULAU & CO., 37 Soho Square, London.

Melbourne:

WALKER, MAY & CO., PRINTERS, 9 MACKILLOP STREET.

1896.

Field Naturalists' Club of Victoria.

ROOMS—ROYAL SOCIETY'S HALL, VICTORIA ST., MELBOURNE.

BUSINESS PAPER FOR MONTHLY MEETING.

Monday, 11th May, 1896, at 8 p.m.

1. Correspondence and Reports.

   Report of Excursion to Black Rock, from Mr. J. Shephard.

   Report of Excursion to Biological School, from Professor Baldwin Spencer, M.A.

2. Election of Members.

	Proposer	Seconder
Mr. J. Brunning ..	Mr. G. E. Shepherd ...	Mr. A. Coles.

3. Nominations for Membership.

   Members making nominations will oblige by handing the full name and address to Hon. Secretary.

4. General Business.

   Nominations (to be in writing) for Office-bearers for year 1896-97.

   Election of two Auditors.

5. Reading of Papers and Discussions thereon.

   By Rev. W. Fielder, "The Intermediate Hosts of Fluke—Third Note."
   By Mr. G. A. Keartland, "Ornithological Notes from Central Australia."

6. Reading of Natural History Notes.

   Members who may note any unusual occurrence, or see anything of interest in Foreign or Colonial papers, are requested to mention the same at our meetings for the purpose of discussion.

7. Exhibition of Specimens and Conversazione.

   Members exhibiting specimens are requested to furnish the Hon. Sec. with written particulars of their Exhibits, for record in Minutes and *Naturalist*.

✻ EXCURSIONS. ✻

MONDAY, 25TH MAY.—Port Phillip Bay. Under the leadership of Mr. J. Gabriel, F.L.S. Start from the Gem Pier, Williamstown, at 10 a.m. Object: Dredging.

MONDAY, 25TH MAY.—Lilydale. Under the leadership of Mr. F. G. A. Barnard. Start from Prince's Bridge station, at 7 a.m. The leader will meet the party either at Hawthorn or on arrival at Lilydale. Object: Fern Collecting.

ANNUAL CONVERSAZIONE.

The Annual Conversazione will be held in the Athenæum, on Thursday and Friday, 28th and 29th inst. Members are urgently requested to make the exhibition of specimens as complete as possible, and to send in particulars of their exhibits not later than 16th inst. to ensure allotment of space and insertion in catalogue. Extra tickets may be obtained from the Hon. Secretary at one shilling each, and it will further the success of the Conversazione if members will do their utmost to dispose of as many tickets as possible. Messrs. Frost, Gabriel and T. S. Hall, M.A., have been appointed as executive committee to have complete control of the arrangements and spacing of exhibits.

Vol. XIII.—No. 2. May, 1896.

The Victorian Naturalist:

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— OF —

The Field Naturalists' Club of Victoria.

PUBLISHED JUNE 5, 1896.

Editor: F. G. A. BARNARD, Esq.

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

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1896.

Field Naturalists' Club of Victoria.

ROOMS—ROYAL SOCIETY'S HALL, VICTORIA ST., MELBOURNE.

BUSINESS PAPER FOR MONTHLY MEETING.

Monday, 8th June, 1896, at 8 p.m.

1. Correspondence and Reports.

Report of Dredging Excursion in Port Phillip Bay, from Mr. J. Gabriel.
Report of Excursion to Lilydale, from Mr. F. G. A. Barnard.

2. Election of Members.

	Proposer	Seconder
Mr. L. Arendts	Mr. D. M'Alpine ...	Mr. C. French (sen.)
Miss Brent ...	Mr. D. Le Souëf ...	Mr. H. P. C. Ashworth.
Mr. F. Buckie ...	Mr. G. A. Keartland	Mr. D. Best.
Rev. J. S. Hart	Mr. F. G. A. Barnard	Mr. T. S. Hall, M.A.

3. Nominations for Membership.

Members making nominations will oblige by handing the full name and address to Hon. Secretary.

4. General Business.

Consideration of Annual Report and Balance Sheet for 1895-96.
Election of Office-bearers for 1896-97.

The following nominations have been made:—

PRESIDENT—Professor Baldwin Spencer, M.A.
VICE-PRESIDENTS—Mr. C. French, F.L.S., Mr. J. Shephard.
HON. TREASURER—Mr. C. Frost, F.L.S.
HON. LIBRARIAN—Mr. O. A. Sayce.
HON. SECRETARY—Mr. C. French, jun.
COMMITTEE—Messrs. H. P. C. Ashworth, D. Best, J. Gabriel, T. S. Hall, M.A., H. R. Hogg, C. M. Maplestone, F. Spry, W. Stickland, W. Stone, G. Sweet, H. T. Tisdall, and F. Wisewould.

5. Reading of Papers and Discussions thereon.

By Mr. H. R. Hogg, "On the Flight of Sea Birds."
By Mr. C. C. Brittlebank, "The Miocene Rocks of Bacchus Marsh."

6. Reading of Natural History Notes.

Members who may note any unusual occurrence, or see anything of interest in Foreign or Colonial papers, are requested to mention the same at our meetings for the purpose of discussion.

7. Exhibition of Specimens and Conversazione.

Members exhibiting specimens are requested to furnish the Hon. Sec. with written particulars of their Exhibits, for record in Minutes and *Naturalist*.

✻ EXCURSIONS. ✻

SATURDAY, 13TH JUNE.—Keilor, *viâ* St. Albans. Under the leadership of Mr. T. S. Hall, M.A. Start from Spencer Street station, at 12.15 p.m. Object: Geology.

VOL. XIII.—No. 3. JUNE, 1896.

The Victorian Naturalist:

THE JOURNAL AND MAGAZINE

— OF —

The Field Naturalists' Club of Victoria.

PUBLISHED JULY 9, 1896.

Editor: F. G. A. BARNARD, Esq.

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DULAU & CO., 37 Soho Square, London.

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1896.

Field Naturalists' Club of Victoria.

ROOMS—ROYAL SOCIETY'S HALL, VICTORIA ST., MELBOURNE.

BUSINESS PAPER FOR MONTHLY MEETING.

Monday, 13th July, 1896, at 8 p.m.

1. Correspondence and Reports.

   Report of Excursion to Keilor, from T. S. Hall, M.A.

2. Nominations for Membership.

   Members making nominations will oblige by handing the full name and address to Hon. Secretary.

3. General Business.

4. Reading of Papers and Discussions thereon.

   By Mr. J. Gabriel, "Full Flood." Illustrated by about fifty limelight views.
   By Mr. C. C. Brittlebank, "The Miocene Rocks of Bacchus Marsh."

5. Reading of Natural History Notes,

   Members who may note any unusual occurrence, or see anything of interest in Foreign or Colonial papers, are requested to mention the same at our meetings for the purpose of discussion.

6. Exhibition of Specimens and Conversazione.

   Members exhibiting specimens are requested to furnish the Hon. Sec. with written particulars of their Exhibits, for record in Minutes and *Naturalist*.

Members are invited to hand to the Hon. Secretary, on or before Monday evening, July 13th, 1896, suggestions for Excursions for 1896-97.

EXCURSIONS.

SATURDAY, 18TH JULY.—Sandringham. Under the leadership of Mr. H. T. Tisdall, F.L.S. Start from Prince's Bridge station, at 1.40 p.m. Object: Fungi.

MEETING FOR PRACTICAL WORK.

The Monthly Meeting for Practical Work will be held on Monday evening, 27th July, when Mr. J. Shephard will give a demonstration on Botanical Section Cutting and Staining. Members are requested to bring microscopes with a few slips and covers.

Members are requested to see *Naturalist* for particulars of further meetings.

VOL. XIII.—No. 4. JULY, 1896.

The Victorian Naturalist:

THE JOURNAL AND MAGAZINE

— OF —

The Field Naturalists' Club of Victoria.

PUBLISHED AUGUST 6, 1896.

Editor: F. G. A. BARNARD, Esq.

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

CONTENTS.

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Field Naturalists' Club of Victoria.

ROOMS—ROYAL SOCIETY'S HALL, VICTORIA ST., MELBOURNE.

BUSINESS PAPER FOR MONTHLY MEETING.

Monday, 10th August, 1896, at 8 p.m.

1. Correspondence and Reports.

   Report of Excursion to Sandringham from C. French, jun.

2. Nominations for Membership.

   Members making nominations will oblige by handing the full name and address to Hon. Secretary.

3. General Business.

4. Reading of Papers and Discussions thereon.

   By Mr. H. T. Tisdall, "Under Eastern Baw Baw."
   By Mr. R. Hall, "Box Hill Birds in July, 1896."

5. Reading of Natural History Notes.

   Members who may note any unusual occurrence, or see anything of interest in Foreign or Colonial papers, are requested to mention the same at our meetings for the purpose of discussion.

6. Exhibition of Specimens and Conversazione.

   Members exhibiting specimens are requested to furnish the Hon. Sec. with written particulars of their Exhibits, for record in Minutes and *Naturalist*.

✻ EXCURSIONS. ✻

SATURDAY, 22ND AUGUST.—Clayton to Oakleigh. Under the leadership of Messrs. J. Shephard and C. French, jun. Start from Prince's Bridge station, at 1.30 p.m. Object: Botany and Pond Life.

SATURDAY, 5TH SEPTEMBER. Cheltenham. Under the leadership of C. French, F.L.S. Start from Prince's Bridge station, at 1.10 p.m. Object: Botany.

MEETING FOR PRACTICAL WORK.

The Monthly Meeting for Practical Work will be held on Monday evening, 24th August, when Mr. T. S Hall, M.A. will give a demonstration on "Identification of some common rocks."

Members are requested to see *Naturalist* for particulars of further meetings.

Field Naturalists' Club of Victoria.

Patrons:

BARON SIR F. VON MUELLER, K.C.M.G., M. & Ph. D., LL.D., F.R.S.
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OBJECTS.

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.

SPECIAL NOTICE.

Members are reminded that the Club's year ended on 30th April last, and that subscriptions (15s.) for 1896-97 are now due. The Hon. Treasurer (Mr. C. Frost, East Kew) will be glad to receive such subscriptions as early as possible.

THE VICTORIAN NATURALIST

Contains the proceedings of the Field Naturalists' Club of Victoria.

MOST of the Numbers from the commencement, January, 1884, can be obtained from the Hon. Sec., Mr. C. French, jun., "Fernshawe," Park Street, South Yarra, at Sixpence each, or in sets (except Vols. I. and IV.), with title page and index, 6/- per volume.

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VOL. XIII.—NO. 5. AUGUST, 1896.

The Victorian Naturalist:

THE JOURNAL AND MAGAZINE

— OF —

The Field Naturalists' Club of Victoria.

PUBLISHED SEPTEMBER 10, 1896.

Editor: F. G. A. BARNARD, Esq.

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

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1896.

Field Naturalists' Club of Victoria.

ROOMS—ROYAL SOCIETY'S HALL, VICTORIA ST., MELBOURNE.

BUSINESS PAPER FOR MONTHLY MEETING.

Monday, 14th September, 1896, at 8 p.m.

1. Correspondence and Reports.

   Report of Excursion to Clayton and Oakleigh, from Messrs. J. Shephard and C. French, jun.

   Report of Excursion to Cheltenham, from C. French.

2. Election of Members.

3. Nominations for Membership.

	Proposer.	Seconder.
Mr. J. Paul ..	Mr. J. Haase	Mr. C. French, jun.

   Members making nominations will oblige by handing the full name and address to Hon. Secretary.

4. General Business.

5. Reading of Papers and Discussions thereon.

   By Mr. A. E. Kitson, "Geological Notes on the Toombullup Goldfield and adjacent country."

   By Mr. James H. Wright, "Mode of Wood Petrifaction."

   By Lt. Col. Legge, F.Z.S., &c., "Notes on a Sericornis from Kent Group."

6. Reading of Natural History Notes.

   Members who may note any unusual occurrence, or see anything of interest in Foreign or Colonial papers, are requested to mention the same at our meetings for the purpose of discussion.

7. Exhibition of Specimens and Conversazione.

   Members exhibiting specimens are requested to furnish the Hon. Sec. with written particulars of their Exhibits, for record in Minutes and *Naturalist*.

❋ EXCURSIONS. ❋

SATURDAY, 19TH SEPTEMBER.—Mitcham. Under the leadership of Mr. G. Coghill. Start from Prince's Bridge station at 1.35 p.m. Object: Botany.

SATURDAY, 3RD OCTOBER.—Sandringham. Under the leadership of Mr. C. French, jun. Start from Flinders Street station at 1.40 p.m. Object: Botany.

SATURDAY, 17TH OCTOBER.—Ringwood. Under the leadership of Mr. G. H. F. Hill. Start from Prince's Bridge Station at 1.35 p.m. Object: Entomology and Botany.

EXHIBITION OF WILD FLOWERS.

In place of the usual practical evening it has been decided to hold an Exhibition of Wild Flowers on Monday evening, 28th September, 1896. Every member is kindly requested to exhibit, with a view to making the Exhibition a success.

VOL. XIII.—No. 6. SEPTEMBER, 1896.

The Victorian Naturalist:

THE JOURNAL AND MAGAZINE

— OF —

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PUBLISHED OCTOBER 8, 1896.

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ROOMS—ROYAL SOCIETY'S HALL, VICTORIA ST., MELBOURNE.

BUSINESS PAPER FOR MONTHLY MEETING.

Monday, 12th October, 1896, at 8 p.m.

1. Correspondence and Reports.

   Report of Excursion to Mitcham, from Mr. G. Coghill.
   Report of Excursion to Sandringham, from Mr. C. French, jun.

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✻ EXCURSIONS. ✻

SATURDAY, 17TH OCTOBER.—Ringwood. Under the leadership of Messrs. G. Coghill and C. French, jun. Start from Prince's Bridge Station at 1.35 p.m. Object: Entomology and Botany.

TUESDAY, 3RD NOVEMBER.—Dandenong Ranges, *via* Croydon. Under the leadership of Mr. C. Frost. Start from Prince's Bridge Station at 7 a.m. Object: General Collecting.

MONDAY, 9TH NOVEMBER.—Berwick. Under the leadership of Mr. C. French, F.L.S. Start from Prince's Bridge Station at 7.50 a.m. Object: General Collecting.

NOTICE.—Attention of members is drawn to the November meeting being held on the 16th instead of the 9th November, that day being a public holiday.

MEETING FOR PRACTICAL WORK.

The monthly Meeting for Practical Work will be held on Monday evening, 26th October, when Mr. W. Stickland will give a demonstration on "Desmids: their Study and Classification." Members are requested to kindly bring their microscopes.

Members are requested to see *Naturalist* for particulars of further meetings.

VOL. XIII.—No. 7. OCTOBER, 1896.

The Victorian Naturalist:

THE JOURNAL AND MAGAZINE

— OF —

The Field Naturalists' Club of Victoria.

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   Report of Excursion to Mitcham, from Mr. G. Coghill.
   Report of Excursion to Sandringham, from Mr. C. French, jun.
   Report of Excursion to Ringwood, from Mr. C. French, jun.
   Report of Excursion to Dandenong Ranges, from Mr. C. Frost.

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MONDAY, 9TH NOVEMBER.—Berwick. Under the leadership of Mr. C. French, F.L.S. Start from Prince's Bridge Station at 7.50 a.m. Object: General Collecting.

SATURDAY, 21ST NOVEMBER.—Ringwood. Under the leadership of Mr. F. G. A. Barnard. Start from Prince's Bridge Station at 1.35 p.m. Object: Entomology and Botany.

SATURDAY, 12TH DECEMBER.—Brighton. Under the leadership of Mr. J. Shephard. Start from Flinders Street Station at 1.40 p.m. Object: Pond Life.

NOTICE.—Attention of members is drawn to the November meeting being held on the 16th instead of the 9th November, that day being a public holiday.

VOL. XIII.—No. 8. NOVEMBER, 1896.

The Victorian Naturalist:

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— OF —

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PUBLISHED DECEMBER 9, 1896.

Editor: F. G. A. BARNARD, Esq.

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   2.—By Mr. O. A. Sayce. "Karyokinetic Cell Divisions, with examples of various stages."

   3.—By Mr. J. G. Luehmann, F.L.S., "Notes on a new Acacia."

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SATURDAY, 12TH DECEMBER.—Heidelberg. Under the leadership of Mr. J. Shephard. Start from Collingwood Station at 2.15 p.m. Object: Pond Life.

NOTICE.—Owing to the exceptionally dry season, it has been decided to change the Club excursion from Brighton to Heidelberg on Saturday, 12th December, 1896.

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VOL. XIII.—No. 9. DECEMBER, 1896.

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PUBLISHED JANUARY 7, 1897.

Editor: F. G. A. BARNARD, Esq.

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

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1897.

Field Naturalists' Club of Victoria.

ROOMS—ROYAL SOCIETY'S HALL, VICTORIA ST., MELBOURNE.

BUSINESS PAPER FOR MONTHLY MEETING.

Monday, 8th February, 1897, at 8 p.m.

1. Correspondence and Reports.

   Report of Excursion to Nar-Nar-Goon, from Mr. H. Giles.
   Report of Excursion to Fern Tree Gully, from Mr. F. G. A. Barnard.
   Report of Excursion to Beaumaris, from Mr. J. Shephard.

2. Election of Members.

3. Nominations for Membership.

   Members making nominations will oblige by handing the full name and address to Hon. Secretary.

4. General Business.

5. Reading of Papers and Discussions thereon.

   By Mr. D. Le Souef—"Notes on a Trip to the Bloomfield River, Queensland." (Illustrated with limelight views.)

6. Reading of Natural History Notes.

   Members who may note any unusual occurrence, or see anything of interest in Foreign or Colonial papers, are requested to mention the same at our meetings for the purpose of discussion.

7. Exhibition of Specimens and Conversazione.

   Members exhibiting specimens are requested to furnish the Hon. Sec. with written particulars of their Exhibits, for record in Minutes and *Naturalist*.

❋ EXCURSIONS. ❋

SATURDAY, 6TH FEBRUARY.—Beaumaris. Under the leadership of Mr. J. Shephard. Start from Flinders Street Station at 1.40 p.m. Object: Marine Zoology.

SATURDAY, 20TH FEBRUARY.—Heidelberg. Under the leadership of Mr. W. Stickland. Start from Collingwood Station at 2.15 p.m. Object: Pond Life.

VOL. XIII.—NO. 11. FEBRUARY, 1897.

The Victorian Naturalist:

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Monday, 8th March, 1897, at 8 p.m.

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   1. "Contributions to the Flora of Victoria, part ii." By Mr. F. M. Reader; communicated by Mr. C. Frost, F.L.S.
   2. "Two rare nests and eggs of Australian Birds." By Mr. A. J. Campbell; communicated by Mr. D. Le Souef.
   3. By Mr. D. Le Souef—"Notes on a Trip to the Bloomfield River, Queensland." Continued. (Illustrated with limelight views.)

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❋ EXCURSIONS. ❋

SATURDAY, 13TH MARCH.—Hatherley, for Kororoit Creek. Under the leadership of Mr. W. Stickland. Start from Spencer Street Station at 1.50 p.m. Object: Pond Life.

SATURDAY, 10TH APRIL. 1896.—Coburg. Under the leadership of Mr. T. S. Hall, M.A. Meet Tram terminus, Elizabeth Street, 2 p.m. Object: Geology.

SPECIAL NOTICE.

In addition to the usual Exhibits, Special Exhibits of Insects collected during the season 1896-7 are invited for the April meeting.

Exhibits of Native Flowers are greatly desired at each monthly meeting.

VOL. XIII.—NO. 12. MARCH-APRIL, 1897.

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Editor: F. G. A. BARNARD, Esq.

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ROOMS—ROYAL SOCIETY'S HALL, VICTORIA ST., MELBOURNE.

BUSINESS PAPER FOR MONTHLY MEETING.

Monday, 12th April, 1897, at Eight p.m.

1. Correspondence and Reports.

   Report of Excursion to Hatherley (for Kororoit Creek), from Mr. W. Stickland.
   Report of Excursion to Coburg, from Mr. T. S. Hall, M.A.

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   1.—By Mr. H. T. Tisdall, "A Botanical Peep into the Rocky Pools of Sorrento and Queenscliff."

   2.—By Mr. R. Hall, "Bird Fauna of the Box Hill District: The Warblers."

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Committee: MR. D. BEST, MR. J. GABRIEL, MR. T. S. HALL, M.A., MR. W. STICKLAND and MR. G. SWEET, F.G.S.

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