

THE
Victorian Naturalist

THE JOURNAL AND MAGAZINE

of the

FIELD NATURALISTS' CLUB OF VICTORIA

VOL. 65

MAY, 1948, TO APRIL, 1949

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

MELBOURNE:
BROWN, PRIOR, ANDERSON PTY. LTD., 430 LITTLE BOURKE STREET
1949

The Victorian Naturalist

Vol. 65.—No. 1

MAY 6, 1948

No. 773

PROCEEDINGS

The monthly meeting of the Club was held at the National Herbarium on Monday, April 12, 1948. The President, Miss Ina Watson, and about 250 members and friends were present.

The President explained that the impending departure of Mr. Colliver had necessitated the appointment of someone to act in his stead, and that Mr. J. R. Garnet had agreed to act as Secretary for the remainder of the year.

Mr. Garnet mentioned that a footnote on page 213 of the March *Naturalist* might lead members to believe that the National Monuments Sub-committee was inactive. This was not the case, as considerable time and effort had been put into an investigation of Victoria's National Parks and a report concerning them was now in circulation among members of the Sub-committee; it was hoped that it would soon be available for discussion by the various interested societies which participated in the conference some time ago.

Mr. A. J. Swaby briefly referred to the forthcoming tree-planting day at Maranoa Gardens. Members were reminded of the interest taken in this unique garden by the Club and it was hoped that the occasion would be marked by a large attendance—the "Friends of Maranoa" and their friends.

The following were elected as Ordinary Members of the Club: Mrs. G. Wright, Mrs. N. Scoble, Misses Lock-Smith, M. Yates and D. Tempany, Messrs. C. M. Walker, A. W. Thomson and J. Dwyer. The new members were welcomed by the President.

Nominations were called for the two positions of Auditor, Messrs. A. S. Chalk and A. G. Hooke being the only nominations received. Members were also invited to submit nominations to the Committee for the 1948 Natural History Medallion.

On behalf of the Club, the Hon. Editor, Mr. A. H. Chisholm, presented to Mr. F. S. Colliver a fine kangaroo-hide wallet containing substantial monetary gifts from the members and Committee as a mark of their appreciation of the long and invaluable service he had rendered during seventeen years' association with the Club, most of the time in the office of Honorary Secretary. Mr. Colliver was assured of the best wishes of all members for success in the new work he is about to undertake at the Geology Department of the University of Queensland, and he suitably responded.

Mr. C. Gabriel took the opportunity to make a private presentation to Mr. Colliver and he explained that his gift was one likely to be treasured by the recipient. It was a very rare and very small land shell known only from South Gippsland and shortly to be named in honour of Mr. Colliver. His gift was the co-type.

Mr. Colliver, in reply, said he was doubly honoured in having a tiny shell named for him, as his name had also been used on a whale.

Reference was made to the Easter Camp-out by Mr. A. A. Baker, who commented on the rich geological interest of the Heathcote-Derrinal district, indicating that the area merited longer and closer study by Club members. It was hoped that another extended excursion would be held. The instructive excursion to Beenak on Saturday, April 10, was mentioned and attention directed to some particularly interesting exhibits from both Heathcote and Beenak.

NINE MONTHS ON NOVAYA ZEMLYA

Mr. H. Dyce Murphy gave a highly diverting but none-the-less informative account of his whaling experiences and travels in the Antarctic and Arctic regions. Mr. Murphy's adventurous career led him into many strange and remote places and into several predicaments, not the least being that in which he was ice-bound for eight or nine months at latitude 77 in the Arctic. The reasons advanced for the survival of the party were of the greatest interest to Mr. Murphy's appreciative audience and many facets of natural history in the icy regions were revealed during his whimsical discourse.

His comment on the absence of arboreal growth from Macquarie Island and Kerguelen, despite their equable climate, later brought forth the suggestion that seeds would almost certainly be brought there through the agency of birds, but no doubt they would fail to germinate as a consequence of the almost unchanging low temperatures (about 5 degrees above freezing point).

In contrast, the island of Novaya Zemlya, in a far higher latitude (69 to 77 degrees north), was a veritable Arctic paradise invested with more than 300 flowering plants, among them being various grasses, sedges, saxifrages and the yellow Arctic poppy, *Papaver nudicaule* (better known to us as the "Iceland Poppy"), which was particularly abundant. In the words of the speaker, "Bees, moths, butterflies and birds were there in multitudes—and of birds the Little Auks were there in millions." So vivid were the mental pictures conjured up by his lively descriptions, that one did not miss the films or slides that usually accompany such a travel talk.

The appreciation of members for this unusual address was expressed in a vote of thanks moved by Mr. H. C. E. Stewart and seconded by Mr. Ivo Hammet.

EXHIBITS

Mrs. J. J. Freame: Marine objects, including: 1. Head of Angel Shark from Point Cook (resembled picture of *Squalus teryocellata* featured in *Fishes of Australia*, p. 158). 2. Curious ball-like green alga (*Codium nanmillotum*) from Lorne. 3. Parchment tube of worm (*Chaetopterus intus*)—lives permanently in seashore mud and the tube usually harbours a commensal crab (*Polyonyx transversus*).

Mr. A. A. Baker: Collection of rocks, minerals and fossils from the Heathcote-Derrinal district (taken during the Easter Camp-out, 1948).

Mr. A. N. Carter: Some colourful shells from U.S.A., including: *Murex bicolor* Val., *M. radix* Lam., *M. festiva* Hind., *M. triolata* Sow., *Olivia porphyria* Linn., *O. sayana* Reeve, and *O. incrassata* Dillw.

Mr. C. J. Gabriel: Scallop and Fan snells from Western Port—*Pecten novae-zealandiae* Reeve, and *Chlamys asperimus* Lam.

Mr. J. R. Garnet: 1. Branch of Swamp Gum (*Eucalyptus ovata*) completely galled by the coccid *Apiomorpha munita* (collected at Rosebud, 28/3/48). 2. A native slug (*Cystopelta* sp.) found under the bark of a large Woolly Tea-tree (*Leptospermum pubescens*) at McCrae's Creek, Beenak, 10/4/48. 3. Two very small land snails, also collected under rotting wood in a fern gully at McCrae's Creek, and identified by Mr. Gabriel as *Allodiscus meracius* Cox and Hedley. 4. A curious "puffball" fungus from Beenak (*Colostonia fuscum*)—a group of five fruiting bodies, including the dehiscent cap which resembles an acorn cup.

Mr. A. J. Swaby: *Utricularia lateriflora* (Tiny Bladderwort), *U. dichotoma* (Purple Bladderwort or, to use a new vernacular name coined by the Fisch children, "Fairies' Aprons") and *Lycopodium laterale* (Slender Club-moss) showing the fertile spikes on the sides of the main branches—from Beenak.

Mr. J. S. Seaton: *Acralinium roseum*, a Western Australian "everlasting"; and *Astruloma conostephioides*—both garden-grown at Caulfield.

Messrs. R. C. E. Stewart, J. R. Garnet and J. H. Willis: 1. Fifty species of native plants collected on the Club excursion to Beenak (McCrae's Creek area), including: *Nothofagus Cunninghamii* (Myrtle Beech), *Gleichenia cirrhinata* (Coral Fern), *Sticheris tener* (Silky Fan-fern), and a frond of *Blechnum procerum* (Hard Water Fern) with infertile leaflets on one side of the mid-rib and fertile leaflets on the other. 2. Also various plants in flower, several species of fungi, and fresh specimens of the Fly Agaric (*Amanita muscaria*)—a poisonous toadstool found under pine trees at Olinda.

SOCIAL NOTE

Mr. and Mrs. F. S. Colliver were the guests of honour at a very happy junction held in the Victoria Palace Banquet Room on April 1st. The occasion was quite informal and afforded about 120 Club members and close friends an opportunity to wish Mr. and Mrs. Colliver all success on their departure for new labours in Brisbane. Several members with musical ability led the gathering in community songs and solo items, and older honorary members gave reminiscences from the Club's long history. Mrs. T. H. Saroyich, who also undertook the financial arrangements, improvised a camp-fire scene on the staging; Miss Aileen B. Adams was responsible for the programme, Mr. P. Crosbie Morrison was master of ceremonies, and Mr. L. H. Cooper gave sterling service as pianist at short notice. Thanks are due to these friends, to the President and Vice-Presidents, and to all who made the valedictory evening such a conspicuous success.

THE SPANGLED DRONGO IN VICTORIA

By K. A. Hindwood, Sydney, N.S.W.

In the *Victorian Naturalist* (Vol. 64, March 1948, p. 211), Mr. H. Hunt, when recording the presence of a Drongo (*Chibia bracteata*) at Mansfield, asks: "Is it known to frequent any other part of the State?"—that is, Victoria.

During the past ten years or so I have been collecting data on the occurrence of the Spangled Drongo in south-eastern Australia. Its status in that part of the continent seems to be that of an autumn and winter nomad, or largely so, because most of the records fall outside the normal breeding season, October to January. The most southerly acceptable breeding locality available to me is Way Way Creek, Nambucca, central coastal New South Wales (M. V. Goddard, *in litt.*).

The Drongo appears to be a fairly regular, though rare, autumn and winter visitor to the Sydney district. There are several records for New South Wales localities south of Sydney and at least three from Tasmania. Victorian records known to me are listed below. Details of any additional occurrences would be appreciated, as would the date of the Mansfield observation.

1885. Specimen in the National Museum, Melbourne, from Gippsland Lakes, presented by J. Leadbeater, May 21, 1885. This is probably one of the "specimens taken in Eastern Gippsland, Victoria, 1885, . . . in the National Museum and in the collection of birds of the Government Entomologist, Melbourne . . ." (Campbell, A. J., *Nests and Eggs*, 1901, p. 86.)
1893. Recorded from Myrning and surrounding districts by C. C. Brittlebank (*Vict. Nat.*, Vol. 16, August 1899, p. 59); name only. This may be the record noted by A. J. Campbell (*Nests and Eggs*, 1901, p. 86), who refers to a bird "answering the description of the Drongo in the Lederberg [= Lerderderg] Ranges, Victoria, November, 1893."
1926. May. "The head of a bird found at Lakes Entrance was sent for examination by Mr. J. Egan, who says that the bird was shot because it was persistently trying to kill some canaries in an aviary. No one could remember having seen such a bird in the locality before."—Donald Macdonald in "Nature Notes and Queries," *The Argus*, 18/6/1926. This is the same bird as noted in the *Victorian Naturalist* (Vol. 43, July 1926, p. 94).
1932. May-June. Single bird observed near Mooroolbark. (*The Emu*, vol. 32, October 1932, p. 94.)
1938. "In the winter of 1938 a Spangled Drongo found its way into the Comblenbar Valley, only to perish in a snow-storm, and another has been seen there since." (*Vict. Nat.*, Vol. 58, November 1941, p. 105.)
1948. (?) Mansfield (*Vict. Nat.*, Vol. 64, March 1948, p. 211). Date of occurrence and other particulars not published.

It should be mentioned that Fred Barton, Jr., recorded (*Vict. Nat.*, Vol. 43, August 1926, p. 119) the Drongo as a breeding migrant to Sperm Whale Head, Gippsland Lakes. His descriptions

of nests and eggs, supposedly of the Drongo, do not agree with those of that species. I understand that Barton later intimated that his "Drongo" was none other than the introduced Blackbird. There is a superficial resemblance in the plumage coloration of both species, though they are distinct enough in their habits.

ALTERATION TO CLUB RULES AND INCORPORATION UNDER COMPANIES ACT

Eleven years have elapsed since the last review of the Club rules, and, as amendments were necessary, a sub-committee consisting of the President, Secretary and Treasurer was appointed to consider and recast the rules of the Club. To this committee Mr. Chisholm, Mr. Hooke and Mr. Hyam were co-opted.

Registration of the Club under the Companies Act (as a company not for profit) was investigated, and Mr. C. E. Bryant, of Moule, Hamilton & Derham, was present at one meeting to give his legal advice. Incorporation has been recommended by the sub-committee and, in turn, by the General Committee for the following reasons:

1. The Club is then recognized as a legal entity, with an improved psychological effect on potential donors, though there is nothing to prevent the Club accepting gifts (of money, land, etc.) as it is at present constituted.

2. Stability of proprietorship of assets (e.g., land. Title to this would be in the name of the F.N.C.V. permanently. At present, the Club is regarded as a collection of individuals, and cannot hold title in its own name; the title must be in the names of holding trustees appointed by the Club. The trust deed would have to be altered whenever a different trustee was appointed.)

3. Known set of conditions (laid down by legislation) governing administration of property.

It should be noted that the management of Club affairs and any property is substantially the same whether incorporated or not. Cost of incorporation would be approximately £50.

Notice of motion will therefore be given at the May meeting: "That this Club be incorporated under the Companies Act."

If this motion is carried at the annual meeting in June, then the Memorandum (outlining the powers of the Club and the activities it may embark upon) and Articles of Association (governing the administration of the Club) will have to be drawn up by a solicitor, using the present revised rules as a basis.

INA WATSON (President), on behalf of the Committee.

THE LATE ROBERT J. ALKEMADE, OF COIMADAI

From Mr. A. Baker has come news of the death, on March 29, at Coimadaí, of Mr. R. J. Alkemade.

Although not a member of this Club, Mr. Alkemade was keenly interested in nature and always gave our excursionists a warm welcome to his property, on which exist notable glacial pavements and other features of geological fame. During the Club excursion to Coimadaí last Cup Day he gave our members considerable assistance in locating points of interest in the area and in commenting on its natural history.

The Club is fortunate in having contact with men such as Mr. Alkemade, and we feel sure that members who may visit Coimadaí in the future will receive as genial treatment from his son as they did from the father.

To his widow, sons and daughters we extend our sympathy.

J.R.G.

LAKE MOUNTAIN CAMP-OUT

By J. ROS GARNET

For thirty-two members and friends of the Club the Australia Day week-end (January 24-26) proved most enjoyable under nearly ideal weather. Arrangements were made and, through the efforts of Mr. H. Preston, completed to convey a party of twenty and their gear by motor coach to Lake Mountain—the nearest alpine area to Melbourne, no more than 58 miles in a straight line north-easterly and about 11 miles beyond Marysville.

Leaving Melbourne at 9 a.m. on Saturday, participants reached the coach terminus, five miles beyond Marysville, at about 2 p.m. Fortunately for the peace of mind and bodily comfort of our party, Mr. and Mrs. Paul Fisch and family came along with their truck and were good enough to take aboard all the heavy camping gear and carry it a further six miles up on Lake Mountain itself to a more suitable spot than was available in the vicinity of the coach terminus (at the junction of the Cumberland Falls and Lake Mountain roads).

Unencumbered by packs, our walk to the chosen camping ground was very pleasant and, as the road skirted Mt. Arnold, we had an opportunity to observe the change in nature of the vegetation as we ascended. Near the Cumberland turn-off (3,500 feet) was the showy Christmas-bush (*Prostanthera lasiantha*) in bloom. In the vicinity of 4,000 feet the Balm Mint-bush (*P. melissifolia*) became abundant, while at and near the summit (4,800 feet) the dwarf but very beautiful Alpine Mint-bush (*P. cuneata*) represented this genus.

Several shrubs were especially conspicuous along the track near the 4,000 ft. level. A bitter-pea (*Daviesia corymbosa*, var. *orborea*) grew almost to the stature of a small tree, in dense thickets almost enveloping the road, while in places were seen tall specimens of the robust highland form of Long-leaf Wax-flower (*Eriostemon myoporoides*) mingled with Hickory Wattle (*Acacia falcatiformis*), Golden-tip (*Goodia latifolia*), Elderberry Panax (*Tieghemopanax sambucifolius*), Rough Coprosma (*Coprosma hirtella*) and the Otway Daisy-bush (*Olearia Gunniana*)—a very inappropriate name. The Daisy-bush, with Cascade Everlasting (*Helichrysum thyrsoideum*) and the Derwent Speedwell (*Veronica Derwentia*), were especially abundant and heavy with flowers. Many of us had never before seen them in such profusion.

Arriving at our camping place just beyond the Forests Commission huts, we found Mr. W. H. Nicholls and Mr. Fred Bishop already installed and we immediately set to work to put up tents and prepare meals, while the seven children played about.

The early evening was spent examining our immediate surroundings, and members were quick to note the comparative paucity of



General view of Echo Flat, with excursionists, looking toward Lake Mountain tower (4,800 ft.)

Photo. : J. Ros Garnet.



Sky Lilies (*Herpolirion novae-zealandiae* Hk.f.) *in situ*, with fallen corolla bells of Snow Heath (*Epacris petrophila* Hk.f.).

Photo. : H. T. Reeves.

bird-life. The only obvious denizens of the heights were a few Currawongs and a flock of Spine-tailed Swifts skimming in search of insects, which were very abundant. Miss Colleen Chugg collected some interesting specimens and Mr. Nicholls, for the once forsaking his interest in orchids, later netted several beautiful swallow-tailed butterflies up on the summit of Lake Mountain. The leader made a small, rather indiscriminative, collection of insects and spiders for others, and this collection included a Harvestman "spider"—one of a curious family which seems to be quite widespread although imperfectly known.

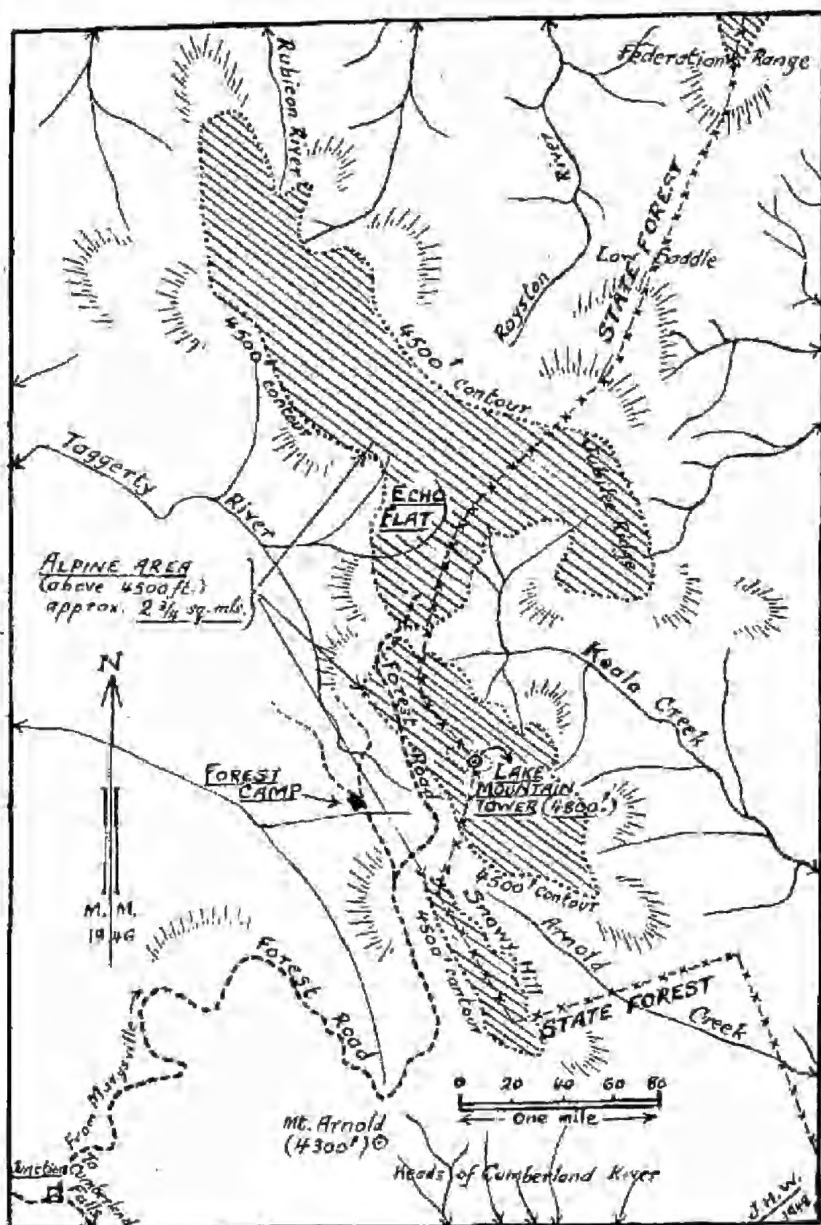
On the authority of a member of the Ski Club it can be stated that, apart from cattle, the larger animals are uncommon on and around Lake Mountain; a few deer, dingoes and foxes can be seen in the less frequented places. Of reptiles, snakes are said to be rare, but we saw small lizards in myriads.

Camp was actually pitched among the dead spars, fallen logs and saplings of Alpine Ash (*Eucalyptus delegatensis*) where lush tussock grass covers the granite rocks and stones. Bidgee-widgee burrs grew rankly there, while the Andean Caraway (*Oreomyrrhis andicola*) and creeping fan-flower (*Scaevola Hookeri*) formed little mats here and there among the widespread Mountain Wood-ruff (*Asperula Gunnii*), Derwent Speedwell and grass. In many places, as among the banks of grass, grew Mountain Greenhood orchids (*Pterostylis alpina*) in unusual abundance and with very robust flowers.

After evening meal the campers repaired to "Mr. Nicholls' house," where by the glow of a comfortable fire and the light of hurricane lamps we pored over a collection of photographs of alpine scenes and plant studies taken by Messrs. Bishop and Nicholls in their callow days while tramping many of the alpine parts of our State in search of scenic and floral attractions.

On Sunday morning the first of the campers arose at dawn and, for most of us, breakfast was over by 8 o'clock; soon after we were on our way to Echo Flat. Echo Flat is of slightly lower altitude than Lake Mountain and the two elevations are linked by a saddle on which the Marysville branch of the V.S.C. has established a ski-run. Resulting from the combined activities of the Forests Commission, skiers and herds of grazing cattle, there is a well-defined track leading up to and over the Flat. The grade is quite easy and, in summer, negotiable by car, although not constructed to accommodate large motor coaches.

Not far from the camping ground, in dense scrub beside a mountain streamlet, some plants of the Royal Grevillea (*G. Victoria*) were observed in bloom, and later that day several of the party came upon an extensive patch of the species farther up on one of the south-west ridges. It was somewhere in this region



Lake Mountain locality sketch, with alpine Snow Gum area (above 4,500 feet) shaded—adapted from Forests Commission's and Aerial Photographic Surveys (which are sometimes at variance).

that these same energetic scramblers discovered a picturesque waterfall, named by them Dale's Falls (after Jean of that ilk)—perhaps to commemorate "falls" of another sort!

As we ascended steeply, a halt was made to examine a tiny unhurt Beech grove and among the plants found in this cool, moist, sheltered spot were the Baw Baw Berry (*Wittsteinia vaccinacea*) in immature fruit, the Pretty Grass-flag (*Libertia pulchella*), Alpine Filmy-fern (*Hymenophyllum peltatum*), Alpine Water-fern (*Blechnum penua-marina*) and Common Bird-orchid (*Chiloglottis Gunnii*), with *Cardamine*, *Epilobium*, *Stellaria*, *Lagenophora* and *Viola* on the outskirts.

Leaving the gully head, we made up to the road above and botanized among such highlands plants as Alpine Pepper (*Drumys Vickeriana*), Alpine Mint-bush, Mountain Shaggy-pea (*Oxylobium alpestre*), Snow Gum (*Eucalyptus pauciflora*, var. *alpina*), Grass Trigger-plant (*Stylidium graminifolium*), Mountain Speedwell (*Veronica nivea*), Alpine Everlasting (*Helichrysum Hookeri*), Heath Daisy-bush (*Olearia floribunda*), Otway Daisy-bush (*O. Gunniana*) and the Mountain Woodruff.

Finally we came to the sphagnum bogs which make Echo Flat so interesting. Throughout the many acres of the Flats meandered little water courses and here and there one came upon small tadpole-infested pools and patches of sphagnum moss. In these moist places grew hosts of pygmy plants, while the general appearance of the area was that of a wet alpine heathland where the Heath Daisy-bush, Candle Richea (*R. continentis*), Snow Heath (*Epacris petrophila*) and Mountain Shaggy-pea, all in full bloom, mingled with Baw Baw Heath (*Epacris baw-bawensis*), now past its best, and the Alpine Everlasting in bud. Scattered among the dense growth of these shrubs were single specimens, or occasionally small colonies, of the Alpine Bottle-brush (*Callistemon Sieberi*) and the Mountain Heath-myrtle (*Baccharis Gunniana*), the latter showing to great advantage as it sprawled over the big granite boulders that are strewn about the Flat.

Hugging the ground, flowering shoots of the Alpine Bush-pea (*Pultenaea fasciculata*) sometimes formed a carpet of golden yellow. The herbaceous and pygmy plants formed charming little communities which call for some comment. Here and there would be seen grey-green swards of the little pale bluish-flowered Sky Lily (*Herpochiron nova-zealandia*), densely packed colonies of the Veined Sun-orchid (*Thelymitra venosa*), some of which opened their flowers during early afternoon, colonies of the lilac-tinted Alpine Leek orchid (*Prasophyllum Suttonii*) not yet in bloom and of the Green Bird-orchid (*Chiloglottis cornuta*)—formerly known in Victoria as *C. Muelleri*.

More showy herbs such as the Silver Daisy (*Celmisia longi-*



Contrast in Communities. Alpine Billy-buttons (orange form of *Craspedia uniflora* Forst.) and Silver Daisy (*Celmisia longifolia* Cass.) fringing an alpine pool at Echo Flat.



Billows of Cascade Everlasting (*Helichrysum thyrsoideum* (DC.) Morris and Willis) on Lake Mountain.

Photos.: H. T. Reeves.

folia), and an orange-yellow form of the Common Billy-button (*Craspedia uniflora*) were abundant in scattered patches. In wet places, at the base of granite boulders, was found the Mountain Club-moss (*Lycopodium fastigiatum*), the Alpine Sundew (*Drosera Arcturi*) bordered pools, and occasional plants of Mountain Gentian (*Gentiana diemensis*) were seen. Along the banks of little streamlets which traversed the Flats a small buttercup *Ranunculus rivularis*) and a daisy (*Brachycome* sp.) were exceedingly plentiful, mingled with a host of small sedges not yet identified by the writer.

For the uninitiated, Echo Flat may be described as a small granitic plateau with depressed soakage area of considerable extent. To the south-east several breaks in the granite walls provide egress for the streamlets which arise in peaty alpine morasses fed by the winter snows and rains. The moss bogs are treeless, winding between Snow Gum hillocks and opening into shallow pools at many places. The vegetation on the rocky summer-dry walls of the depression is naturally in striking contrast with that of the boggy flats and more akin to that on the granite slabs around Lake Mountain tower. Within the walls one may see interesting transitions from one vegetational type to another.

At the time of our visit Snow Gums in bud, flower and fruit formed the outliers with tussocks of Snow Grass (*Poa caspitosa*, var. *alpina*) and such shrubs as the floribund Cascade Everlasting. Within this line of eucalypts (most of them unfortunately fire-killed, but sprouting from the butts) one finds patches of Long-leaf Hovea (*H. longifolia*), Mountain Shaggy-pea, Alpine Mint-bush, Mountain Phebalium (*P. phyllicifolium*) and occasionally the Mountain Plum-pine (*Podocarpus alpina*)—a plant that aroused no small interest on account of its habit of growth and the apparent great age of some of the specimens. These plants then merge into the alpine heath-bog from which one passes to the innermost sphagnum communities around pools. A find of some note was that of the brilliant red Starfish Fungus (*Ascroë rubra*)—the specimen, rather past its prime, was collected amongst grass near the Snow Gum boundary by Mrs. Fisch.

Most of the party concluded a wonderful day by tramping across a saddle to the summit of Lake Mountain where, from the 50-ft. Forests Commission observation tower, there is a grand view of the Goulburn and Yarra River watershed country. Up on the dryish granite summit of this mountain grew an interesting garden, the more showy components including Alpine Mint-bush, Mountain Shaggy-pea and Derwent Speedwell. In shallow depressions among the flat pavement-like rocks were seen white star-like flowers of a dwarf, succulent condition of the common White Purslane (*Claytonia australasica*).

If it were possible to ignore the awesome panorama of fire-killed forest that surrounded us on every side, and if there were a hope that these mountains and valleys would be free from devastating fires for the next fifty years, we might have known we were in one of the loveliest parts of the State. For the present, older walkers may only treasure the memory of how this region looked years ago. The changes that have occurred in the past twenty-five years, and those that will almost certainly take place in the next quarter of a century, make a fascinating subject for study by naturalists with leanings toward ecology. It may here be remarked that there is no "lake," nor ever was one on Lake Mountain, albeit there are several sizeable but very shallow pools. Although the writer has made some enquiries as to the origin of the name, the only hint he could get arose out of the designation which was, at one time, used on some of the locality maps, viz., "Mount Lake."

Sunday evening concluded with an open-air concert around the camp-fire and, as a sociable gathering, it was a revelation of the quantity of musical talent, wit, and humour concealed within the earnest frames of at least thirty-two field naturalists. After the strenuous occupations of Sunday, the campers would not have noticed any discomfort had they slept on a bed of granite instead of the comfortable cushion provided by the soft mats of grass. By 9 a.m. on Monday breakfast was over, the tents more or less silently folded and the bulk of the baggage loaded on to the truck of our "good fairy" for the six-mile stage down to the bus rendezvous.

Some of the party, who had been too occupied in other ways on Sunday, made a sally to the mountain summit to enjoy early morning views. Others, with the day before them, made a leisurely descent, photographing scenes and specimens on the way, while some of this advance column completed their explorations by a hurried visit to the Cumberland Falls—rather more than eleven miles from our mountain camping place. At 5 p.m. all who had not gone on by other conveyances (which included one bicycle) were assembled at the rendezvous. The coach duly arrived to carry us home after what was surely a propitious resumption of those "camp-outs" which in pre-war days were such an admirable feature of Club activities.

The observations of the botanists in our group—particularly the careful notes by Mr. J. H. Willis—will be a useful contribution to our knowledge of sub-alpine plant distributions and a large addendum to the records already listed by Mr. P. F. Morris in the *Victorian Naturalist*, Vol. XLVI (1929), p. 34 *et seq*. For the information of members who may visit this area in the future, Mr. Willis has prepared a list (following) of all the highland plants recorded for Lake Mountain to date, most of which were noted by members of the camp-out party.

VASCULAR FLORA OF THE LAKE MOUNTAIN ALPS

By J. H. WILLIS, National Herbarium, South Yarra

NOTES

Between the heads of the Royston River to the north and Cumberland to the south lies an elevated granitic region that culminates in Lake Mountain proper (4,800 ft.). The country above 4,500 ft. (alpine limit in Victoria) covers about 2½ square miles and is disposed in three contiguous masses tailing off to the south, that of Snowy Hill being the smallest (see map on p. 9). For convenience, the three masses may be collectively known as "Lake Mountain," since the whole carries a distinctly alpine flora that is associated with Snow Gum (*Eucalyptus pauciflora*, var. *alpina*) as dominant tree and is very similar to vegetation existing on the Baw Baws or Mt. Buffalo.

This alpine region (the nearest to Melbourne) is, in turn, part of a mountain system called the "Cerberean Ranges," extending twelve miles north to Mt. Torbreck (5,000 ft.) which falls away abruptly toward the north and east into heads of Jerusalem Creek and Big River. Between Torbreck and Lake Mountain is another considerable area exceeding 4,500 ft., viz., Mt. Federation, connected to the former by low saddles. Adjoining Lake Mountain is the extensive series of sphagnum bogs known as Echo Flat, Mt. Federation has a much smaller morass (heads of Second Creek), while Torbreck's little bog—on the south-eastern shoulder—is not much more than an acre in extent.

As might be expected, the Echo Flat flora is the richest in the whole mountain chain; but there are several species from Mts. Federation and Torbreck that have never been noted at Lake Mountain—presumably they are absent. Here follows a list of these plants:

<i>Festuca Muelleri</i>	<i>Rubus parvifolius</i>
* <i>Vulpia myuros</i>	<i>Hymenanthera angustifolia</i>
* <i>Bromus mollis</i>	<i>Pimelea axiflora</i> , var. <i>alpina</i>
<i>Dryoxia monticola</i>	<i>Nertera reptans</i>
<i>Uncinia compacta</i>	<i>Wahlenbergia gloriosa</i>
<i>Carex Gaudichaudiana</i>	<i>Oleavia megalophylla</i>
<i>Lomandra longifolia</i>	<i>Helichrysum rutidolepis</i>
<i>Lonatia Fraseri</i>	* <i>Cirsium lanceolatum</i>
<i>Scleranthus biflorus</i>	* <i>Pieris hieracioides</i>

Lake Mountain was first explored botanically (in the days before forest roads) by Mr. P. F. Morris, who camped there for five days in the early summer of 1928/9. His report was published in this journal (Vol. 46, pp. 34-42, June 1929). Forty-four species of indigenous vascular plants and a few lower cryptogams are listed for Echo Flat. The writer visited Lake Mountain and Mt. Federation on February 6, 1943, and Mt. Torbreck on March 24

of the same year; Mr. Morris's Echo Flat tally was more than doubled, a total of 130 indigenous and 12 alien species being recorded for the alpine portions of these three mountain masses. During the recent camp-out by F.N.C.V. members on January 24-26, practically all the species previously noted at Echo Flat were seen again and some 18 additions were made, embracing 15 plants entirely new to the Lake Mountain-Federation-Torbreck areas. The flora of Lake Mountain (including Echo Flat and Jubilee Ridge) now stands at 130 native and 8 alien species, the former distributed among 48 families and 103 genera (i.e., 1.26 spp. per genus). Of particular interest is a common, but as yet undescribed, species of *Brachycome* that inhabits the sphagnum bog—glabrous strap leaves, and white rays as in *B. radicans*.

In the accompanying list

- * denotes an alien plant (naturalized).
- † " a species recorded by Morris, 1928, but not again.
- + " an addition made during the F.N.C. camp-out, 1948.
- (m) " a marginal plant, i.e., just reaching the alpine zone from lower altitudes.
- (Bog) " a plant of the wet moss beds and pools

Systemotic Enumeration

PTERIDOPHYTA

HYMENOPHYLLACEÆ

Hymenophyllum peltatum

DICKSONIACEÆ

Dicksonia antarctica (m)

POLYPODIACEÆ

Hypolepis rugosula (m)

Polystichum proliferum

Asplenium flabellifolium

Blechnum

penna-marina (Bog)

fluviale (m)

procerum

Histiopteris incisa

Polypodium australe

LYCOPODIACEÆ

Lycopodium fastigiatum

SPERMATOPHYTA

TAXACEÆ

+*Podocarpus alpina*

GRAMINEÆ

+*Hierochloë redolens*

**Anthoxanthum odoratum*

Poa

**annua*

cæspitosa

(vars. *latifolia* and *alpina*)

Deyeuxia

+*quadrifida* (m)

sp. (m)

Agrostis

parviflora

hiemalis (m)

**Aira caryophyllæa*

Danthonia

penicillata

nudiflora

CYPERACEÆ

Scirpus

aucklandicus (Bog)

+*inundatus* (Bog)

Carex

appressa (Bog)

hebes

breviculmis

Blakei (Bog)

+*Schœnius calypttratus* (Bog)

+*Orcobolus* sp. [aff. *O. distichus*]

(Bog)

RESTIONACEÆ

Hypolaena lateriflora (Bog)

JUNCACEÆ

Luzula campestris

Juncus

bufonius

†*falcatus* (Bog)

pallidus

pusillus (Bog)

LILIACEÆ

Dianella tasmanica

Astelia alpina, var. *novæ-*

hollandiæ (Bog)

- +*Herpotion novae-zealandiae*
(*Bog etc.*)
- IRIDACEÆ**
Libertia pulchella
- ORCHIDACEÆ**
Gastrodia sesamoides
Prasophyllum Suttonii (*Bog*)
Thelymitra venosa (*Bog*)
Caladenia Lyallii
Chiloglottis
 cornuta (*Bog*)
 Gunnii
Pterostylis alpina
- FAGACEÆ**
Nothofagus Cunninghamii
- URTICACEÆ**
Australina Muellieri
- PROTEACEÆ**
Orites lancifolia
+*Grevillea Victoriæ* (*m*)
- POLYGONACEÆ**
**Rumex acetosella*
- PORTULACACEÆ**
Claytonia australasica
- CARYOPHYLLACEÆ**
Stellaria pungens
**Cerastium glomeratum*
- RANUNCULACEÆ**
Ranunculus
 hirtus
 rivularis (*Bog*)
- WINTERACEÆ**
Drimys
 lanceolata (*m*)
+*Vickeriana*
- MONIMIACEÆ**
Atherosperma moschatum
(*m*)
- CRUCIFERÆ**
Cardamine
 hirsuta
+*dictyosperma* (*m*)
- DROSERACEÆ**
Drosera Arcturi (*Bog*)
- ROSACEÆ**
†*Alchemilla vulgaris* (*dubious record*)
Acacia
 anserinifolia (*syn. A. sanctisorbis*)
- LEGUMINOSÆ**
Acacia
 falciformis
+*alpina* (*v. rare*)
Oxylobium
 alpestre
- Daviesia*
 corymbosa, var. *arborea*
 (*m*)
 †*fulcinea*
Pultenaea
 Muelleri
+*fasciculata* (*Bog, etc.*)
Bossiaea foliosa
Hovea longifolia, var. *lanceolata*
†*Glycine clandestina*
**Trifolium repens*
- GERANIACEÆ**
Geranium pilosum
- OXALIDACEÆ**
Oxalis
 corniculata
 †*magellanica*
- RUTACEÆ**
Eriostemon myoporoides
Phebalium phyllicifolium
Pleurandropsis trymalioides
- EUPHORBIACEÆ**
Poranthera microphylla
- GUTTIFERÆ**
Hypericum japonicum (*Bog*)
- VIOLACEÆ**
Viola
 hederacea
 betonicifolia
- MYRTACEÆ**
Eucalyptus
 pauciflora, var. *alpina*
 delegatensis (*m*)
Lepospermum pubescens, var. *Callistemon Sieberi* (*Bog*)
Bæckea Gunniana (*Bog, etc.*)
- ONAGRACEÆ**
Epilobium Billardierianum (?)
- HALORAGIDACEÆ**
Haloragis
 tetragyna
 micrantha (*Bog*)
Myriophyllum pedunculatum -
(*Bog*)
- ARALIACEÆ**
Tieghemopanax sambucifolius
- UMBELLIFERÆ**
Hydrocotyle hirta
Oreomyrrhis andicola
- ERICACEÆ**
Gaultheria appressa (*m*)
Wittsteinia vacciniacea
- EPACRIDACEÆ**
†*Cyathodes accrosa* (*dubious record*)

- Leucopogon*
Hookeri (*Bog, etc.*)
Macraei
†virgatus
Acrotiche prostrata
†Monotoca elliptica (*dubious record*)
†Trochocarpa Clarkei
Epacris
hawhawiensis (*Bog*)
petrophila (*Bog*)
Richia continentis (*Bog*)
MYRSINACEÆ
†Rapanea Howittiana
GENTIANACEÆ
Gentiana diemensis (*Bog, etc.*)
†Centaurium pulchellum
CONVOLVULACEÆ
Dichondra repens
LABIATÆ
†Prunella vulgaris
Prostanthera
cuneata
†melissifolia (*m*)
lasianthos (*m*)
SCROPHULARIACEÆ
Gratiola peruviana
Veronica
Derwentia
nivea (*Bog, etc.*)
†scryllifolia (*Bog, etc.*)
*+*Mimulus moschatus*
PLANTAGINACEÆ
†Plantago tasmanica
CAPRIFOLIACEÆ
†Sambucus Gaudichaudiana
(m)
RUBIACEÆ
Coprosma hirtella
- †Nertera depressa* (*Bog*)
Asperula
Gunnii
pusilla
LOBELIACEÆ
Pratia puberula (*Bog, etc.*)
GOODENIACEÆ
Scævola Hookeri (*Bog, etc.*)
STYLIDIACEÆ
Stylidium granitiformium
(Bog, etc.)
COMPOSITÆ
Olearia
floribunda (*Bog*)
Gunniana, var. *flavescens*
Celmisia longifolia (*Bog, etc.*)
†Erigeron pappochroma (*Bog, etc.*)
Lagenophora stipitata
Brachycome
trivialis
†scapigera
sp. (Bog—as yet undecribed)
Cotula filicula
Craspedia uniflora (*Bog, etc.*)
Helichrysum
Hookeri (*Bog, etc.*)
thyrsoidium
Gnaphalium
purpureum
collinum, var. *radicans*
(Bog, etc.)
Erechtites quadridentata,
var. *Gunnii*
Senecio australis (*broad-leaved var.*)
**Hypochaeris radicata*
**Taraxacum officinale.*

BRITANNIA CREEK

On March 14 a full bus-load of members attended the excursion to this area in excellent weather. The principal search of the day was for ferns, and we were well rewarded. There is a luxuriant growth of these beautiful plants all up the valley and thickly edging the hurrying little stream. Of particular note were the king ferns (*Todea barbara*), their soft green fronds gracefully rising from amongst the surrounding vegetation, and the high "mounds" of *Gleichenia microphylla* were also of great interest. Our attention was attracted by the size of the mountain correa (*C. Lazorenciana*), many trees being 15-18 feet in height.

As we penetrated farther up the creek, myrtle beech trees (*Nothofagus Cunninghamii*) were noticed among the mountain ash, blackwood, and wattles. The area is quite delightful, and much of it still unspoilt by fires.

Thanks are due to the Melbourne Women's Walking Club for use of their fireplace to boil our lunch billies.—M.E. and A.B.A.

ORCHIDS OF THE WESTERN WIMMERA

By E. T. MUIR, Dimboola.

The Wimmera, generally regarded as a vast tract of land devoted to the production of wheat, has also its orchids. A visit discloses that there are many areas which are still not cultivated, many which are never likely to be. There is the Little Desert, for instance,—a large area of land, 15 miles in width and 60 miles long in Victoria before it passes over the South Australian border. There are also the Lawloit Ranges, which extend from the Little Desert towards the larger desert region. Much of this area is still in its virgin state.

Many small areas of a couple to 50 acres or more are scattered throughout the Wimmera. An excellent example is the reserve for protection of flora and fauna at Dimboola; it contains 33 acres. Such areas are rich in plant life, especially those which have not been very much disturbed by fires or grazing.

In the Western Wimmera I have recorded 33 orchid species. There are three other species recorded for the district which I have not yet noted, probably because I have had insufficient time to cover the whole area effectively. These three species are indicated by a symbol (†) in the following list:

PRASOPHYLLUM	CALADENIA (contd.)
† <i>clatum</i> R.Br.	<i>filamentosa</i> R.Br. ²
<i>fuscoviride</i> Reeder	+ var. <i>tentaculata</i> (Tate)
<i>fuscum</i> R.Br.	Rogers
<i>odoratum</i> Rogers	<i>Paterstonii</i> R.Br.
GASTRODIA	<i>reticulata</i> FitzG.
<i>sesamoides</i> R.Br.	GLOSSODIA
THELYMITRA	<i>major</i> R.Br.
<i>aristata</i> Lindl.	DIURIS
<i>antennifera</i> Hk.f.	<i>palustris</i> Lindl.
<i>azurca</i> Rogers	<i>maculata</i> Sm.
† <i>fixoides</i> Sw. ¹	<i>pedunculata</i> R.Br.
ACIANTHUS	PTEROSTYLIS
<i>exsertus</i> R.Br.	<i>barbata</i> Lindl.
<i>reniformis</i> (R.Br.) Schlecht.	<i>cyclocephala</i> FitzG.
LYPERANTHUS	<i>longifolia</i> R.Br. ⁴
<i>nigricans</i> R.Br.	<i>mutica</i> R.Br.
ERIOCHILUS	<i>nana</i> R.Br.
<i>cucullatus</i> (Labill.) Reichb.	† <i>pedoglossa</i> FitzG. ²
CALADENIA	<i>pusilla</i> Rogers
<i>cucullata</i> FitzG.	<i>robusta</i> Rogers
<i>cardiochila</i> Tate	<i>rufa</i> R.Br.
<i>carnea</i> R.Br.	<i>squamata</i> R.Br. ³
<i>deformis</i> R.Br.	<i>vittata</i> Lindl.
<i>dilatata</i> R.Br.	

Notes on the Distribution of Species

Gastrodia sesamoides, recorded by D'Alton from the Little Desert. I have recorded only at Diapur in the Lawloit Ranges.

Thelymitra aristata is the most common Sun-orchid and it occurs over most of the Wimmera. *T. antennifera* has a wide distribution, but is nowhere very plentiful; it grows chiefly in the red sandy soil overlying sand-stone. *T. asurea* favours the nearly pure sand of the Little Desert near Wail. Mr. T. E. George found it in the Great Desert near Yanac (1942), so the distribution is probably wider, covering most of the desert area. *T. laxioides* was recorded for the Little Desert by D'Alton. I have not yet seen a specimen.

In the sandy soil of the Little Desert, Lawloit Ranges and North Serviceton district, *Acianthus cersertus* and *A. reniformis* are very common. In some places both species are to be found together.

Lyperonthus nigricans is found in the same localities as *Acianthus*, but does not flower freely—hundreds of plants are to be found, yet the flowers are rarely noted.

Eriochilus cucullatus has been recorded from the Lawloit Ranges at Diapur—by one specimen only.

The genus *Caladenia*, with eight species, is second largest. *C. carnea* is the most common one and is to be found in most situations. *C. cardiochila* has been recorded at Dimboola—five plants (Mr. Marc Cohen, Sept., 1947), and at Diapur—one specimen (Mr. J. Ros Garnet, 1944). *C. deformis* is restricted to several widely separated places; in all probability its original range has been reduced by cultivation, etc. *C. cucullata* is recorded for Kiata by Mr. K. Hately—growing on a sandy rise at the back of the township. Typical *C. filamentosa* is recorded for the Little Desert by Mr. A. J. Swaby, but from what part I do not know. I have not found it along the northern edge, where the pale variety *tentaculata* is very plentiful; this is also found in the new reserve for flora at Dimboola. *C. Patersonii* is to be found in red soil along the banks of the Wimmera River, where it is always white. *C. dilatata* and *C. reticulata* are plentiful and have a wide distribution, especially the former.

Diuris maculata is common in all types of soil, while *D. palustris* has been seen only at isolated places; it is by no means common. *D. pedunculata* is very common, especially in reserves along the railway lines.

The genus *Pterostylis* is represented by eleven species, few of which are plentiful—most of them have a very limited distribution. *P. barbata* thrives on loamy rises in the Little Desert some miles south of Kiata. *P. cynocephala* is not plentiful, but it has been located at Serviceton, Diapur and Dimboola. *P. mutica* is one of the commonest, occurring in all parts of the Wimmera and in all types of soil. *P. longifolia* has been collected at Diapur and Dimboola. In both places it occurs side by side with an interesting dwarfish form,⁴ and at Diapur both forms have been found in the same colony. *P. nana* is as widely distributed as *P. mutica* and

in similar situations. *P. pedaglossa*² is included because of an annotation by Mr. A. J. Swaby (*Vic. Nat.*, xxx, 65—a copy of which Mr. Swaby kindly sent me). *P. robusta* is the species most frequently encountered. In the flora reserve at Dimboola twin-flowered specimens have been noted on occasions.

Three species of the "rufa group" of *Pterostylis* have been recorded. *P. rufa* comes from the banks of the Wimmera River at Lochiel and the Dimboola golf links, where it grows in open ground away from vegetation. Recently a single specimen was located in the flora reserve at Dimboola. One specimen of *P. pusilla* (now in J. R. Garnet's herbarium) was located near Lochiel in 1944, but I have not found any further specimens. Neither *P. rufa* nor *pusilla* are at all common. *P. squamata*³ was discovered in the old water reserve, near the 262-mile post on the Dimboola-Rainbow railway line; eight plants were found. This was the only patch of undisturbed Mallee for many miles in the locality; but unfortunately I have not been able to revisit the spot. The locality, perhaps, is not strictly "Wimmera," but is worthy of reference. Mr. G. Lyell has specimens of *P. Mitchellii* from Kewell, a few miles to the east of Dimboola. There is every reason to believe that it will be re-discovered along the Wimmera. *P. vittata* is also quite rare, having been recorded only from Diapur; there it is found growing in the Lawloit Ranges, chiefly amongst scrub of *Baeckea Behrii* and *Metastica* spp.

As to the genus *Prasophyllum*, *P. fuscum* is found in most open situations, while *P. odoratum* has been recorded only at Serviceton, from the railway reserve on the South Australian side. The record of *P. elatum* is based on a collection from Yanac (determined at the National Herbarium) by Mr. T. E. George (1942), but I have not seen his specimen. *P. fuscoviride* has been located only at Dimboola in the new reserve for flora and fauna, but it is very plentiful there, being the most common orchid in the reservation.

Glossodia major appears in plenty along the northern edge of the Little Desert and at Diapur, always favouring sandy loam.

A large area has still to be worked over by the orchid hunter and results to date give promise of good future prospects. My thanks are due to the Government Botanist and his able staff at the National Herbarium, South Yarra, for help so freely given, without which this article would never have been complete.

REFERENCES

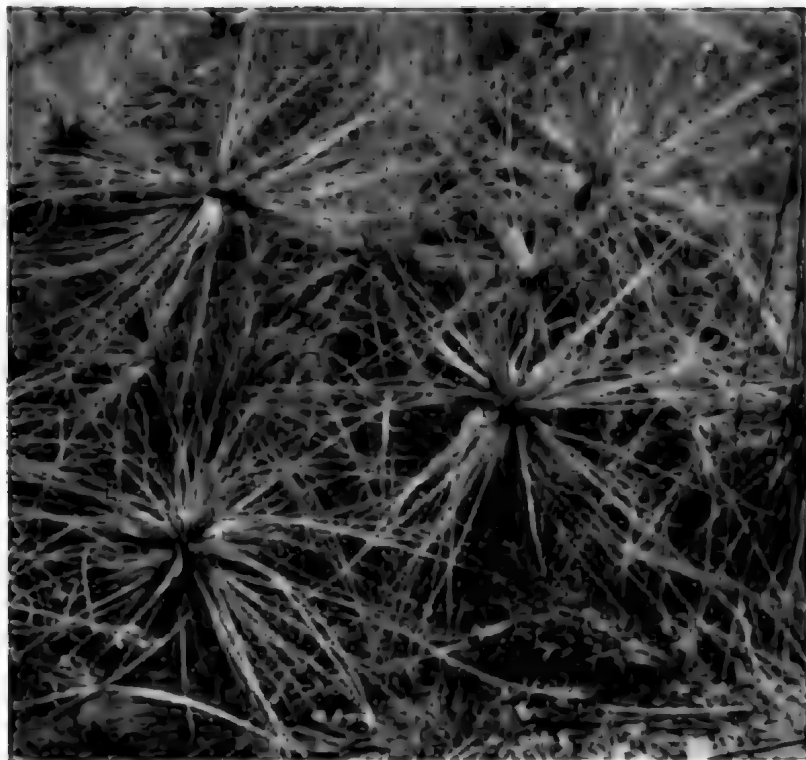
1. *Victorian Naturalist*, Vol. 30, p. 65 (1913).
2. Vol. 53, p. 71 (1936).
3. Vol. 62, p. 168 (1946).
4. Vol. 64, p. 151 (1947).

Material in hand for the *Victorian Naturalist* includes articles by Mrs. Edith Coleman, the Rev. Edmund Gill, the Rev. H. M. R. Rupp, and Mr. T. Rayment. Members are invited to supply short contributions—interesting paragraphs, however brief, are always desirable.

A CURIOUS SPINIFEX

A large silky head of *Spinifex hirsutus* Labill. was shown to me at Portland some months ago. I enquired where it grew, and photographed it, admiring the fine "pattern picture" it made.

Professor A. J. Ewart, in his *Flora of Victoria*, tells me that it is one of four species in Australia, and has the male and female flowers on different plants. When ripe, the seeding head falls off and rolls along the beach until it disintegrates. He notes that it is very useful as a coastal sand-binder.



Hairy Spinifex or Spiny Rolling Grass—a good native sand binder.

Photo.: Ina M. Watson.

Mr. J. H. Willis has amplified the above by saying that this silvery-grey, long-creeping plant is a valuable sand-binder and likes the salt so well that it will grow almost to the water's edge.

It is common on the beaches all round the sandy coastline of southern and eastern Australia, Tasmania, and New Zealand. "Hairy Spinifex" has been standardized as the vernacular name (C.S.I.R. Bulletin No. 156, p. 36, 1942), but the term "spinifex" has unfortunately become associated with the Porcupine grasses (genus *Triodia*) of the Inland—just as we erroneously apply the name "Nasturtium" to garden flowers that have nothing to do with the genus *Nasturtium* (water-cresses). J. M. Black's use of Spiny Rolling Grass for the true coastal *Spinifex* is very appropriate.

I.M.W.

PLANT NAMES SUB-COMMITTEE

In its two editions of the *Census* of Victorian vascular plants, the Club has given a common name to *every one* of the 2,300-odd species. Since 1928 many more indigenous species have been added to the list, largely as a result of critical revisions by experts in certain groups, e.g., the ferns, grasses, sedges, and orchids. Your Plant Names Sub-committee has found it extremely difficult to find suitable vernacular names (short of deliberately coining rather clumsy and artificial ones) for groups of very similar species like the small club-rushes (genus *Scirpus*) and minute-flowered leek-orchids (genus *Prasophyllum*).

To multiply such epithets as "dwarf," "pygmy," "tiny" or "small" within one genus is valueless, yet to express the distinctive features of each in short, crisp, intelligible words is almost impossible. It is most improbable that any but a skilled botanist will ever bother to differentiate between them, and whoever does will certainly use only the scientific names. The question then arises, "Why bother to invent common names for these diminutive plants at all?" *Standard Plant Names* (an important American work of 1942) does not attempt to give vernaculars for *all* the garden species listed, and we must consider whether the Club may not be courting ridicule by insisting that all Victorian plants, however insignificant, *must* have a common name, even if it is unlikely to be used. At present the Plant Names Sub-committee is charged to find names for every plant; but it would like to have that mandate confirmed or (modified) by an expression of opinion from the general members of the Club.

J. H. WILLIS (Secretary).

EUCALYPT GROWN FROM "CUTTING"

At a recent meeting of the Club's Botany Group an account of the striking of a Eucalypt cutting was given by Mr. J. R. Garnet.

A small seedling of what is probably *E. Baxteri* was planted out in the front garden at his home in Brunswick, but the three-inch-high plant was later accidentally sheared off near ground level while trimming some grass nearby. The cutting was immediately set in the sand-over-soil pot which was in use at the time for striking some other cuttings. The pot was kept under glass from February, 1944. By June of the same year it was evident that the cutting had developed roots, since fresh foliage had begun to appear. In the spring the plant, by this time with a good root system, was replanted in the garden and at the time of writing is several feet high and flourishing.

In the discussion that followed the account of this experiment, Mr. A. Burke mentioned that he believed the procedure was quite commonly used in England for the propagation of Eucalypts.

Mr. Garnet said that the experiment was accidental rather than deliberate as the seedling was thought to be *Correa reflexa*—the red-flowered form from Portland, which is a very desirable garden subject. The small juvenile leaves of the Eucalypt are not only ovate but rough and hairy and in the first few months of growth are easily mistaken for young plants of the *Correa*.

Mr. Stewart stated that a similar error had been made at the time of the replanting of Baron von Mueller's grave. What was thought to be a *Correa* has now developed into a substantial Eucalypt, which because of its size will have to be removed.

ARARAT F.N.C.

The annual meeting of the Ararat Field Naturalists' Club was held on March 11, and the following office-bearers were elected: President, Mr. R. M. Butler; Vice-Presidents, Messrs. J. J. Norman-Bail, S. Kelly, H. J. Blackie, H. McMillan, A. Hargreaves, and Misses A. G. Mitchell and L. L. Banfield; Secretary and Treasurer, Miss J. Guyot, Librarian and Correspondent, T. H. Banfield.

A letter was received from the Ararat Gun Club acknowledging a petition asking for co-operation in securing the discontinuance of live-bird trap-shooting. The letter stated that the petition had been sent to the Victorian Gun Club's Association. The petition contained about 400 signatures of Ararat and district residents.

It was decided to hold a two-day Wildflower Show in October.

More than forty members and friends joined in a recent excursion to Tree-Fern Gully, Mount Cole, the leader for fern study was Miss Mitchell, and for forest insects Mr T. H. Banfield. About half a dozen different ferns were noted, some covered with spores, and numerous insects were seen, including the little brown mountain butterfly (*Oxidixenica orichora*)

T. H. BANFIELD.

NEW BRANCH OF THE AMATEUR ENTOMOLOGISTS' SOCIETY

The honorary editor and organizer of the Australian branch of the Amateur Entomologists' Society (K. D. Fairey) writes stating that this society has now been established—at present on a correspondence basis—with headquarters at Newcastle, N.S.W. (P.O. Box 605).

The parent society in England was formed in 1935 and now has a membership of more than a thousand. With the much vaster field of exploration in this country, the Australian branch may expect to grow both in influence and membership and make noteworthy contributions to the advancement of our knowledge of the *Insecta* and the *Arachnida*—subjects with which the members are mainly concerned.

At present its membership is small and scattered over the Commonwealth, but, with anticipated expansion, it is hoped to hold general meetings at centres where warranted by the concentration of members.

The branch publishes a monthly four-page bulletin and an annual 32-page journal, each dealing with insects and spiders. Further information can be obtained from the branch honorary secretary, Miss Colleen Chugg, 480 Barker's Rd., East Hawthorn, E.3, Victoria.

"SAVE THE FORESTS" CAMPAIGN

The Third Annual Report, now circulated, is an attractive presentation of the work of the Campaign and an outline of its development and organization.

The report serves a two-fold purpose—a presentation of the Campaign's work and a booklet of educational and pictorial value. Several fine plates illustrate phases of the Campaign's work and include pictures of community plantings organized by the Campaign in country districts. Community planting is one of the Campaign's main activities. Pictures of young trees in the tubing stage show a method of raising plants which is new to most Victorians.

A number of these reports has been set aside for distribution to interested persons and on application to the Campaign office, Temple Court, 422 Collins Street, Melbourne, C.1., a copy will be sent post free.

WHAT, WHERE AND WHEN**General Excursions:**

Saturday, May 22—Lilydale. Subject: "Hull Road Fossils." Leader: Rev. G. D. Gill, B.A., B.D. Train from Flinders Street, 8.25 a.m. Bring one meal. This excursion includes a visit to Cave Hill Quarry, then various fossil outcrops along the main road, thence along Hull Road, returning to city from Mooroolbark Railway Station.

Saturday, June 5—Botanic Gardens. Subject: "Australian Trees in Winter"—second of series for beginners. Leader: Mr. H. Stewart. Meet 2.30 p.m. Rose Pavilion on Hopetoun Lawn.

King's Birthday Week-end—Murray Valley, from Albury to Kerang. Subjects: Physiography, Birds, and General. Accommodation for a limited party only. Leave Melbourne 4.15 p.m. train to Albury on Friday, June 11; return from Kerang on Monday, June 14. Further details from Leader, Mr. H. Stewart, 14 Bayview Terrace, Ascot Vale (Tel. FU 022, Extension 457—day only).

Group Fixtures:

Thursday, May 6—Wild-flower Garden Group. Royal Society's Hall, 8 p.m. Subject: "Maranoa Gardens," by Mr. W. Bury. New members welcome.

Friday, May 7—Marine Biology Group. Royal Society's Hall, 8 p.m. Particulars from Hon. Sec. of Group, Miss W. Taylor, 13 Jolimont Square, Jolimont, C.2 (Tel. MY 4269—day only).

Saturday, May 15—Marine Biology Group excursion to National Museum. Subject: Conchology, "Shells of the Barrier Reef." Leader: Miss Macfie. Meet Russell Street entrance to Museum, 2.30 p.m.

Saturday, May 15—Geology Group excursion. Further details from Hon. Sec. of Group, Mr. A. A. Baker, 53 Carlisle Street, Preston, N.18.

Saturday, May 15—Botany Group excursion to Port Melbourne. Subject: "Ecology of Salt Marsh." Meet at Garden City bus terminus, 2 p.m. Bus from Flinders Street, City.

Monday, May 24—Botany Group. Royal Society's Hall, 8 p.m. Subject: "Fungi of Timber," by Mr. J. H. Willis, B.Sc.

Tuesday, June 1—Geology Group. Royal Society's Hall, 8 p.m. Subject: "Palaeontology, Pt. III—Hydrozoa, Coelenterata, Graptolites."

Thursday, June 3—Wild-flower Garden Group. Royal Society's Hall, 8 p.m. Further particulars from Hon. Sec. of Group, Mr. H. Preston, 34 Coppin Grove, Hawthorn, E.2.

Friday, June 4—Marine Biology Group. Royal Society's Hall, 8 p.m.
A. A. BAKER,
Excursion Secretary.

The Victorian Naturalist

Vol. 65.—No. 2

JUNE 2, 1948

No. 774

PROCEEDINGS

The monthly meeting of the Club was held at the National Herbarium on Monday, May 10, 1948. The President, Miss Ina Watson, and more than 200 members and friends attended.

Apologies for non-attendance were received from Miss Mcfie and Messrs. A. H. Chisholm, A. D. Hardy and P. C. Morrison.

The President made various announcements and invited the secretary to make a statement regarding the suspension of approximately 70 members from the mailing-list as a consequence of their being two years or more in arrears of subscription.

Mr. A. J. Swaby asked for volunteers from among members living in the Malvern district to act as examiners in tree-lore and natural history in connection with the Malvern Boy Scouts' examinations for proficiency badges.

The excursions secretary (Mr. Baker) spoke about two of the forthcoming excursions—the general excursion to Lilydale on May 22 and the special Geology Group excursion on May 15.

A letter from the Hon. Editor, Mr. A. H. Chisholm, notifying his inability to accept re-nomination to office was received with concern and regret. In explanation Mr. Chisholm said that his future duties in an editorial position of a national nature would necessitate his transfer to Sydney. He was sorry to lose the fellowship of Club members and to be obliged to relinquish his editorial office, which during the nine years of his occupancy had afforded him considerable pleasure.

The following were elected as Ordinary Members of the Club: Miss Marjorie Butchart, Mrs. M. Fawcett, Miss Gwen. Rogers, Miss Jan. Vaughan, Mr. Arthur Cobbitt, Mr. R. Davidson, Mr. Fred. Lewis, Mr. A. E. Lowe, Mr. Jack Preston and Mr. Clive Preston. George Hunt was elected as an Associate Member.

The honorary auditors of previous years, Mr. A. S. Chalk and Mr. A. G. Hooke, having been nominated for re-election without opposition, were declared elected.

The following nominations were received: President, Mr. J. Ros Garnet; Vice-Presidents, Mr. Colin Lewis and Mrs. J. J. Fream: Hon. Secretary, Mr. Harry Preston; Hon. Assistant Secretary, Miss Aileen Adams; Hon. Editor, Mr. J. H. Willis; Hon. Treasurer, Mr. E. E. Lord; Hon. Assistant Treasurer, Mr. A. Carter, Hon. Librarian, Mr. A. Burke; Hon. Assistant Librarian, Mr. R. D. Lee; Hon. Excursions Secretary, Mr. A. A. Baker; Committee, Dr. Margaret Chattaway, Miss M. L. Wigan, Mr. I. C. Hammet, Mr. G. N. Hyam, Mr. R. B. Jennison, Mr. H. C. E. Stewart.

The President, in further reference to the statement appearing in the May issue of the *Victorian Naturalist*, explained the nature of the rules revision by a comparison of the old rules and the recommended revised version. Revisions were for the most part of a clarifying nature, but several were new in intention. That relating to life members raises the life subscription from £20 to £25 to bring it into line with the present annual subscriptions, while in Rule 4 "country members" is replaced by "country, interstate and overseas members," "associate" is replaced by "junior" and the age limit for juniors set at 18 years. Eligibility for country membership is restricted to those who reside more than 20 miles from Melbourne instead of 15 miles as at present. The term "Committee" has been replaced by "Council" and the formula for election is varied to permit nominees defeated in an election for a higher office standing for election to another office, or to the Council, without further nomination.

The President concluded by re-stating the terms of the motion and invited members to discuss the proposals at the end of meeting.

OUR WILDFLOWERS

Mr. Ivo Hammet and Mr. H. T. Reeves gave those present a delightful survey of Victoria's choicest wildflowers. Slides in colour, prepared from photographs taken by Mr. Reeves, were projected through the epidiascope and Mr. Hammet gave a running commentary on each picture. The plants shown ranged from those to be seen in the rain-forests of East Gippsland, the near-Melbourne hill and coastal areas, alpine places, the Grampians, the Wimmera and the Mallee "deserts," and the private gardens of several Club members. There can be no doubt that these "wildlings" deserve far more recognition than has so far been accorded them by professional nurserymen, horticulturists, and even the general public; and the appreciation with which they were viewed by those present, as shown by their applause, suggests that there are 200 or more people who would enthusiastically advocate the preservation and propagation of our own native herbs, shrubs and trees.

EXHIBITS

Mr. C. Gabriel: A complete collection of the known Victorian species of *Cowries*, including the rare *Umbilica*.

Mr. A. Carter: Some "Tulip Shells"—*Fusculvaria australasiae* Lam., Victoria; *F. distans* Lam., Florida; *F. gigantea* Kiener, Gulf of Mexico; *F. tulipa* Linn., Florida.

Miss A. Adams: A collection of fungi and lichens from Heaney Park, Ferntree Gully.

Mr. A. J. Swaby: Specimens in flower of the Western Australian Pin-cushion *Hakea (H. laurina)* and Yellow Gum (*Eucalyptus leucosylon*)—a pale pink, rather insipid but extremely floriferous form. The exhibitor remarked that the tree was actually borne down by the weight of blossom.

Mr. and Mrs. R. Savage: Collection of garden-grown native flowers, including *Melaleuca pulchella* and *thymifolia*; *Cassia artemisioides*; *Epacris impressa*; *Rhagodia linifolia*; *Grevillea dallachiana* and *ilicifolia*; *Eucalyptus leucocorylon*, var. *rosca*; *Correa rubra* (2), *reflexa*, and *alba*; *Eriostemon obovatis*; *Viola hederacea*; *Acacia botrycephala*; *Atriplex nummularium*.

Mr. J. R. Garnet: A small scorpion, identified by Mr. R. Dunn as probably *Lychas marmoratus* L. Koch, collected at Rosebud, April 26.

Mr. Ken Atkins, Melbourne Botanic Gardens: Collection of native flowers from the Gardens, including *Stenocarpus sinuatus* (Fire-wheel Tree), *Banksia collina* and *Eucalyptus leucocorylon*, var. *macrocarpa*.

Mr. J. Seaton: Native flowers, garden-grown at Caulfield.

Mr. A. A. Baker: Collection of rocks with embedded fossils from Kilmore, showing Silurian (Upper) plants, probably *Bythotrephis* sp. brachiopods and trilobite fragments; and differentiation in colouring of sandstone from May Hill, Kilmore, collected 9/5/48.

EXCURSION TO LOCH

Loch is in the Bass River Valley, which is famous, among other things, for being one of the localities in which the possibly extinct Leadbeater's possum was to be found. On May 1, in perfect autumn weather, a party of 32 members travelled there by parlour coach in search of the giant earthworm (*Megascolides australis*). After a pause to see the area of mangrove at Tooradin, the party arrived in time for a walk before lunch at the hotel.

Unfortunately the ground was very dry, and the worms had retreated well underground, so that the party was disappointed in not locating the worm by hearing its gurgle as, warned by the vibration, it retreats down from the surface into a moist burrow. However, we were able to inspect three specimens previously obtained by Mr. A. D. Davenport, and later watched while another one was dug out. The dry conditions made it very difficult to take the worms without injury, and it is suggested that any future excursions should be held in the rainy mid-winter season.

A family of yabbies was unearthed while digging, and a frog found under the bark of a tree nearby.

In the early afternoon we left on the return trip, with many long views as the road turned and twisted across the ranges to Strzelecki. A stop was made to collect specimens of *Psalliota campestris* for gastronomic study.

The excursion was very successful, and thanks are due to Mr. Hugh Stewart for his careful organization.

INA WATSON.

EXCHANGE OF INSECT SPECIMENS INVITED

From Mr. Melbourne Ward, Medlow Bath, Blue Mountains, N.S.W., a letter has come asking whether there are members in the Club who would be interested in exchanging Victorian and Tasmanian butterflies and moths for *Buprestidae* and other *Coleoptera* in his collection. Mr. Ward adds that it is his hope eventually to have a complete collection from Victoria. Any member of the Club who is interested in the possibilities of such an exchange should communicate directly with Mr. Ward at the above address.

FIELD NATURALISTS' CLUB OF VICTORIA

STATEMENT OF RECEIPTS AND PAYMENTS FOR 12 MONTHS ENDED 30th APRIL, 1948

GENERAL ACCOUNT

Ordinary Income		Ordinary Expenditure	
Subscriptions—		<i>Victorian Naturalist—</i>	
Arrears	£52 9 6	Printing	£306 12 6
Current	461 16 6	Illustrating	61 9 6
Life Membership	2 0 0	Despatching	27 8 6
	<u>£516 6 0</u>	Index	6 15 0
Cash Sales of—			<u>£402 5 6</u>
<i>Victorian Naturalist</i>	£6 7 4	Reprints	7 4 5
Badges	6 12 6	Postage	10 13 11
	<u>12 19 10</u>	General Printing and Stationery	12 6 2
Advertisement in <i>Naturalist</i>	4 10 0	Library	4 18 6
Interest received, Library Fund, £50 @ 3½%	1 12 6	Rent, Caretaking and Meeting	29 18 6
Donations received	9 14 6	General Expenses	33 12 9
	<u>£545 2 10</u>	Honorarium to retiring Secretary	50 0 0
Excess of Expenditure over Income for year	11 17 11	Donations and Affiliation Fees	6 1 0
	<u>£557 0 9</u>		<u>£557 0 9</u>

BUILDING AND CONTINGENCIES ACCOUNT

Balance in Savings Account at 30/4/47	£30 1 3	Cost of Reprinting Publications	£3 10 7
Interest on Commonwealth Bonds and Current Account	35 4 11	Deposit on Hawthorn Town Hall, for next Wild Nature Show	3 0 0
Sale of Publications	9 14 9	Balance in Savings Bank Account at 30/4/48	118 10 4
Donation received	50 0 0		
	<u>£125 0 11</u>		<u>£125 0 11</u>

LIFE MEMBERSHIP ACCOUNT

Balance in Savings Bank No. 2 Account at 30/4/47 £38 0 0 <hr style="width: 10%; margin-left: auto; margin-right: 0;"/> £38 0 0	Taken into Ordinary Income in year to 30/4/48 £2 0 0 Balance in Savings Bank No. 2 Account at 30/4/48 36 0 0 <hr style="width: 10%; margin-left: auto; margin-right: 0;"/> £38 0 0
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BALANCE SHEET AS AT 30th APRIL, 1948

LIABILITIES	
Building and Contingencies Fund	£1,068 10 4
Dudley Best Library Fund	50 0 0
	£1,118 10 4
Subscriptions paid in advance—	
Ordinary	£31 8 2
Life Membership	36 0 0
	67 8
Excursion Account	19 14
Special Donations in hand	2 12
Surplus of Assets over Liabilities	978 4
	£2,186 8 6

ASSETS	
Bank Current Accounts—	
General Account, E.S. & A. Bank	£22 1 5
Life Membership, State Sav. Bank	36 7 0
	£58 1 5
Arrears of Subscriptions, estimated to realize	40 0 0
Stocks on Hand at Valuation—	
Publications	£43 14 3
Badges	26 2 6
	69 16 9
Investments—	
Dudley Best Library Fund .. .	
Commonwealth Bonds	£50 0 0
Building and Contingencies Fund—	
C'wealth Bonds	£950 0 0
State Savings Bank	118 10 4
	1,068 10 4
Library, Furniture, Epidiascope and Water-colour Paintings—at valuation	1,118 10 4
	900 0 0
	£2,186 8 6

Audited and found correct,
 A. S. CHALK }
 A. G. HOOKE } Hon. Auditors.
 17th May, 1948.
 E. E. LORD, Hon. Treasurer.

WHY DO BIRDS PROBE THEIR NESTS?

By A. H. CHISHOLM

A remarkable practice among birds of various kinds, and one which resembles in some degree the curious habit of "anting," is at present engaging international attention.

Eleven years ago Mrs. Edith Coleman, of Melbourne, recorded in *The Emu* (vol. 37, p. 69) that the male of a pair of White-plumed Honeyeaters which she had under observation often put his head well down in the nest and shook the structure violently, the beak spearing the floor of the nest so definitely that its tip was sometimes visible through the bottom. Occasionally the bird clung to the outside of the nest and speared it so vigorously as to leave it quite ruffled. The observer assumed that the action was "something akin to our airing and turning beds and was probably useful in disturbing and dislodging vermin."



Probing the nest. "Greenie" perched upside down in typical "spearing" attitude. A young bird is seen pushed to one side.

Photo.: Edith Coleman.

More recently (March 1948) Mrs. Coleman has varied her theory to a slight extent. Following some notes which I wrote regarding the "open-work" nature of certain nests used in summer, she has reported having again seen a White-plumed Honeyeater "spearing" its nest—this time from the outside—and she has added the suggestion that the reason of the practice may be to let air into the nest on very hot days.

Curiously, this subject has been engaging a good deal of attention in England of late—I say "curiously" because the practice, as with that of "anting," appears to be deep-seated and widespread, and therefore should have been more or less freely remarked long ago.

Comment on the matter is made in *British Birds* for April 1945 (p. 206) by N. D. Pullen: in the course of a paper on the Blue Tit he mentions that while young were in the nest the mother-bird frequently dived head first to the bottom of the structure and remained there for periods up to five minutes, during which time nothing could be seen but the movements of her feet and tail. Mr. Pullen labels the action "digging" and suggests that its reason

may have been to search for insects, such as fleas, or for faecal matter, but if so whatever was found must have been eaten on the spot, for at no time was anything to be seen in the beak when the bird emerged.

Following Mr. Pullen's lead, at least five other contributors to *British Birds* have discussed the subject, all giving stimulating notes and comments on what the journal itself terms "nest-probing."

H. G. Hurrell (August 1945, p. 300) relates that a Blue Jay which had five young ones would stand in the middle of the overcrowded nest and dive the beak down to the bottom and shake vigorously. As the parents swallowed all droppings ejected by the young birds, the "digging" could not have been related to ordinary sanitation. "The purpose can at present be only a guess," Mr. Hurrell says. "It may, of course, be concerned with parasites, but as an alternative I am considering the possibility that it may have to do with the removal of the young birds' scaled-off feather-sheaths."

Miss N. C. Hicks (November 1945, p. 360) records having seen four species of birds rapidly poking or tugging at the lining of their nests, pausing every few seconds to pick minute objects from the nest-lining and swallow them. As the young of a Blackbird which poked at the nest were only two days old at the time, the action could not have been for the purpose of removing scaled-off feather-sheaths. "I suggest," says the writer, "that the tugging or poking shakes any fleas or other vermin present into a state of activity, so making them easier to see and dispose of."

B. H. Ryves (May 1946, p. 159) lists ten species of birds which he has seen "probing" the nest and suggests that the practice may be for any of the following purposes: (1) Eradication of insects. (2) Inducement to the young to evacuate faeces. (3) To prevent the bottom of the cup becoming a solid floor in order that the "scurf" shed by the young may percolate through the lining. (4) To move the positions of the feet of the young in order to lessen the risk of their becoming entangled in the lining.

Stanton Whitaker (same issue) records having seen the "digging" practised not only by several species of small birds but by the Sparrowhawk, Snipe and Redshank, the last two doing the work before the young were hatched. All the evidence indicated that the procedure was "purely one of ventilating the nest during hot weather." Negative evidence strengthened this theory, for the writer had not known the practice to be followed by birds whose nests were loosely constructed and therefore self-ventilating.

Stuart Smith (August 1946, p. 255) differs from Mr. Whitaker. "Having seen the action a great many times at the nests of many species," he says, "I am convinced that eradication of parasites is the major, if not the only, motive of the action. . . . The adult

bird raises a piece of the lining in its beak, shakes it quickly, lets it return, and then studies the area carefully with a most intense attitude. In most instances the bird will then pick up something from the lining and eat it." The writer adds that a hen Goldfinch which he watched was most assiduous in "lining-shaking," a striking development in the case of a bird which makes no serious attempt at ordinary nest-sanitation.

So there you are! Whether we term the practice "spearing," "digging," "probing," "poking," or "lining-shaking," it resolves into a queer little problem and one that merits further attention.

What is to be deduced from the evidence now available?

Personally, I reject the theory touching the disposal of "scum" shed by the young (for nest-probing is sometimes practised before the eggs are hatched), and I see little to support two other theories submitted by Mr. Ryves. The "nest bet," it seems to me, is either eradication of insects or airing of the nest. Certainly Mr. Stuart Smith presents a strong case for eradication, and his theory would probably be unassailable but for the evidence of Mr. Whitaker and Mrs. Coleman, notably the latter's report that the "Greenie" sometimes probed while eggs were in the nest and sometimes probed from the outside. These points, coupled with the fact that on one occasion the honeyeater used nesting material a second time (so indicating that it was not verminous) seem to weaken the supposition that nest-probers are concerned only with eradication of insects.

Is it possible that more than one reason obtains? If so, we may find that in some instances the "spearing" aims at ventilation—the airing of the babies' beds—and in other instances is prompted by an impulse to eradicate insects. Conceivably, indeed, both purposes may be served by the one action.

In any event, I am still rather dazed by the reflection that so many experienced observers in Australia (including some who have watched birds for up to half a century) have failed to see any indication of what is apparently a confirmed practice; and I wonder vaguely—and perhaps hopefully!—if the nature of our nests generally causes the action to be less common here than it is in Britain.

MODERN HOLIDAY CAMP AT HEALESVILLE

An up-to-date holiday camp has been established beside Maroonah Lake, Healesville, and the organizers have offered the site as a local point for field rambles by members of our Club and other kindred societies.

Tracks around the lake to Watts River below the Dam have been opened, and the manager of the camp has indicated that further development in this direction, with the provision of facilities additional to the present kiosk, cabin and caravan park, is expected to take place soon. Anyone wishing to take advantage of this offer should get in touch with Mr. J. A. Henderson, "Camp Marrodah," Fernshaw Road, Healesville.

MORE ABOUT HERBS AND BIRDS

By EDITH COLEMAN, Blackburn, Vic.

Mr. Fisch has added two names to the list of aromatic leaves carried or woven into birds' nests (*V.N.*, April 1948, p. 237). In this instance we have English birds using leaves of Australian plants. Were other, non-aromatic leaves chosen one might assume that they are used for concealment, more especially in species in which incubation does not start with second or third eggs.

Some British birds (pheasant, partridge, moorhen, little grebe) conceal their eggs until incubation starts, or when leaving the nest during incubation. The moorhen is said to cover her buff-coloured eggs with dead reeds of the same colour; but when, rarely, she nests in a leafless tree or hush overhanging water, she adds green leaves to the nest as soon as the hush bursts into leaf, and also covers the eggs with green reeds.

David Lack (*Life of the Robin*, 1943) has a few remarks which bear, indirectly, on our subject. He first quotes Turner on the robin (1544) from Ray's translation, 1678:

It makes its nest among the thickest thorns and shrubs in spinneys where it finds many oaken leaves; and when it is built covereth it with leaves, not leaving it open every way, but only one passage to it. On that side also where the entrance is it builds a long porch of leaves before the aperture, the outmost end thereof, when it goes forth to seek its meate, it shuts or stops up with leaves. What I now write I observed when I was very young; howbeit I will not deny that it may also build after another manner.

Says Lack, writing 400 years later: "That Turner did not altogether trust his boyhood memories is evident. Other writers were not so cautious and Turner's observation was quoted as a general nesting habit of the robin by Buffon, Bewick and other less distinguished ornithologists. Recent records show that Turner's observations may after all have been correct."

Lack continues: "The robin normally builds a cup-shaped nest; but when it is placed in a hole, or in grass on a bank, there is sometimes the appearance of a tunnel in front. Kirkman reports a robin paving such a tunnel with dead hawthorn leaves. Brown reports a robin's nest in which the bird covered the eggs with oak leaves, removing them when 5 eggs were laid and incubation started. It is unusual for a robin to conceal its eggs during the laying period, but another case is on record from Cornwall. In this instance the eggs were hidden in the nest-lining until incubation started. Between them these three records cover the essentials of what Turner observed."

Lack writes of Turner as a "good observer." Although regarded as the "Father of Ornithology" he was perhaps better entitled to his other name, "Father of British Botany." Certainly he shared some of the errors and fantastic beliefs of his age. He even accepted the barnacle-geese legend.

Lack's notes start another train of conjectures. Was the robin's use of concealing leaves the element of fact upon which were founded fantastic stories of its covering the bodies of unburied dead? They are sometimes attributed to the ballad, "Babes in the Wood":

No burial these pretty babes
Of any man receives,
Till Robin-redbreast piously
Did cover them with leaves.

This, according to Bishop Percy, was written in 1601 by Rob Yarrington; but the story is older still, and was given in many earlier books on natural history—some of which might better have been termed un-natural history:

The Robin-red-breast, if he find a man or woman dead will cover the face with moss, and some think that if the body should remain unburied he will cover the whole body. (Jackson's *Cornucopia*, 1596.)

The tradition was repeated many times in prose and poetry during the 16th and 17th centuries, more frequently by Elizabethan writers, i.e., Shakespeare (*Cymbeline*), Drayton (*The Owl*) and Decker (*Villanies Discovered by Lanthorn and Candlelight*). Webster associates wren and robin in the pious deed, in a refrain which Cornella's grandmother sang to her lute whenever she heard the bell toll:

Call for the Robin red-breast and the wren
Since o'er shady groves they do hover
And with leaves and flowers do cover
The friendless bodies of unburied men.

(*The White Devil*, 1612.)

Does the wren, too, conceal its eggs with leaves? Izaak Walton's "The Robin loves mankind, both dead and alive," doubtless has reference to the same legend, and Gray has what is probably an allusion to it:

There scatter'd oft, the earliest of the year,
By hands unseen are showers of violets found;
The redbreast loves to build and warble there,
And little footsteps lightly print the ground.

(*Elegy*, 1st ed.)

These legends certainly suggest a new line of approach to Australian bird-watching. Also, they recall the biblical pronouncement:

The thing that hath been, it is that which shall be; and that which is done is that which shall be done; and there is no new thing under the sun.

Is there anything whereof it may be said, "See, this is new"? It hath been already of old time, which was before us.

(*Eccles. I, 9-10.*)

THE MONOTYPIC ORCHIDS OF AUSTRALIA AND TASMANIA

By the Rev. H. M. R. RUPP, Northbridge, N.S.W.

By a monotypic orchid, I mean of course one belonging to a genus of which only a single species is known to exist. We have quite a number of genera in Australia which are represented here by a single species only; but most of them possess other species in other lands. Of strictly monotypic orchids we have eleven, viz.: *Orthoceras strictum* R.Br., *Goadbyella gracilis* Rogers, *Corunastylis apostasioides* Fitzg., *Townsonia viridis* (Hook.f.), Schltr., *Rimucala elliptica* (R.Br.) Rupp, *Burnettia cuneata* Lindl., *Leptoceras fimbriatum* Lindl., *Rhizonthella Gardneri* Rogers, *Cryptanthemis Slateri* Rupp, *Drynoanthus minutus* Nicholls, *Mobilabium homatum* Rupp.

It may be of interest to orchid-loving readers to have a few notes on these "solitary" species brought together in one article.

1. *ORTHO CERAS STRICTUM* R.Br., *Prodr.* 317 (1810). Well known to wildflower observers in many areas of south-eastern Australia and Tasmania. It does not seem to extend farther north than the southern parts of Queensland, nor farther west than South Australia. It occurs in New Zealand, where it was named by the botanist A. Richard *Diuris novae-zelandiae*; but Brown's name had a priority of 22 years, and the plant cannot be satisfactorily placed in *Diuris*. With that genus, however, it has obvious affinities, as may be seen by examining the structure of the labellum and column. A young plant of *Orthoceras*, with the raceme just showing, may easily be mistaken for a *Diuris*. The mature raceme, with its erect "straight-horned" flowers, is very different, and easily recognizable. The plant is often very robust, and may attain a height of three feet. The flowers vary in colour from dark brown to light green.

2. *GOADBYELLA GRACILIS* Rogers in *Trans. Roy. Soc. S Austr.*, LI (1927), 294. This rare Western Australian terrestrial appears to be a link between the genera *Microtis* and *Prasophyllum*. The small green flowers differ from those of *Microtis* in being reversed, and in certain structural details; while the lateral sepals, labellum, and column are all different from those of *Prasophyllum*. The plant itself considerably resembles a slender *Microtis*; it may reach a height of 37 cm. The genus was named in honour of its discoverer, the late Lieut.-Col. B. T. Goadby.

3. *CORUNASTYLIS APOSTASIOIDES* R.D. Fitzg. in *Aust. Orch.*, II, 3. This curious little plant might be regarded as an anomalous form of *Prasophyllum*, in which genus it was placed by Mueller in his Second Census of Australian Plants (1887). The anther and stigma are separate structures, so that

a rigid adherence to the defined character of the Orchidaceae would exclude it from this family altogether. It was found at Berrima, near Bowral in New South Wales, but has not been recorded for over 60 years, and our knowledge of it is entirely confined to the particulars given by Fitzgerald.

4. *TOWNSONIA VIRIDIS* (Hook.f.) Schltr. in Fedde, *Repert.*, ix (1911), 249. The genus *Townsonia*, of which the New Zealand botanist Cheeseman was the author, was discussed by the present writer in this journal for May 1933, p. 18. The opinion was there expressed that Hooker's Tasmanian *Acianthus viridis* (which Schlechter transferred to *Townsonia*) and Cheeseman's New Zealand *Townsonia deflexa*, were not only members of the same genus, but were actually conspecific. In collaboration with Mr. E. D. Hatch of Auckland, I was able subsequently to investigate this matter more fully; and we reached the conclusion that the New Zealand and Tasmanian plants are completely identical. *Townsonia* differs from *Acianthus* in its creeping rhizome, its stalked leaf quite independent of the flowering stem, and its broadly winged column. It has not so far been found on the mainland of Australia.

5. *RIMACOLA ELLIPTICA* (R.Br.) Rupp in *Vict. Nat.*, LVIII (1942), 188. Robert Brown placed this plant in the genus *Lyperanthus*, where, however, its position always appeared to be rather unsatisfactory. It is a very different plant, both in habit and floral structure, from any other species within that genus. Its present generic name was given in allusion to its invariable habit—"the dweller in crevices." It has only been found in moist crevices of sandstone cliffs in the Blue Mountains and the Central Coast of New South Wales. Within these areas it is by no means uncommon. With its graceful, drooping racemes of vivid-green flowers emerging from among the broad leaves, it is a very attractive orchid. Fitzgerald regarded it as a link between terrestrials and epiphytes. (*Austr. Orch.*, I, 1.) The form of the individual flower suggests an intermediate position between *Acianthus* and *Lyperanthus*.

6. *BURNETTIA CUNEATA* Lindl. in *Gen. and Sp. Orch.* (1840), 518. This pretty little orchid, usually found in moist, peaty soil near the coast, occurs chiefly in Victoria and Tasmania, but extends to New South Wales, where (besides one or two coastal localities) it has been recorded from the Blue Mountains. It is figured in one of Fitzgerald's unpublished plates in the Mitchell Library at Sydney, the locality being given as Woodford. The genus is closely related to *Lyperanthus*, and was included in it by Mueller.

7. *LEPTOCERAS FIMBRIATUM* Lindl. in *Gen. and Sp. Orch.* (1840), 416. Bentham included this in *Caladenia* on account

of its affinities with *C. Mengesii* R.Br. There are, however, no distal calli on the labellum, and there is often more than one leaf; so it seems better to accept Lindley's genus. It is an attractive little flower, the labellum being conspicuously fringed. It is found in Victoria, South Australia and Western Australia, usually in peaty soil.

8. *RHIZANTHIELLA GARDNERI* Rogers in *Journ. Roy. Soc. W. Austr.*, xv (1928), p. 1. With this may conveniently be taken No. 9, *CRYPTANTHEMIS SLATERI* Rupp in *Proc. Linn. Soc. N.S.W.*, LVII (1932), 58; *ibid.* LVIII (1933), 225; *ibid.*, LIX (1934), 118; *Austr. Orch. Review* III, No. 2 (1938). These are the two extraordinary subterranean orchids of Australia, obviously related, yet not sufficiently to allow of their inclusion in the same genus. *Rhizanthella* was found at Corrigin in Western Australia; *Cryptanthemis* nearly 2,000 miles away at Bulahdelah in New South Wales. A short account of the latter appeared in this journal for August 1932. Rogers's description of *Rhizanthella* is illustrated by W. H. Nicholls, and there is a good figure of it in the late Mrs. Pelloe's *West Australian Orchids*, p. 65. The best illustrations of *Cryptanthemis* (without floral details) are those in the *Austr. Orch. Review*, 1, c. Much still remains to be learnt about these remarkable orchids; the references given above have not been followed, so far as I know, by any later information.

10. *DRYMOANTHUS MINUTUS* Nicholls in *Vict. Nat.*, LIX (1943), 173. This diminutive epiphyte from North Queensland is fully described and illustrated by the author. It is allied to *Sarcochilus*, but the labellum is not lobed, and is sessile immediately at the base of the column. It was discovered at Mount Fox near Ingham, N.Q.

11. *MOBILABTUM HAMATUM* Rupp in *N. Queensland Nat.*, xiii (March 1946). Another small epiphyte from North Queensland. Superficially it somewhat resembles the Tangle Orchid (*Sarcanthus tridentatus*), but morphologically it is nearer to *Saccolabium* than to *Sarcanthus*. It differs from these genera in the possession of a mobile labellum, attached to the column-foot by a short, strong claw, on which it can be turned upside-down and back again, quite freely. The leaves are conspicuously reflexed (hooked) at their tips.

STARLINGS AS "WOOD-SWALLOWS"

When Mr. Alan Otto and I were roaming about Wattle Park recently our attention was attracted by what we at first supposed to be wood-swallows, but which presently became revealed as starlings. The birds were floating and wheeling at a fair height in precisely the fashion of wood-swallows. Curiously, Mr. A. S. Chalk has reported having seen a similar occurrence recently at Murrumbidgee.—A.H.C.

GEOLOGY OF THE POINT LONSDALE-QUEENSCLIFF AREA, VICTORIA

By HENRY D. GILL, B.A., M.Sc., Melbourne

Introduction

If it were not for Ice Age dune-building, there would be no Point Lonsdale or Queenscliff. And if it were not for a comparatively recent high sea-level, Point Lonsdale and Queenscliff would be islands instead of headlands. The Point and Queenscliff are of dune limestone (called aeolianite because built by the wind), and the country immediately behind consists of sands and shell-beds deposited some 3,000 to 5,000 years ago when the sea reached about 20 feet above present low-water mark. (See Browne, 1945, p. viii; Crocker and Cotton, 1947, p. 100.) The area is fringed by high dunes along the ocean strandline, and by lower dune ridges along the Port Phillip margin.

Jurassic Sandstones and Shales

The oldest rocks of the district do not outcrop at the surface, but are well known from shafts and bores. They belong to the same group as those of the Otway Ranges and the coal-bearing strata of the Gippsland Hills. Indeed they were explored for coal in 1860-1862 (see Daintree, 1862). No commercial quantities were obtained. However, the thin seams of coal that are present, being formed from land plants, indicate that the strata in which they occur were laid down on a land surface—probably in a series of swamps. The thickness of this series is not known, but Bore 1 of the Geelong and Western Port Coal Prospecting Co. (see *Diamond Drills in Victoria*, 1885) went to a depth of 1501 ft. 2 in without piercing the Jurassic rocks. The old land surface must have been gradually sinking relative to the sea to maintain the swampy conditions and yet build up such a thickness of strata.

The Otway sandstones and shales¹ occur not only in the Otway Ranges and the South Gippsland hills, but also in much of the low country in between, where they are covered by later deposits. A small patch outcrops on the beach near Mornington. These rocks thus form a coastal fringe more or less parallel with the present Great Dividing Range. The blocks of country forming the Otways and South Gippsland hills respectively have been raised, and are bounded by faults and warps. The strata in the Otways dip towards Bass Strait at 15° (Coulson, 1939), and were apparently implicated in the earth movements which formed Bass Strait.

Ancient Lava Flow

Water, wind, and the other sub-aerial agents wore down the old Jurassic rocks, because shafts and bores show that the former land surface on this formation was undulating and with pebbles

1. These rocks are of the order of 125,000,000 million years old. For the basis on which such calculations are made, see Holmes (1937).

deposits in places. Over this terrain flowed a stream or streams of molten lava from an eruption farther north. Many think that Mt. Bellarine itself was a point of eruption. This river of molten rock solidified into the basalt which is a feature of the north central part of Bellarine Peninsula. So old is this rock, that it is now much weathered and decayed, and probably the rock remaining is but part of its former extent.

This Older Basalt, as it is called, is seen also in the cutting behind the North Melbourne station, at South Melbourne, at a number of points on the east side of Port Phillip Bay, and it forms the craggy cliffs of Cape Schanck.²

Miocene Marine Limestone

Following the flood of lava, there came a flood of the sea. Either because the sea rose or the land fell, the sea transgressed the land. The former is probably correct, for there is a fairly even fringe of rocks from this transgression all round Australia. The Australian continent is one of the stable blocks of the earth's crust, and so probably did not sink. In any case, that a whole continent should sink evenly like that is beyond the range of probability. It is thought that at the time there was a world-wide eustatic rise of sea-level.

The sea invaded the land and in Victoria deposited a fringe of limestones with some sandstones and mudstones. They constitute the Gippsland coastal plain, some of the rocks of the Nepean Peninsula, the base of the Werribee Plain and Geelong, and the base of the Western District Plain which is now mostly covered with lava flows and ash spreads. The seas also invaded the Murray valley, forming an inland sea and covering the Mallee and Wimmera with marine rocks. Wells and bores often bring to light shells laid down in that sea (Chapman, 1916). Rocks of that same age underlie much of the Bellarine Peninsula.

Pliocene Sands and Clays

Over the Miocene marine limestones of the Peninsula lie ferruginous sands and sandy clays which are usually regarded as Lower Pliocene in age, but no fossils have been found in them to prove their age. Various interpretations have been given these beds and their correlatives elsewhere. My opinion is that, with the Red Beds of the eastern bayside and the rather sinular chocolate-coloured sands seen along the cliffs of the Childers Cove-Peterborough coast, they are rocks laid down as the high Miocene sea gradually receded. The effect of the lowering of the sea would be the rejuvenation of the streams on land. They would bring down a heavy load of comparatively coarse sediments, and spread them over the recently deposited limestones. The beds may well be partly terrestrial and partly marine.

2 These rocks are of the order of 30,000,000 years old.

The Pliocene sands and clays are all rich in iron, and display the red to dark brown stainings due to iron oxides. In some places buckshot gravel is well developed. This probably formed during arid periods when percolating waters would bring up the iron in solution, then, evaporating, deposit it near the surface of the ground.

Aeolianite

During the Pleistocene Ice Age,³ the Antarctic ice-cap advanced so as to cover most of Tasmania, and the Arctic ice in the northern hemisphere advanced to a similar extent. There was a world-wide lowering of sea-level due to the removal of such vast quantities of water for glaciation. Shells and other calcareous skeletons left high and dry on the former sea-floor were broken by the winds, just as we can see the shells of many aboriginal kitchen middens being broken up by the winds along the coast of the Western District now. The resultant calcareous sand (a contrast with the quartz sand of the Pliocene beds) was blown up into a series of high dunes. Percolating waters dissolved some of the lime, then re-deposited it again, cementing the grains of sand together. In this way the consolidated dune rock or aeolianite was formed.

With the melting of the ice-caps, the sea rose again, and much of the dune formation was covered by the sea. At Point Lonsdale itself, below the lighthouse, the wind-bedded rock can be clearly seen in the cliffs. On the edge of the shore platforms, the same wind-bedding can be seen going down below low tide level. At Warrnambool the dune rock goes to about a hundred feet below sea-level at the coast (Gill, 1943).

It is interesting to note that one of the earliest geological reports in Victoria (Daintree, 1862) contains a lithograph of the rocks at Point Lonsdale.

3. The Pleistocene Ice Age (there were others) began about a million years ago, and finished roughly 20,000 years ago. Conditions oscillated, giving five glacial phases with four interglacial phases. The fossil soil horizons often seen in the aeolianite are thought to originate in the better climate of the interglacials.

FIG. 1

Geological Map of Point Lonsdale-Queenscliff Area.

This map is based on the Military Map, Sorrento Sheet. Some closer contours were taken from a map inscribed "Intelligence Section, 3rd Reserve Bn., H. C. Hayman Sgt., 15/3/42." The area within a couple of miles radius of Point Lonsdale was covered in detail, and a reconnaissance made of the rest. Some of the boundaries are taken from the Geological Survey Qr. Sheet 29 N.E. Precise boundaries in country of such low relief are difficult to obtain, but it is believed the map gives an accurate picture of the geology of the area. The contours are based on L.W.M. Williamstown, but the mean spring rise of the tides at Port Phillip Heads is 2 ft. higher than at Williamstown.

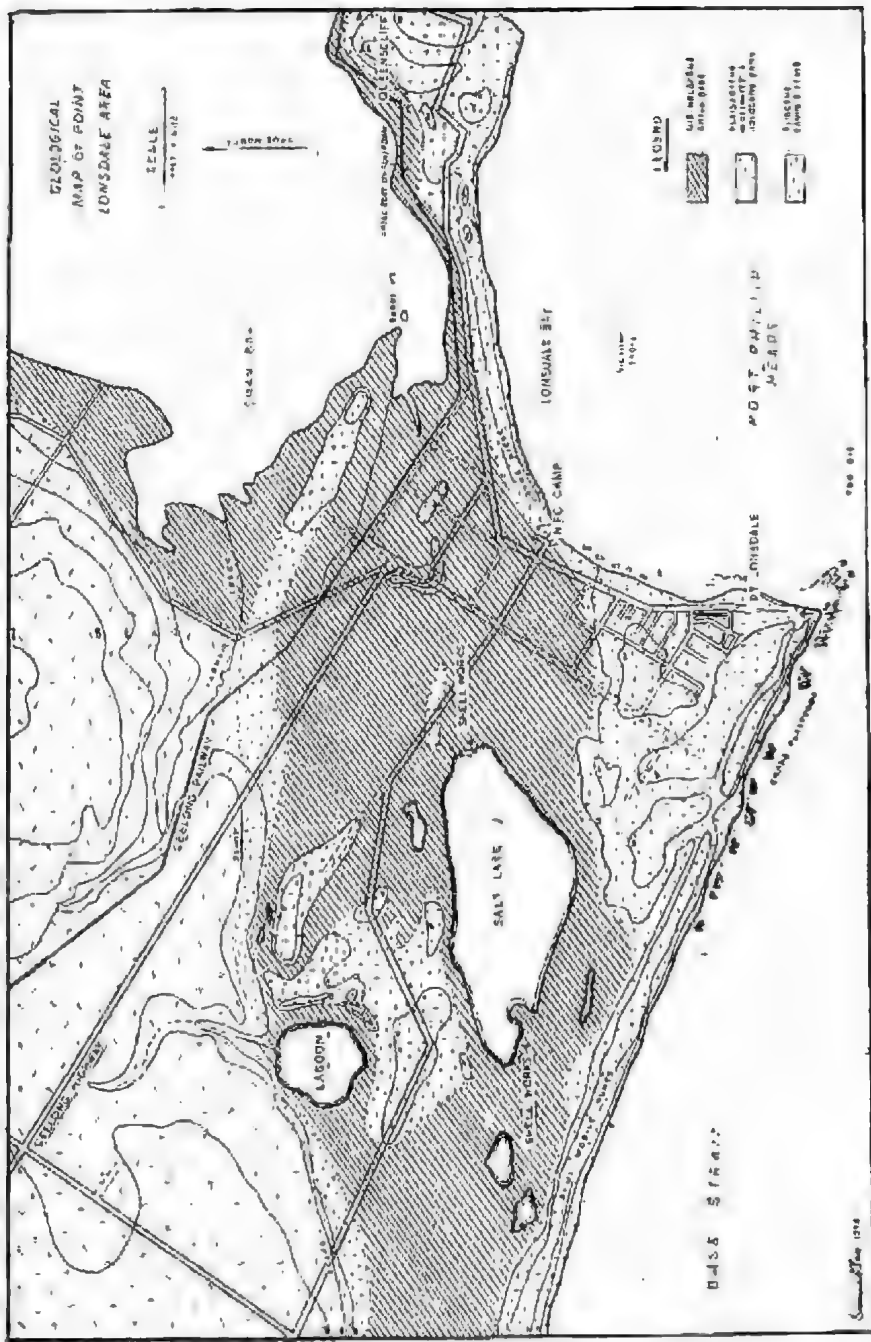


Fig. 1

As shown on the map (Fig. 1) the aeolianite is piled up against what was the former shoreline. When approaching Point Lonsdale from either Geelong or Ocean Grove, there is a marked scarp where the high Pliocene rocks end and the younger ones commence. This was the shoreline before the old dunes were built. This innermost dune line continued round through Queenscliff, but has been much broken by later erosion. A second line of dunes is indicated by the ridge of aeolianite which runs along the

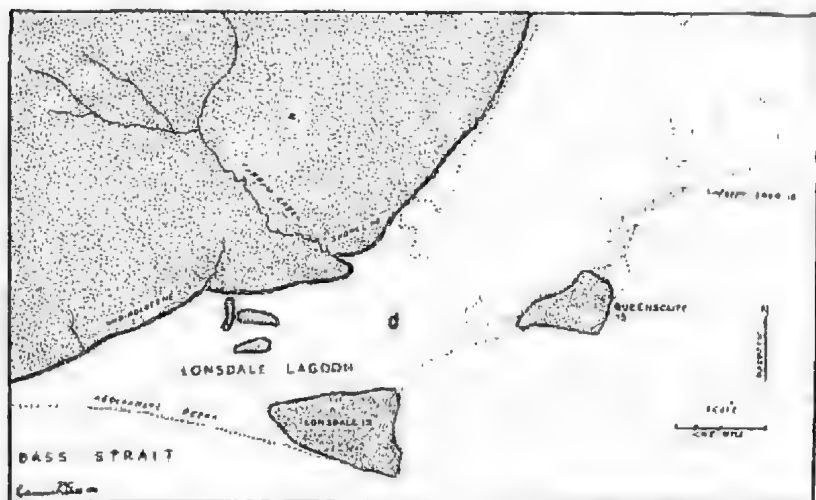


FIG. 2

Palaeogeography of the Point Lonsdale-Queenscliff Area, at the time of the mid-Holocene higher sea-level. The shell-beds were laid down in the comparatively quiet waters of the lagoon.

northern edge of Salt Lake (also called Lake Lonsdale). Victory Shoal is the remnant of a dune. Also, a line of dunes obviously connected Point Lonsdale and Point Nepean. The Rip is the narrow and shallow entrance to Port Phillip Bay, but geologically it is a breach in an old dune line which constitutes a bay bar (Keble, 1947). That is why there is deeper water inside the Rip and outside it. The shore platforms jutting out from Point Lonsdale and Point Nepean show where the dunes were. The rock blasted from the Rip when the entrance to the Bay was being improved for shipping was aeolianite.

For most of the distance along the Bass Strait shoreline, it can be seen that the semi-mobile dunes there are resting on a platform of aeolianite—an old shore platform. Before the dunes were built, this reef of rock must have formed a bar on which the heavy seas of Bass Strait broke. Inside the reef, lagoonal conditions would obtain (see Fig. 2).

Holocene Shell Beds

The low-lying flats between the scarp (as marked on Fig. 1) and the headlands of Point Lonsdale and Queenscliff are characteristic of the physiography of this area. They consist of fine marine sands, large areas of which are packed with fossil shells. Three firms are working this shell commercially. At McMahon's shell works (the more northerly of the two at the eastern end of Salt Lake) there is a large excavation which shows very clearly the nature of the shell beds. The deposit is a compact mass of shells, other calcareous material, and sand. The shells have been examined by Miss J. Hope MacPherson, conchologist of the National Museum, who reports as follows:

McMahon's Shell Works, Point Lonsdale

PELECYPODA

- Ostræa sinuata* (Lamarck).
- Anadara trapezia* (Deshayes)—often referred to as *Arca*.
- Katelysia scalarina* (Lamarck).
- Katelysia strigosa* (Lamarck).

GASTEROPODA

- Bullaria botanica* (Hedley).
- Bittium cerithium* (Quoy and Gaimard).
- Cominella lineolata* (Lamarck).
- Cominella eburnea* (Reeve).
- Fasciolaria australasiac* (Perry).

Pelecypods and *Bullaria* usually found in sandy mud, *Ostræa* and *Anadara* below low tide level, and others between tides. Other gasteropods between tides on rocky outcrops. All common Victorian shells.

Davis' Shell Works (S.W. corner of Salt Lake)

PELECYPODA

As at McMahon's Shell Works.

GASTEROPODA

- As at McMahon's except for the *Fasciolaria*. Also:
- Nassarius pyrrhus* (Menke).
- Batillaria australis* (Quoy and Gaimard).
- Mesodactyla cuneata* (Lamarck)
- Syncrea brazieri* (T. Woods).
- ? *Diala picta* (A. Adams).

Bullaria and *Batillaria* inhabit sandy mud flats between tides. *Diala* and *Nassarius* live among weed on sandy mud flats below low tide. *Syncrea* occurs in estuarine mud flats. All common Victorian shells.

The shells in the excavation at McMahon's shell works are in layers, and also are so closely packed, that it is clear their present position is one to which they were moved after death, and not the place in which they lived. This is also proved by the fact that the shells belong to different habitats—between tide levels, below low-water mark, in mud, among weeds, and on rocks. The rock-loving gasteropods would adhere round the aeolianite islands and reefs shown in Fig. 2.

Often the two valves of bivalve shells like *Katelaysia* are still fixed together. From this it is inferred that the shells were deposited in quiet waters, otherwise the valves would have been knocked apart. On the other hand, some of the shells are worn, and most of them have their concave side downwards; also there is some cross-bedding. These facts show that although the waters were quiet, they

- (a) were not deep, for tidal and other currents were present which caused cross-bedding; and
- (b) the currents were strong enough to push shells to and fro so as to wear off their "ornament,"
- (c) also to push the shells over so that they were left concave side downwards.

If exhaustive collections were made, it would probably be found that the same assemblage of shells occurs at each of the localities examined, but the proportions of the species varies considerably. At McMahon's, *Katelaysia* is the dominant member of the faunule, while the oyster and *Anadara*, though present, are by no means common. On the other hand, the latter two forms are very common at Davis' shell works. The gasteropod *Batillaria* is also noticeably more frequent there. So it is inferred that within the shell-bed facies there were a number of sub-facies, i.e., sets of conditions which favoured some forms of life more than others.

The beds at McMahon's shell works dip to the south at about 2°. This shows that the open sea was to the south, as it is at present. But at the time when the shells were laid down, the sea was obviously higher than it is now, and also there were no dunes along the Bass Strait shorelines as now. As Fig. 2 shows, a line of aeolianite reefs formed a bar which broke the force of the sea, giving the quiescent conditions which have already been inferred from the shell-beds. Around the edge of the shell-beds there is usually a marked change of contour, i.e., a noticeable bank where the higher sea-level came. In some places the shell-beds are being changed into a solid limestone by the deposition of calcareous matter as a cement between the shells and fragments.

Near the Queenscliff Yacht Club jetty, on the S.E. side of the railway crossing, there is exposed (Fig. 1) what is evidently a former shore platform with sea cliff behind it. On the platform there is a shell-bed about four inches thick. The platform is 8.07 feet above Admiralty datum (low-water outer spring tides at Queenscliff).

Dainree (1862) provides an interesting lithograph of an aeolianite platform near the N.E. end of Salt Lake, with an oyster bed on top of it. In the aeolianite are shown caves from which guano was extracted. That was before the days of superphosphate, when deposits of guano were greatly valued. In the caves, wombat bones were found.

Origin of Shell Beds

As the shell beds are above present high tide level, either the sea must have been higher when they were deposited, or the land lower. It has been established that some 3,000 to 5,000 years ago the sea reached about 20 feet above present low tide level. This higher eustatic level was accompanied by warmer weather and land conditions that were arid compared with the present (Crocker and Wood, 1947). It is believed that this higher world-wide sea-level was caused by a partial melting of the polar ice-caps. The recession of the ice-caps would mean hotter climates farther south, and so the more arid conditions, of which evidence has been collated in South Australia (Crocker and Wood, 1947) and in the Mallee (Hills, 1939).

This recent high sea-level is no doubt the one under which the Point Lonsdale shell-beds were laid down. The shellfish are all forms still found living round the Victorian coast. The conchologist's report shows that the shells were washed from the intertidal zone and from places below low-water mark into their present position. The shell-beds must therefore have been laid down a few feet at least below the then L.W.M. But the top of these beds is now some feet above high-water mark. At McMahon's shell works, the shell-beds reach 8.06 feet above Admiralty datum. Near the high ground north of the works (below Miss Phipp's house) and about a chain south of the road, the shell-bed was found to be 9.74 feet above datum, and the sand on the shell reaches 10.3 feet above datum. It is probable that further inland still, at the limit to which this sea went, the shell-beds occur higher still above datum. Present spring tides, on the average, reach 4.8 feet above datum at Port Phillip Heads.

It would appear from evidence gathered from estuarine terraces, shell-beds, and such like, that the sea did not fall suddenly to its present level, but rather came down in a series of stages, perhaps three. There is much detailed work to be done yet to unravel the story of this higher sea-level of recent times, but evidences of it are abundant. Shell-beds similar to those at Point Lonsdale are found in the estuary of the Yarra River, at Altona, north and west of Point Lonsdale, at Barwon Heads and Lake Connemara, Gellibrand River, Port Campbell, Peterborough, Hoplons River, Warrnambool, Dennington, Port Fairy, Yambuk, Narrawong, Portland, and so on in very numerous places round the coasts of Victoria and Australia. In the past, various local explanations have been given of such shell-beds "raised" above the sea, and both Pleistocene and Holocene ages have been attributed to them. However, it is now clear that all these beds are products of this mid-Holocene higher sea-level.

Sand Dunes and Ridges

The sand dunes and ridges are the most recent geological formations in the district. They are in process of formation—and destruction—at the present time. It is important to distinguish between the dunes which line the Bass Strait part of the coast, and the dune ridges which line Lonsdale Bay. The dunes are from 50 to 100 feet in height, and are a function of the prevailing winds. The ridges, on the other hand, are only from 20 to 25 feet high, and are not related to the prevailing winds. They line the coast, whatever direction it goes, and are a joint product of wave and wind. The waves throw up rocks, sand, and such like to form a beach ridge. This forms an anchorage, as it were, for sand moved by the wind.

Acknowledgements

Dr. A. G. Scholes, secretary of the National Fitness Council, and the warden of the Point Lonsdale N.F.C. camp, Mr. Bertrand, did much to facilitate the survey, and my thanks are extended to them.

Levels were determined by dumpy level (kindly loaned by Mr. M. Teese), commencing with permanent bench marks on Point Lonsdale road. For the values of these relative to datum I am indebted to Messrs. Gutteridge, Haskins and Davey, consulting engineers.

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INSECT GLEANINGS FROM MARANOA GARDENS

By J. ROS GARNET

During a visit to Maranoa Gardens on April 17 last, several of the excursion party gave some attention to the smaller animal life existing there. The mountain grasshopper (*Acripessa reticulata*) was an early find—a sturdy male specimen with powerful pincers, strong enough to give our fingers a distinct nip. For lack of a better container it finished up in a paper twist.

In the late afternoon our interest was caught by the "midges"—swarming compactly on a Jilly-pilly, the tips of several of the branches, leaves and stems being entirely concealed by thousands of little black flies. A sample was hastily transferred to a 1-pint milk bottle for further investigation; but, although careful enough, we were not sufficiently agile to avoid being showered with hundreds of the harmless little insects. It may be recalled that Miss Janet Raff (*Pict. Nat.*, 1943, LX, 67) offered some comments on the swarming of "midges" in autumn, and this was followed (on page 95 of the same volume) by my further reference to swarms being observed in mid-winter. On that occasion specimens were not collected and, remembering the consequent incompleteness of the record, our Maranoa "midges" were seized for later identification at the National Museum. Mr. A. N. Burns has since informed me that the species is *Scatopse richmondensis* Sk., belonging to the family *Bibionidae*.

Another note of entomological interest concerns the painted apple-moth. A caterpillar had spun its cocoon among the tips of the branchlets of a Casuarina; at the time of our visit, the wingless female moth had emerged from her flimsy white, almost diaphanous cocoon, had mated with the winged male of the species, and laid her numerous eggs on the surface of its pupal house. The Casuarina (*C. suberosa?*) is conceivably one of the natural food-plants of this species, which like several other well-known natives has adapted itself to exotic vegetation and become a pest to orchardists.

NATURE NOTES FROM MR. R. J. ALKEMADE

It is unfortunate that several observations recounted by the late Mr. Alkemade, at our last Cup Day excursion (Nov. 4), were not received early enough for inclusion with the obituary notice in the *May Naturalist* (p. 5). At the age of eighty, Mr. Alkemade was still actively interested in the natural world around him, as the following notes will testify:

Rosellas nesting in burrows

Rosellas, which usually nest in the hollows of dead trees, had been found, quite frequently, to be nesting in rabbit burrows—probably due to the scarcity of dead trees in Coimadaí district, whence they have been removed for the requirements of limestone kilns and for domestic fuel.

Absence of small birds at Coimadaí

Since local authorities ordered the destruction of box-thorn, there has been a noticeable decrease in the number of small birds, especially over the last few years. These box-thorn bushes were a safe refuge for smaller birds from marauding hawks, which could not force their way through the maze of small branches and thorns.

Koalas migrating

Mr. Alkemade stated that an experimental number of koalas had been released in his district, by the Fisheries and Game Department, some time ago; but upon searching recently, he could not find one koala, although numbers had been seen in more bushy parts of the country toward Macedon. These, he thought, were probably the ones liberated at Coimadaí, from where they had migrated on their own account.

A. A. BAKER

WHAT, WHERE AND WHEN**General Excursions:**

Saturday, June 5—Botanic Gardens. Subject: "Australian Trees in Winter" (second of series for beginners). Leader: Mr. H. Stewart. Meet 2.30 p.m. Rose Pavilion on Hopetoun Lawn. Timed to finish 4.15 p.m. at Park Street gates.

King's Birthday Week-end—Murray Valley, from Albury to Kerang. Subjects: Physiography, Birds, and General. Limited party only. Total approx. cost, £7/11/-. Leave Melbourne 4.15 p.m. train to Albury on Friday, June 11; return from Kerang on Monday, June 14. Further details at June meeting, and from Leader, Mr. H. Stewart, 14 Bayview Terrace, Ascot Vale (Tel. FU 022, ext. 457—day only).

Saturday, June 26—Mystery Winter Walk, of approx. 6 miles, easy going. Leader: Mr. Colin F. Lewis. Nash's bus leaves Batman Avenue 8.45 a.m. Bus bookings with Mr. H. Stewart; fare, 8/6 return. Bring one meal.

Saturday, July 10—Kallista/Sherbrooke. Subjects: "Lyrebirds" and "Giant Eucalypts." Leader: Mr. A. G. Hooke. Train from Flinders Street 9.18 a.m. to Upper Ferntree Gully, thence motor bus to Kallista. Bring one meal. Afternoon excursionists meet party Clematis Avenue about 2.30 p.m.

Group Fixtures:

Saturday, June 5—Geology Group excursion to Sunbury/Gisborne. Subject: "Graptolites." Train details at Group Meeting.

Saturday, June 19—Marine Biology Group excursion to National Museum. Subject: "Fishes and Other Marine Fauna of the Barrier Reef." Meet Russell Street entrance to Museum, 2.30 p.m.

Saturday, June 19—Botany Group excursion to Ferntree Gully National Park. Subject: "Timber Fungi, etc." Trains to Upper Ferntree Gully, 9.18 a.m. and 12.45 p.m.

Monday, June 28—Botany Group. Royal Society's Hall, 8 p.m. Subject: "Hepatics," by Mr. P. N. S. Bibby.

Thursday, July 1—Wildflower Garden Group. Royal Society's Hall, 8 p.m. New members welcome. Particulars from Hon. Sec. of Group, Mr. H. Preston (Tel. Haw. 1853).

Friday, July 2—Marine Biology Group. Royal Society's Hall, 7.45 p.m. Further details from Hon. Sec. of Group, Miss W. Taylor, 13 Jolimont Square, Jolimont, C.2 (Tel. MY 4269—day only).

Tuesday, July 6—Geology Group. Royal Society's Hall, 8 p.m. Subject: "Chemical Tests for Minerals," by Mr. H. Preston.

A. A. BAKER,

Excursion Secretary,

53 Carlisle St., Preston, N.18.

The Victorian Naturalist

Vol. 65.—No. 3

JULY 7, 1948

No. 775

PROCEEDINGS

The Annual Meeting of the Club was held at the National Herbarium on Monday, June 7, 1948. The President, Miss Ina Watson, and about 150 members attended. Apologies for non-attendance were received from Mr. F. Lewis, Mrs. V. Miller and Miss Blackburn.

The Secretary reported having received a letter from the General Secretary, A.N.Z.A.A.S., inviting the Club to send a delegate to forthcoming meetings. Members were invited to submit names if they wished to attend. Members knowing anything about Lord Howe Island were asked to get in touch with Miss Taylor, Secretary, Marine Biology Group.

Mr. Swaby spoke of the forthcoming Show on October 19-21, and pointed out that a three-day Show would entail much work for everyone. He requested that those able to help would indicate the times on cards available at the meeting.

Election of Members

The following were elected as Ordinary Members of the Club. Mrs. A. E. Lambert, Mrs. E. E. Chartaway, Miss E. Davis and Miss B. Ferrott; and as Country Members, Mr. A. G. Smith and Mr. Wallace Stevens. It was proposed by Mr. Lord, and seconded by Mr. Garnet, that Mr. J. T. Hamilton, a member since 1905, should be admitted to honorary membership.

The following nominations were received: Ordinary Members, Miss L. G. Dunn, Miss Mavis Starkey, Mrs. J. T. Hamilton, Mr. and Mrs. C. E. Isaac, Mr. R. G. Thompson, Mr. H. Haase; and as Country or Interstate Members, Mr. B. Easterbrook, Mr. C. E. Chadwick.

Incorporation of Club under the Companies Act

The President spoke to the motion: "That this Club be incorporated under the Companies Act," and the matter was thrown open for discussion. Miss Watson advised the meeting that, since the notice on page 5 of the May *Naturalist* was written, she had with Mr. Hooke interviewed a solicitor of the Registrar-General's Department, who entirely endorsed the recommendation of the sub-committee that the Club should be incorporated, and stated that if at any time the Club should desire a Govern-

ment grant, e.g., for publications, a claim would not be considered unless the Club were incorporated. A member enquired regarding the cost of this move. The President stated the cost would be approximately £50. She further advised that a Public Officer would have to be appointed, the Club would need to have a Registered Office (*viz.*, The Royal Society's Hall) and a Balance Sheet and Report would have to be lodged annually at the Registrar-General's Office.

Mr. V. Miller and Mr. P. Crosbie Morrison also spoke in support of incorporation. This motion, proposed by Miss Watson and seconded by Mr. Lord, was put to the vote and carried with only one dissident (Mr. E. S. Hanks).

Miss Watson then proposed the motion (seconded by Mr. Lord): "That the Rules of the Club, as revised by the sub-committee appointed for the purpose and subsequently approved by the General Committee, be adopted." This motion, when put to the vote, was carried unanimously.

Annual Report and Balance Sheet

The Secretary read his Annual Report and its adoption (moved, Mr. Morris; seconded, Mr. French) was carried unanimously. Mr. Coghill, on behalf of members, congratulated the Secretary on such a comprehensive Report.

Mr. Hooke presented the Balance Sheet and Financial Statement, explaining certain features of the Balance Sheet; its adoption (moved, Mr. Hooke; seconded, Mr. Chalk) was carried. Mr. Lord, as Treasurer, spoke of the increased volume of work entailed in drawing up the Balance Sheet in its present form. Some new ledger accounts had been opened during this last year, and the system of bookkeeping improved. He expressed the thanks of members to the Honorary Auditors.

The Secretary requested any member holding Club property to notify him without delay, as an inventory of these items was being compiled.

Election of Office-bearers

As only one nomination had been received for the office of incoming President, Miss Watson then handed the meeting over to Mr. J. Ros Garnet, whom she had much pleasure in declaring President for the ensuing year. Mr. Garnet, in assuming the chair, thanked fellow-members for the honour and confidence entrusted to him and proceeded to the election of office-bearers for 1948-49. As the exact number of nominations had been received for offices and Committee in the new Council, no election was necessary, and the following were duly proclaimed:

President, Mr. J. Ros Garnet; Vice-Presidents, Mrs. M. E. Freame and Mr. Colin Lewis; Hon. Secretary, Mr. Harry Preston; Hon.

Assistant Secretary, Miss Aileen Adams; Hon. Editor, Mr. J. H. Willis; Hon. Assistant Editor, Miss Ina Watson; Hon. Treasurer, Mr. E. E. Lord; Hon. Assistant Treasurer, Mr. Allan Carter, Hon. Librarian, Mr. A. Burke; Hon. Assistant Librarian, Mr. R. D. Lee; Hon. Excursions Secretary, Mr. A. A. Baker.

Committee: Dr. Margaret Chattaway, Miss M. E. Wigan, Mr. G. N. Hyam, Mr. R. B. Jennison, Mr. H. C. E. Stewart.

The new President, Mr. Garnet, expressed regret that neither Mr. Swaby nor Mr. Hammet would be on his Council, and he conveyed the thanks of members to these loyal retiring officers for their able help in the past.

Retirement of Hon. Editor (Mr. A. H. Chisholm)

The following motion (proposed by Mr. Garnet, seconded, Mr. Chalk) was carried with acclamation: "That this Club place on record its deep appreciation of the fine service rendered by Mr. A. H. Chisholm during the nine years of his occupancy of the office of Honorary Editor of the Club's publications." Mr. Chalk addressed the meeting and spoke of the value of Mr. Chisholm's work for the Club, especially during the difficult war years. As a mark of appreciation a small gift would be made on behalf of the Club to Mr. Chisholm.

Mr. Chisholm, in reply, thanked members for their good wishes, and said that although the editorship entailed a good deal of work he had enjoyed it. The *Naturalist* was still the best publication of its kind in Australia and the standard should be kept up. He expressed regret at leaving so many friends in Melbourne, but assured the Club that he would follow its activities with great interest while resident in Sydney.

Presidential Address, etc.

The retiring President, Miss Watson, chose for her Presidential address the lives of Linnaeus and Lamarck, which were contrasted and presented as shining examples to which all naturalists might well aspire. (A summary of this address is published elsewhere in the journal.) Dr. Margaret Chattaway told us that at Oxford a section of the University garden was planted by Linnaeus and the same kinds of plants were flourishing there just as he had designed.

Mr. Crosbie Morrison notified receipt of a letter from the Secretary of Lands in Western Australia in reference to a request that members of the recent Grimwade Expedition had presented to him. In consequence, at Cape le Grand an area of some 39,500 acres had been set aside as Class A Reserve, and the islands of the Recherche Archipelago, comprising an area of about 22,800 acres, had been declared a reserve also.

Miss Chisholm drew members' attention to some snapshots on the exhibit table of Miss Helen Keller with a bouquet of wild-

flowers which had been collected after the last General Meeting and presented to her next day. She had been delighted with them, notably on account of their strong aromatic perfume.

EXHIBITS

Mr. R. D. Lee: Specimens of fungi—*Clavaria sinapicolor*, *C. ochraceo-salmoneicolor*, *C. vinaceo-cervina*, *Lepidaria lamprofulva*. Photos. of fungi—*Morchella* sp., *Hexagonia Gunnii*, *Mutinus borneensis*, *Clavaria fusiformis*, *Crepidotus eucalyptorum*, *Amanita grisea*; also photo. of *Hakea petiolaris*.

Mr. C. J. Gabriel: Marine Shells of the genus *Spondylus* ("thorny oysters") from various localities, including *S. tenellus* Reeve (Bass Strait).

Mr. A. A. Baker: A collection of rocks and fossils from Cave Hill Quarry, Lilydale, and Hull Road, Mooroolbark—from the excursion on May 22.

Mr. A. N. Carter: Some of the world's "Fiat Shells"—*Chlamys circumlaris* Carp. (U.S.A.), *C. biffons* Lam. (South Australia), *C. latianaritus* Con (U.S.A.), *C. pallium* Eum. (S.W. Pacific), and *C. irradians* Lam. (U.S.A.).

Mr. K. Atkins and Mr. A. Burke: Collection of native flowers from the Botanic Gardens—*Rauksia intricifolia*, *Hakea pubescens*, *H. tenuifolia*, also the vivid scarlet late-flowered *Eucalyptus leucoxylon* var. *macrocarpa*.

Mrs. M. E. Freame (omitted from list of exhibits for May 10): 1. An Irish "shillelagh" (of Blackthorn wood) used at Burke's brewery, Dublin, in 1866. 2. Shell (*Murex* sp.) from Gaza in the Mediterranean. 3. Brittlestar (*Ophiura* sp.) from Altona, Vic.

"FAIRY WRENS"

(A Book Review)

Written in Alec H. Chisholm's alluring style, this slim volume will be hailed with delight by bird lovers and a wide public. The Fairy Wrens, "little birds of the stickup tails," are a group of native fauna about which Australians happily have no uneasy conscience. We have never tried to tame them in cages, our womenfolk have not sought their plumage for adornment, nor have our sportsmen trained guns on them. The book consequently is a "safe" one to send overseas—also an ideal present by reason of the modest cost, 3/9. But we will first desire to own a copy, to re-read, and have it handy for reference.

Of the Fairy tribe, the Superb Wren or "Bluey" is, of course, familiar to all Australians, and one bird club has adopted him as its emblem. The rarer sprightly Fairies, however, are not so well known. In the engaging conversation he has with "Peter" (a medico) Mr. Chisholm makes us privy to the history, habitat, family life and general economy of the fourteen species. The reader becomes infected by the author's obvious pleasure in "acclaiming them as one of the most endearing groups of birds to be found in any part of the world." Ten photographs illustrate the text, and appropriately reproduced is Neville Cayley's fine colour plate of the thirteen *Melanerpes* species, with the one representative of *Kosmia*. The printing and format are excellent, apart from the unfortunate choice of a colour foreign to "Bluey" for the front cover.

The publishers are commended for their enterprise in issuing this little book which, it is hoped, will prove a forerunner of similar volumes. Perhaps the author will consider further discourses on other small birds—the Emu Wrens, the Heath Wrens and the native Robins—from his store of expert knowledge? Like Peter, we wish "to continue as an audience."

H. C. E. STEWART.

SIXTY-EIGHTH ANNUAL REPORT

The Report is of concern to 543 financial members. Of these, 333 are Ordinary Members, 172 Country Members, 16 Associate Members, 19 Honorary Members, and 3 Life Members. In addition, there are 6 Subscribers. The Club has had the pleasure this year of electing to Honorary Membership Messrs. E. E. Pescott, J. W. Audas and A. H. E. Mattingley. During his very long association each has, as member and office-bearer, added much to the prestige of the Club.

During the year we have lost through death several members whose passing has been recorded with sorrow. Among them should be mentioned Messrs. James Searle, R. H. Croll and Charles Daley, all men of eminence in the community and all past-Presidents of this Club. The passing of Miss Ingram severs the last link in our association with that family.

The continued membership expansion has augmented the work and problems of the officers of the Club. The average attendance at meetings has been high—on some occasions embarrassingly so—and although the Lecture Room at The National Museum and Public Library at first seemed an ideal meeting-place, its abandonment was forced upon us by limited seating and exhibit space. The Committee invited an expression of opinion as to the advisability of transferring our General Meetings to the Herbarium and, with an overwhelming vote in favour, the change was effected during March last; the new meeting-place appears to give general satisfaction.

Reference to recent Proceedings will indicate that there has been a good variety of exhibits on display from time to time, but members will doubtless recall that many interesting Natural History objects remain unrecorded in the *Naturalist*. The fault has been with the exhibitor, who should have made it a point to supply the Secretary or Assistant Secretary with a brief identifying and explanatory note. The Editor has made repeated requests for short paragraphs to fill in small spaces in the journal and a regular supply of brief notes on various exhibits would serve very well. The Club has reason to be grateful to its Editor and Assistant Editor for devotion to their honorary offices. The fact that the *Naturalist* appears on time without fail is sufficient comment on the combined efforts of these gentlemen and the publishers. Volume 64 has been completed and the Index is now available. It will have been noted that some small changes have been made in the format, the chief purpose being to devote more space to the Club's own activities.

The popularity of Group Meetings has not lessened and during the year two new Groups have become well established—one for Marine Biology and the other a Wildflower Garden Section—both providing the vehicle for special study and discussion which is

not so easily available, nor perhaps desirable, at our General Meetings.

Attendances at the Botany Discussion Group have been very good. Mr. J. H. Willis has presented a series of lectures dealing with systematic botany and plant ecology, while excursions have been specially arranged to link up with topics discussed at the Group meetings. The exhibits by members have been an important part of the proceedings and the Group has given generous assistance at three public displays during the year. An Index of botanical references from the *Victorian Naturalist* was undertaken by members and it has been decided to attempt an ecological survey of the Sherbrooke Forest area. Members are also indebted to Mr. A. J. Swaby, Mr. H. C. E. Stewart and Mr. P. F. Morris for the part each has played in the development of the Group, the present popularity of which is gauged by its membership of more than 40.

The Marine Biology Group only came into being last August, but is steadily growing in strength and scope. Under the guidance of Mrs. M. E. Freame and Mr. A. J. Swaby (who is conducting a course of lectures on elementary biology) the meetings, discussions on exhibits and special summer excursions to places such as Cowes and Lorne have all added to the interest. The value of the Cowes excursion was enhanced because the leader—Mr. Crosbie Morrison—spoke informatively on various collected specimens which were exhibited in his marine tank. The Group is hoping, in the near future, to possess its own marine tank fitted with a large lens. Such an instrument would add greatly to the interest and instructive value of living marine forms.

The Geology Group is continuing to stimulate interest in geological aspects of natural history and its members have taken full advantage of those excursions to districts of geological interest. Perhaps the most noteworthy was the Easter Camp-out at Heathcote. The Group has suffered a distinct loss in the departure of Mr. F. S. Colliver to Brisbane, but his place is being capably filled by Mr. A. A. Baker, who is instructing beginners in the study of geology, including palaeontology.

The Wildflower Garden Section has planned its meetings at the Royal Society's Hall for the first Thursday in each month. For a variety of reasons meetings have not been regular, but attendances are good. The Section is concerned with encouraging the cultivation of our native plants in private and civic gardens, and the exchange and exhibition of such plants; a "wildflower" seed repository has been set up and is in the charge of Mr. R. Savage.

The wisdom of establishing an Excursion Sub-Committee has been apparent to members who have had the pleasure and profit of joining in the Club's outings. Some of these have been notable successes, and the Sub-Committee's only regret is that present

costs and transport facilities set limits on the number of members who can participate. The Sub-Committee's greatest difficulty—one which should be non-existent in a Club the size of ours—is in obtaining leaders. It might be worth pointing out here that such leaders are not expected to be authorities on the subject with which the excursion may be concerned; the leader's task is rather to define a route, appoint the time and place of the final rendezvous, and assist members of the party to meet and compare notes on the results of the excursion.

The thanks of all are due to the Excursion Secretary, Mr. A. A. Baker, and his helpers, who have worked far harder than we are entitled to expect of them. In regard to excursions, this year has been notable for the revival of F.N.C.V. Camp-outs, the first during the Australia Day week-end at Lake Mountain, and the second during Easter at Heathcote.

Other Sub-Committees have also justified their appointment. That concerned with Plant Names and the Revision of the Census of Victorian Plants reports that its monumental task is nearing completion, while the Maranoa Gardens Advisory Sub-Committee has been largely instrumental in awakening and maintaining interest in those gardens. The Camberwell City Council has now erected the handsome Frederick Chapman Memorial Gates at the Parring Road entrance. The official opening of the Memorial Gates on April 17 last was performed as prelude to a tree-planting ceremony in which many of our officers and members took part. All visitors to Maranoa will be indebted to Mr. A. J. Swaby for his splendid work in identifying, listing, and indexing the vegetation, and our Club wishes to place on record that his work in this connection is deeply appreciated.

The Heathlands Flora Reserve Sub-Committee has pursued enquiries into the feasibility of establishing a permanent natural garden reserve in some part of our characteristic "red-sand" heath area; but, from its report to the Committee, we can hope for very little in this direction unless it take the form of some smaller garden complementary to Maranoa rather than a park-like reserve. To obtain even this, it seems essential to win the interest of private land-holders.

The National Monuments Sub-Committee has continued its work during the year. Initial enquiries into the present condition, status, financial position, and possibilities of development of our existing National Parks has involved extensive correspondence, and visits have been made to several of the Parks. This work has resulted in the compilation of a reasonably comprehensive report which is due to be published soon.

The establishment of a National Forest Reserve in the region of the Lower Glenelg River—a project sponsored by the F.N.C. and R.A.O.U.—has been approved. The Reserve is to be con-

trolled by the Forests Commission—an arrangement similar to that applying to the Kulkyne Forest and Hattah Lakes region, but at present the reservation of the whole area recommended is conditional on the Forests Commission effecting an equitable exchange of acres with the Department of Lands and Survey, which at present controls an important and substantial section of the area.

During the year the Victorian Council of Scientific Societies has held regular meetings at which the Club has been represented by Mr. J. H. Willis. For the ensuing year his place will be taken by Mr. E. E. Lord.

Three delegates attended the A.N.Z.A.A.S. meetings at Perth in August 1947. The Committee has received from one of them (Mr. P. F. Morris) a report on such proceedings as affect the Club.

The Australian Natural History Medallion for 1947 was awarded to Mr. P. Crosbie Morrison, and the presentation made by Mr. W. Russell Grimwade at the November meeting of this Club. The award is now made under rules which have been entirely revised and considerably amplified. Two major alterations deal with the composition and tenure of office of the Award Committee, which is composed of highly competent people nominated by the General Committee, but not necessarily members of that Committee. To permit of some continuity half of the members of this Committee will be replaced every two years by three new members, whose term of office will be for four years. The second important amendment permits a nomination for the Award to stand for *three* years.

Earlier in the year a proposal emanating from the Royal Zoological and Acclimatization Society of Victoria—that this Club should amalgamate with it—gave rise to long discussions between representatives of both bodies; it became apparent that the scheme was unworkable and the Club then proceeded to form its Marine Biology Group, the establishment of which had been delayed by these negotiations.

Since last Annual Report the Club has received several donations of books, and is especially grateful to Mr. Allen (a nephew of the late J. and W. Ingram), Miss Wilcox (the daughter of one of our very early members), Mr. J. McCaw (one-time member of 40 or 50 years ago), the estate of the late Charles Daley, who will be remembered as a prominent member of this Club, Miss F. Smith, Messrs. F. S. Colliver, H. P. Dickins, T. S. Hart, Noel Learmouth and Mr. and Mrs. R. B. Jennison.

Congratulations were offered to several members whose appointments and achievements have brought some distinction during the year: to our former Assistant Secretary, Mr. Noel Lothian, as Director of the Botanic Gardens, Adelaide; to Mr. R. A. Dunn,

as Honorary Archaeologist at the National Museum, Melbourne; and to Mr. F. S. Colliver, as Curator of the Geological and Palaeontological Collection of the Geology Department at the University of Queensland.

Other matters which have been dealt with by the Committee include the setting up of a Sub-Committee to co-ordinate Youth Movements and wherever possible to relate them with those of the F.N.C.V. This Sub-Committee (Messrs. A. J. Swaby, P. F. Morris, S. R. Mitchell and Mrs. M. E. Freame) has kept the General Committee informed of what is being done with various youth associations such as our own Junior Branch at Hawthorn, the Bayside County Boy Scouts' Association, the Hawthorn District Boy Scouts' Association, the Opportunity Clubs, etc. Members of the Sub-Committee and other members (notably Miss I. Watson, Messrs. Colliver, Hammet and Willis) have all devoted portion of their limited leisure in giving Natural History talks to various youth groups and societies. In this and many other ways devised by the Sub-Committee the good influence of the Club is being extended.

It is almost superfluous to say that we have continued our vigilance over matters affecting the conservation of flora and fauna. The wanton destruction of wedge-tail eagles by members of an archery club, the unnecessary cruelty to caged birds as part of the normal activities of country gun clubs, the alleged unsatisfactory captivity of a young kangaroo, the export of our fauna to overseas "zoos," the destruction and vandalism occurring in the habitats of our rarer protected wildflowers, are all matters that have been the subject of representation to the appropriate authorities, often with the support and independent action of the country Field Naturalists' Clubs. A number of short paragraphs stressing the uniqueness and beauty of certain wildflowers, and reminders of their protection under the law, were prepared by some of the members and broadcast from one of the national stations.

One of the major matters that has claimed the attention of the Committee has been that of legal incorporation for the Club. A statement on this matter by the President was published in the *Naturalist* last May, consequently nothing more need be said in this Report except to mention that the proposition had the unanimous endorsement of the General Committee.

Pending acceptance of the proposal by the general body of members, a Sub-Committee consisting of the President (Miss I. Watson), the then Honorary Secretary (Mr. F. S. Colliver), the Honorary Treasurer (Mr. E. E. Lord), with Mr. C. Bryant as legal adviser, was appointed to undertake a complete revision of the Rules. Mr. A. H. Chisholm, Mr. A. G. Hooke and Mr. C. Hyam were co-opted to assist. This long and tedious task

has been completed and after examination and amendment by the full Committee the new Rules have been presented for confirmation by members.

It is necessary to point out that a further revision to one or two of the Rules will be necessary, if and when incorporation is decided upon. In the meantime the present revisions are mostly clarifying in nature, but one of them is of some interest to country members as it extends the radius of residence for metropolitan or ordinary members to 20 miles from Melbourne, instead of 15 as hitherto—the suburban area is now generally regarded as being within a radius of 20 miles of the city.

The amount of clerical work associated with Club activities is now large and occupies a considerable amount of the time of officers to whom this work is delegated; much correspondence might be avoided if all members paid their subscriptions promptly. As from May of this year wrappers for the *Naturalist* will be handled by the addressing machine system and the replication work has been put in the hands of a business firm.

Under the direction of Mr. A. J. Swaby, matters are well in hand for the 1948 Australian Nature Show to be held at the Hawthorn Town Hall next October. It is hoped that this will be an outstanding event in the history of the Club. The several Discussion Groups are closely associated with the project, but individual members should do their best to assist in any way they can.

Regular contact has been maintained with kindred country clubs at Ararat, Bendigo and Portland, and much co-operative work has been accomplished during the year.

The excursions to Ararat and Bendigo were memorable events which created considerable interest among the general public in each town and we can be sure they did much to foster the ever-growing appreciation of our flora and fauna and the value of its conservation.

It is appropriate to mention several notable happenings that have occurred in the Club during the past year. Perhaps the most noteworthy was the acceptance of the office of President by Miss Ina Watson, the first lady to preside over our meetings in the sixty-eight years of the Club's existence.

Another event has been the relinquishing by Mr. F. S. Colliver of the office of Honorary Secretary after almost 17 years' service in that position. The continuity of his service as Secretary was broken once by illness and again for a year by his elevation to the office of President. The departure of Mr. and Mrs. Colliver to Queensland University was suitably acknowledged by the Club at a well-attended farewell social evening last April.

Among the last acts of Mr. Colliver was the completion of a task that has been under way for many years and in which a

number of past officers of the Club has been engaged at one time or another, viz., the 60-year Author Index to the *Naturalist*. The thanks of the Club is due to all who have been associated with this monumental task.

Another severe loss is the recent resignation of Mr. A. H. Chisholm as Honorary Editor of the Club's publications. His transfer to Sydney ends nine years of pleasant companionship and invaluable service to the Club.

As a matter of interest it is recorded that, following representations from numerous bodies, including this Club, the Postal Authorities have decided to issue a special postage stamp in commemoration of Baron von Mueller, an early patron of the F.N.C.

The financial position of the Club is at present on a very satisfactory basis, but it will be seen from the Honorary Treasurer's Audited Statement that the increases in subscriptions and charges which were authorized last year were applied none too soon as the continually rising costs of goods and services for which we must pay would otherwise have left us at a disadvantage.

In conclusion we thank the Government Botanist for his kindness in making available for General Meetings the lecture hall at the National Herbarium, for his affording safe storage for some of the Club's valuable property, including the collection of water-colour paintings by Miss Amy Fuller, and for permitting the officers of the National Herbarium to act on our Plant Names Sub-Committee during their official time. To all members and friends who have devoted time and energy in furthering the aims and ideals of the Club we tender the gratitude of fellow-members. Finally, to our President, who, although a signatory of this Report and one of the Committee on whose behalf it is presented, can claim no responsibility for this last statement, the rest of the Committee desires to record its deep appreciation of her kindness in making available her home for our meetings.

(Signed) INA M. WATSON (President).

J. ROS GARNET (Hon. Secretary).

NATIVE SHRUBS THRIVE WITH GRAVEL

The use of gravel, both incorporated in the soil and as a mulch, is highly to be recommended. Mr. Ivo C. Hammet of Ivanhoe has long been an advocate of its use and, in my own experience, I do not know of any "native" that does not benefit from gravel in the soil.

Most Western Australian varieties seem to relish gravelly soil conditions and I have had best results with the red and green Kangaroo Paw (*Amigozanthus Manglesii*) by liberal applications of gravel, which also effects an increased germination from falling seeds around the shrubs

J. S. SEATON, Caulfield.

THE GREEN FLAG

(Summary of Presidential Address to the F. N. C. V., June 7, 1948)

By INA WATSON

Last December, you will remember, Professor Tiegs spoke to us on "The Metamorphosis of Insects." At the conclusion of his lecture Mr. Morrison mentioned something about "the Lamarckian concept." Later, someone asked—and he probably voiced something in the minds of many—"Who was Lamarck?"

And so the subject of my talk. I am going to tell you something of the personal backgrounds of one or two early naturalists. Here is the story of Carl Linnæus:

The year is 1707 and North America was being colonized and settled. In Sweden, there was great rejoicing; not because a son had been born to Nils Ingemarsson, the Lutheran pastor in a village in Southern Sweden, but because their army had been victorious, and their country had become the masters of Saxony. But the story of victory had a sudden ending in 1709, when the King of Sweden was totally defeated in the Ukraine and had to fly for his life back to a poor dispirited country. It was in the shadow of this defeat that Linnæus lived his early life.

In those days only the highly born had surnames, and Nils Ingemarsson—Nils, son of Ingemar—was the name of the father of Linnæus. As Sweden began to come under the influence of the Continent, the families chose surnames for themselves. Here is a description of Southern Sweden, where our story begins—

"A monotonous succession of rocky knolls, lakes, swamps and forests; it is intensely glaciated and the ice-worn rocks are either covered with scanty moorland vegetation or smothered in drift. Wooden houses, painted red and roofed with live turf, and churches with wooden spires and detached bellfries are scattered about. The trees are chiefly firs and birches with an occasional clump of beeches" [Miall].

There were very few flowering trees, but in his garden Nils Ingemarsson had a Linden tree, which in the summer carried its heavy load of perfumed yellow-green blossoms. He loved it so much that he took its name as the name of his family—Linné—a most appropriate one for his famous son.

Linné—or Carl Linnæus (as the name is usually latinized), was destined for the Church. Until he was 10 he was educated by his father—and taught, too, to recognize and name the flowers for which his father's garden was renowned in the village. After this there came school at the neighbouring town of Wexiö, where he neglected his other studies to learn more of his beloved flowers. But, as he refused to study for the Church, no more time could he waste in schooling, so he was apprenticed to a bootmaker. Here he was obviously wasted, and Fortune smiled—as it was to do at important times all his life—and he had the opportunity

PLATE I



Miss Ira M. Watson, President 1947-48 and first lady to preside over the F.N.C.V.

Photo. by courtesy of Spencer Shier, Melbourne.

to join the household of a rich relative who had a post at the University of Lund.

Universities of those days were not as good as our nuthack schools to-day; they had no equipment and only spasmodic lectures. Linnæus, thirsting for knowledge, left in disgust for the main University at Uppsala, where he found conditions little better.

He did not go as a wealthy student: his capital was £8. His clothing was cast-off, or borrowed; his shoes were stuffed with paper to keep out the bitter northern cold: he was often hungry. He hoped to study under the famous botanist Rudbeck, at Uppsala, but a fire had destroyed all Rudbeck's manuscripts and his herb garden, and the old man had not the heart to rebuild them. At Uppsala, Linnæus had no lectures in anatomy, chemistry or botany, and history tells us that he spent the last of his £8 capital on a trip to Stockholm to watch the dissection of a body of a woman criminal who had been hanged.

But at Uppsala, he met Peter Artedi. This tall, quiet man from the north found his ideal friend in the short, vivacious young Linnæus. They had similar interests which fired each other's enthusiasms. It was at Uppsala they decided to embark on a classification of the whole natural kingdom—animal, mineral and vegetable! Linnæus chose birds, flowers and minerals. Artedi took chemicals, fishes, amphibians and insects. They each in part succeeded.

Linnæus had been fortunate again. He had attracted the attention of Dr. Celsius, Professor of Divinity at Uppsala, who was writing a book on the flowers of the Bible, and offered Linnæus board at his home in return for his help. He also obtained for him a Royal Scholarship. It was the fashion in those days to present to one's patron a poem on New Year's Day. On January 1, 1730, instead of a poem, Linnæus dedicated his first treatise to Dr. Celsius. Its title was "Preliminaries on the Marriage of Plants, in which the Physiology of them is explained, Sex shown, Method of Generation disclosed, and the True Analogy of Plants with Animals concluded."

This created a sensation at the University—there was only one copy, so students copied it, and then stole each other's copies.

At length it came to the notice of Rudbeck, who took Linnæus to his home as tutor to his sons. At this time Linnæus was 23 and lectured in Botany at the University.

The following year Rudbeck and he started agitating for an expedition to Lapland—then a comparatively unknown country, although adjoining Sweden to the north. Finally, in 1732, the sum of £10 was raised and Linnæus set out alone. Here is his own description of what he took with him—

"My clothes consisted of a light coat of Westgotland linsey (woolsey), lined with red shalloon, having cuffs and collar of shag

leather breeches; a round bag, half an ell in length, but somewhat less in breadth, furnished on one side with hooks and eyes, so that it could be opened at pleasure. This bag contained one shirt, two pairs of false sleeves, and two half-shirts, an inkstand, pencease, microscope and spying glass, a gauze cap; to protect me occasionally from the gnats, a comb, my journal, and parcel of paper stitched together for drying plants, both in folio, and my manuscripts on Ornithology, *Flora Uplandica*, and *Characteres Generici*. I wore a hanger (knife) at my side, and carried a small fowling piece as well as an octangular stick, graduated for the purpose of measuring. My pocket book contained a passport from the Governor of Uppsala, and a recommendation from the Academy. . . .

"It was a splendid spring day; the sky was clear and warm, while the west wind refreshed one with a delicious breath. The winter rye stood six inches high, and all the trees were leafing, except the elm and aspen."

He returned six months later without many specimens—he couldn't carry them—but he had named many new botanical species, and with a number of ecological facts of great value. His writing gained him fame in Europe, fame which belatedly came back to Sweden, but jealousy asked why he did not have a degree, and because he could not obtain one there he left his native country to qualify.

The year 1734 was an eventful one for the youthful botanist; he fell in love with Sara Elizabeth Moræa, daughter of a wealthy doctor. Her father promised to keep his daughter for Linnaeus, but made it a condition that he become a doctor and that he should not return for two years. One historian says that his Sara gave him the £100 which financed him on his trip to the Continent, where, after a week's tuition, he obtained his doctor's degree at Amsterdam. In those days of herbs and simples, every botanist was almost a doctor, and a Doctor of Medicine was considered a botanist, so it is not surprising in view of his previous record that he obtained the degree so quickly.

He visited various countries, including England, where he was acclaimed. He returned to Holland, and became associated with Clifford, a wealthy Dutchman, in whose garden he planted his famous floral clock. At this time he met again his old friend Peter Artedi, who was quickly drawn into the charmed circle about Linnaeus. But tragedy followed; this brilliant young man fell from one of the ill-lit wharves of the town at night and was drowned. Remembering their mutual promise, Linnaeus arranged to have published his manuscript on the classification of fish. About this time, Linnaeus had finished his own great work *Systema Naturae*, which was published by Dr. Gronovius at his own expense. At this time, too, he had many chances to go exploring overseas—to the Americas, the Cape of Good Hope, to Surinam, all countries just opening up and full of wonderful plants and animals which were beginning to trickle back to the old world.

But he refused them all—why? Who knows? Was it because it was time to claim his Sara?

Back in Sweden, Dr. Moræa was *still* not satisfied, and Carl must serve still further for his bride. They were not allowed to marry until Linnæus had established himself as a successful physician.

Nothing daunted, Carl set out for Stockholm, where, after various ups and downs, he became Physician to the Queen and held numerous other important positions. There could be no further bar to his marriage, and this took place on June 26, 1739. Later, he was ennobled, became von Linné, and frequently attended Court. No doubt he and his Sara were happy, but history hints that Sara grew into a shrew and became very miserly. It was remarkable that, if true, she would advance him the £100 to go abroad, unless it was that in this popular, alert young man she saw a good investment for her money. Let us give her the benefit of the doubt. Maybe she loved him as he undoubtedly loved her. Certainly she opposed and tried to dissuade him when he gave up his medical work to return to his old university, and became Professor of Anatomy and Physics at Uppsala.

It was there he instituted his famous natural history excursions, which were attended by botanists from all over the world. We have even a record of the prescribed dress and proceedings—

"He (the student) is to wear a short tunic, and thin trousers reaching to the ankle, besides a cap or hat with a broad brim. He is to carry Linnæus' own book and other useful books, a botanical penknife and needle, a bundle of botanical papers and an insect box. The excursions are to occupy one or two days in the summer, starting at 7 a.m. and lasting up to 12 hours." An "annotator" to take notes, and a "fiscal" to keep order, were appointed and they set out [Miall].

And so Linnæus lived out his life in peace and honour, lecturing at the University in winter, living with his favoured students and his family (three daughters and a son) at his country estate at Hammerby in the summer, until he died at the age of 71.

Apart from his major work on classification, which has since been changed and modified, but which at the time unlocked the gates to further knowledge, he contributed much by his influence on other young botanists, firing them with his own enthusiasm and interest to go out and collect all over the world. Although not the originator, he was the first to use extensively the binomial method of naming.

Nothing would please him better than to be commemorated as he is, by a genus—*Linnaea borealis* (the Twin-flower), one of the commonest flowers of the Scandinavian woods.

Now let us tell of another great naturalist—one whose life is in contrast to that of Linnæus, one on whom Dame Fortune turned her back, and the one mentioned at the beginning of this talk. Here is the story of Lamarck:

While Linnæus was lecturing in peace and honour at Uppsala, there was born another son in the Chateau Lamarck at a small French village, in 1744. Jean Baptiste Pierre Antoine Monnet Chevalier de Lamarck was the eleventh child to be born in the old chateau set among fields of cabbages growing on the heavy black earth in Picardy. The chateau was intact until it was shelled in World War I.

"There was practically nothing in the family estates with which to dower a youngest son, and Nature therefore took a hand, and touching his brow, bestowed on him immortal genius. She wished for him that he might speak out the truth, and then, apparently, some unbidden fairy, arriving late and angry at the christening, added that, though he spoke the truth, it should be his destiny that no one who heard him would believe him. A third, unable to undo the curse, capped it with the wish that he should be honoured after he was dead" [Peattie].

Though the family was poor, it had a good tradition of service in the army. Perhaps it was this early training that helped him endure the poverty and misfortune which dogged him all his life.

As with most younger sons of noble families, he was destined for the Church, but he, like Linnæus, rebelled, and on the death of his father he bought an old horse, hired a lad from the village, and rode off to war—France was then at war with Germany. His commanding officer, to whom he had a letter of introduction, was not pleased to see this 17-year-old lad and his yokel attendant, and attached him to a company exposed to the enemy fire. All the officers were killed, but young Lamarck took charge of the 14 remaining men, refusing to let them retreat until they received orders, and for this he was made an officer the next day.

Not long afterwards peace was declared, and he was posted to the south coast of France for garrison duty. There was not much to do, so he climbed the hills and looked at the dry country vegetation, contrasting it with the trees and plants he knew from the north. But he had no thought of becoming a naturalist at that time; he was quite happy as a soldier. And then came the first of his misfortunes. A brother officer tried to lift him by the head in sport, and so injured his neck that he had to go to Paris for rest and treatment. Money was scarce, so most of those long twelve months were spent on a small bed in a little attic room, with nothing to watch but the clouds. But he watched those so intelligently that he could accurately foretell the weather. He even saw one of the rarest of cloud formations—the mammato-cirrus, usually the forerunner of a tornado, and seen so seldom that it is looked on as a phenomenon.

He had a small pension, and when he was better, worked for some time, not very happily in a bank. He was debating the question of whether to take up medicine or music when he was introduced by a friend to de Jussieu the botanist, and the course of his life changed.

Through de Jussieu he met the great Count de Buffon, who was zoographer to Louis XV, and held in high favour at the French Court. Lamarck was appointed tutor to his son. During this time he worked and produced a book on the classification of the flowers of France, which, since botany was popular (and even a suitable study for young ladies), became a notable success. This, together with influence exerted by Buffon, gave him the title of Botanist to the King, and at 35 the great honour of being elected to the French Académie.

Buffon's successor was a relative of Lamarck's, and got him a post as Keeper of the King's Herbarium. All might have been well with Lamarck if the storm of the French Revolution had not burst.

The scientists at the Gardens had little to do with the life at Court, but even so, Lamarck was a member of the lesser nobility and a scientist, and, as such, was suspect by the mob; he must have lived through many anxious moments until order was restored. The name of the Gardens was changed from Gardens of the King to, roughly interpreted, the Botanical Gardens, and in the post-revolution shuffle, Lamarck became Professor of Invertebrate Zoology—though he himself was the one to coin that phrase.

So, at the age of 50, he started again to learn a fresh subject. He immersed himself in bringing order out of chaos in the invertebrate kingdom, which had been studiously neglected by everyone else. And during those nine years, while Napoleon raced victoriously over Europe, and world history was changed, he studied and worked. In 1815, when Napoleon was finally defeated at Waterloo, he had started to write the first of his seven-volume work on the classification of the invertebrates. He only wrote five of the volumes himself, for he paid the penalty of years of peering through poor microscopes in increasing blindness. The remaining two volumes were written from his notes by two friends assisted by one of his daughters.

Up to the middle of the eighteenth century, species were thought to be fixed and immutable. Geology had discovered the fossils in the rocks, but no one thought they had any connection with living things. One popular theory of their origin was that every so often there was a great cataclysm of nature, the earth buckled, and all living things were destroyed. And then, in another space of time, an entirely new set of life forms started over again, a theory which saved a lot of troublesome explanations!

But a new idea was gaining ground—the species of the animal kingdom evolved one from another—and Lamarck stated his "concept," that "the species of the animal kingdom form a connected series, a graduated chain from the monad to man" [Peattie]. Darwin is often given all the credit for the theory of evolution.

I have read somewhere that it has been proved he had at least 100 forerunners. It is said that it needed the publicity from the storm aroused in Victorian England when it was first stated there to bring the theory to popular notice. Although Lamarck's and Darwin's theories of evolution were similar in many ways, they differed in the method by which they believed the species were modified, and evolved. Lamarck "believed that the need that an animal experiences to be adjusted to his environment forces the mechanisms of the body to take on new forms in order to function in a new way. . . . Lamarck does not suggest that they consciously willed to do this, but he implies at least a will that is not "conscious" [Peattie]. It is in this implied "will" that he mainly differs from the theory of natural selection propounded by Darwin 50 years later.

The world was not ready for his theory, and heaped him with ridicule, led by Cuvier the anatomist, who stood by the cataclysmic theory. Lamarck was not the type to fight back—indeed, he has been described as "the type of odd, nervous, gentle gentleman who closed the door so that no one shall see he is sharpening his own pencil" [Peattie].

Of his private life we know little—he was not famous enough for it to be recorded—except that he married three times, and that a number of his children died before him. He was always surrounded by debts, and later in life he became completely blind. His main work was the *Natural History of Invertebrate Animals*. The second edition of it comprised eleven volumes, and is still used for reference.

He lost his money in unlucky investments, and he finished his life in great poverty. The only bit of personal history we glean is that his favourite daughter Cornélie stayed faithfully with him until his death in 1829 at the age of 85. Her last words to him were, "Posterity will honour you." There was not enough money even to buy a permanent grave—after five years his bones were taken to the catacombs to lie with the other paupers.

One of the main sources from which I gathered my material is a delightful book by a modern writer, Donald Culross Peattie. His *Green Laurels* was written about many of the early naturalists because, as he says, it was the book he wanted to read and no one had written it for him. He has one very grateful reader in me.

In another book Peattie has this sentence: "There are always some of us, not a few, in any generation who go over wholly to the green flag. It is such a passionless fealty, so reticent a love, that trumpets do not sound for it. . . . only you will find those who have pledged allegiance are happy about it in quiet."

I have told you of two of the heroes who enrolled under the Green Flag long ago. I like to think that that applies to every

field naturalist, and that our Club is a rallying point for the lovers of the quiet things of nature.

Speaking of Darwin's works on the power of movement in plants, etc., Peattie says: "There is nothing in any of these works that you and I could not have discovered from the most casual weeds about us—had either of us been a Darwin." We may not be Darwins, to draw large theories of evolution from our common observations, but we can all observe and record, and, who knows, one small fact discovered by you or me may be the key for someone else to unlock a treasure house.

In our Club we have a common meeting ground, but it will flourish as a Club only so long as we *all* contribute. We are not all experts, but that doesn't mean that we cannot read and study and share some of the thrills of discovery. So don't leave the leadership to the few who have given and will give so generously of their time and knowledge. We are all comrades under the Green Flag. The Club can only carry that flag high if each one of us keeps a personally high standard of working for the Club ideals—protection of, and interest in, our natural history heritage.

Only by the goodwill and keenness of members will the Club flourish and maintain that fine tradition in the community which has been built up over the last 68 years and handed on to us to preserve.

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ALL VERY ODD

Waxing reminiscent in the course of a recent letter, the Director of the British Museum of Natural History (Mr. N. B. Kinnear) relates a curious occurrence that happened when a flying bomb fell on a roadway near the Museum and broke all the glass of the windows and cases on three floors in the west wing—about 60 tons of glass in all. In a case devoted to nests there was a small snipe-like bird suspended from a wire attached to the top of the case. The blast of the bomb broke the glass and the vacuum caused by the blast blew the bird right out of the building; but with a second blast that followed quickly the specimen was blown into the building again, though this time on a floor below its previous one. And it was still in good condition after all that!

Mr. Kinnear's story recalls a similar one told in a book by E. F. Benson. A window in a dowager's house was blown out by a bomb and then blown in again. The dignified old owner of the house was perfectly calm when describing the strange occurrence to a friend. "My dear," she drawled, "such an *odd* bomb!"

A.H.C.

LINKING ENGLAND AND AUSTRALIA

The picture reproduced on this page recalls memories of the charming countryside of England, but its chief interest for Australians lies in the fact that the man and children shown are descendants of John Gould, "father" of bird-study in Australia, who was in this country during 1838-40.

Although Gould and his talented wife had six children, only one of them married, and although that daughter was married twice she had only one child. The child became the wife of Dr. E. A. Edelsten, and the man



here shown, Dr. Alan Edelsten, is one of her two sons, and therefore a great-grandson of Gould. The children are his son and daughter, David and Helen.

It was Dr. Alan Edelsten and his brother, Dr. Geoffrey Edelsten, who did much for the cause of natural history in Australia by making available to me, in 1938, a valuable collection of old documents, including letters written in Australia by Gould, Mrs. Gould, John Gilbert, Sir George Grey, and Lady Franklin, as well as the diary kept by John Gilbert on the Leichhardt Expedition of 1844-45.

Mrs. Edelsten, Senr. (who lives in London), retains many photographic relics relating to Grandfather Gould and his children, and her two sons (who live in the country) also possess numbers of interesting mementoes. Notable among these are a large portrait of Mrs. Gould, a trinket inscribed "Mr. Gould, from C. Darwin, Esq.," and a cameo presented by the famous French naturalist, Prince Charles Lucien Bonaparte.

A.H.C.

BEENAK FUNGUS FORAY

By J. H. WILLIS

The excursion party of some twenty members which visited Beenak (about eight miles north-east of Gembrook) on Saturday, April 10, experienced a fine calm day—the last one of an exceptionally long dry autumn spell that was to break in heavy rain during the Sunday. Ever-changing hill scenery, as the motor van took us through Lerntree Gully, Belgrave, Emerald, Cockatoo and Gembrook, was enjoyable; but patches of blackened scrub and smouldering stumps bespoke very recent bushfires—they were still burning toward the Little Yarra valley which was enveloped in a smoke haze. Weather conditions were certainly inauspicious for fungus hunting!

A brief halt was called at the Gilwell Scout Camp to inspect some very ornamental exotic trees and Mr. Swahy drew attention to improvements being undertaken in this wonderful training ground. Then on, up a winding road through forests of silvertop, stringybark and peppermint with an undergrowth of Bush-peas (the Golden, Rusty, Rough, and Narrow-leaf species), Myrtle Acacia, Hill Banksia, Holly Lomatia, Pink-eyes and other dwarf shrubs—unfortunately none were a-bloom at this late season. After crossing Tomahawk Creek—a good flowing stream, picked out with white-holed Manna Gums, Scented Paper-barks, tea-tree scrub and swamp vegetation—the gravel road led us to McCrae Creek Falls, within a mile and just beyond the junction of Hoddle's Creek and Beenak settlement roads. Here we stopped for lunch.

Billies were holed in a convenient clearing above the Falls, and we were soon exploring their picturesque surroundings—mossy granite slabs and boulders, swift cascades of icy-cold water, ferny depths and stately Mountain Grey Gums. The little filmy fern, *Hypocnophyllum cupressiforme*, grew plentifully on shaded rock faces, while in the dampest recesses among great boulders flourished three delicate hepatics: *Chiloscyphus fissistipus*, *C. ovalis*, and *Lepidozou centipes*—palest green and almost hair-like.

The uphill road to Beenak (and Gilleroy) overlooks McCrae Creek on the left for four or five miles. We followed it over a mile through splendid stands of Silvertop and Brown Stringybark, pausing here and there to admire extensive beds of the Wiry Coral Fern (*Gleichenia circinnata*), an occasional brave patch of *Lobelia gibbosa* with royal blue flowers like tiny *flowers-de-lis*, or a mass of white-flowered Manuka and Wiry Bauera in damp depressions—little else was blooming.

Opposite Womersley's old selection, we descended once more on to McCrae Creek and spent an hour among the ferns and associate gully vegetation, the humidity was rather oppressive. At an old bridge some unusual sedges were noted, viz., *Scirpus Merrillii* and *Carex olsophila*—an uncommon and endemic mountain species that grew thickly as a knee-deep mass along the water's edge. Here we recorded our first fungi, a few wood-inhabiting species including the dainty little *Polyporus rhizophorum* in numerous colonies on bark.

Only half our party braved a tangle of logs, wiregrass and soft mud between the bridge and what is probably the nearest grove of Myrtle Beech (*Nothofagus Cunninghamii*) to Melbourne, but the wreckage from past bushfires was all too evident. In order to see unspoilt and venerable beeches, festooned with epiphytic mosses and lichens, one must visit the head of McCrae Creek beyond the tin mine, where also grows that elusive Beenak Lily (*Astelia nervosa*, var. *australiana*)—it might well be made the objective of some future Club outing. With the few small beeches grew tremendous gully tea-trees (a form of *Leptospermum pubescens*) up to a foot in diameter, hazel, sassafras, blackwood and Mountain Ash (*Euc. regnans*)

overtopping all. A large clump of Silky Fan-fern (*Sticherus tener*) was most attractive and the related Coral Fern (*Gleichenia microphylla*) scrambled up far ten feet or more in dense bowers; King Fern, Fishbone Fern and Hard Water-fern were also abundant.

Despite the surrounding dry hill-slopes (devoid of fungal growth), we found a goodly assortment of specimens upon turning over sodden logs near the water. Several small gay agarics were these, e.g., blue "Pixie's Pacasol" (*Mycena interrupta*) and vermilion *Hygrophorus coccineus*, but loveliest were the Cup Fungi—scarlet *Lachnea*, lemon yellow *Helotium* and verdant *Chlorosplenium*. A gregarious olive-green species of the last genus grew in total darkness; it can hardly be identified with the familiar *C. ceruginosum* and may be undescribed. The remarkable stalked and operculate puffball, *Calostoma fuscum*, was found by Mr. J. Ros Garnet. Fallen branchwood yielded the White-wash Fungus (*Corticium calcicum*), *Stereum vellereum*, and vivid golden patches of *Poria subaurantiaca*. Here too were collected some native gasteromycetes [see Mr. Garnet's note in the May *Naturalist*, p. 3].

Back at the Falls, three excellent fruiting bodies of the large stipitate and chestnut-coloured *Polyporus Hartmannii* awaited discovery at the base of an old Grey Gum. We boarded our bus again, stopping only for a welcome evening snack at the Tomahawk Creek. With daylight swiftly waning, several of the more energetic hurried upstream to examine a peaty swamp. The two bladderworts (*Utricularia dichotoma* and *U. lateriflora*) were found in bloom still, *Lycopodium laterale* in fruit, and leaves of Forked Sundew (*Drosera binata*) were located amongst sphagnum moss and screw ferns. The return journey in darkness gave no opportunity for sight-seeing, and thus concluded a field day which, if not devoted wholly to mycology, was nevertheless enjoyed by each excursionist.

EXOTIC FOREST AT EMERALD

A forest of Northern Hemisphere trees, many exceeding 100 feet in height, was the centre of attraction for some 25 Club members at the excursion to Emerald on April 24. The weather was fine, following two weeks of rain.

Once portion of the old nursery of C. A. Nobelius and Son, this area is now a park reserve under the Fern-tree Gully Shire, with an ornamental lake and facilities for tourists. Most of the trees were abandoned at the outbreak of the war of 1914-18, and they now present a spectacle that is probably unique in Australia.

Towering tulip-trees (*Liriodendron tulipifera*), poplars and Spanish chestnuts strive for sunlight with blackwood, lightwood and silver wattle (*Acacia melanoxylon*, *A. implexa* and *A. dealbata* respectively). Some very fine specimens of the last-named tree must be more than 30 years old, but the ranger reported that an increasing number is being defoliated each year by small green grubs, possibly assisted by the withdrawal of the native birds.

Beeches (*Fagus sylvatica*), alders (*Alnus glutinosa*), Filberts (*Corylus avellana*), Sugar Maples (*Acer saccharinum*) and "sycamores" (*Acer pseudo-platanus*) are interspersed with two species of New Zealand Liliaceae: the so-called flax (*Phormium tenax*) and the cabbage-tree or tikouka (*Cordyline australis*); also various eucalypts. A lovely avenue of scarlet oak marks the approach, the most brilliant in colour being *Quercus coccinea*, var. *splendens*; the others, *Q. borealis* (*rubra*) and *Q. patulicris*.

From higher ground tall Spanish firs (*Abies pinsapo*) are outlined against bronze-tipped hickories (*Corya glabra*). An inspection of the existing nursery concluded this enjoyable excursion.

F. E. LOUD

PERIODICALS RECEIVED BY THE CLUB

The Hon. Librarian reports that the following fifty-two periodical publications are being received:

General Australian:

Australian Journal of Science,
Council for Scientific and Industrial Research; Journal, Bulletins,
Commonwealth Forestry Bureau: Reports, Bulletins, Leaflets.
Australasian Herbarium News,
Australian Orchid Review,
The Emu (Royal Australasian Ornithologists' Union),
Wild Life.

Victorian:

Royal Society of Victoria: Proceedings.
Microscopical Society of Victoria: Proceedings.
Forests Commission of Victoria: Publications.
Journal of Agriculture, Victoria.
Mining and Geological Journal.
Your Garden.

New South Wales:

Royal Society of New South Wales: Journal and Proceedings.
Linnean Society of New South Wales: Proceedings.
Australian Museum: Magazine, Memoirs.
Australian Naturalist.
Royal Zoological Society of New South Wales: Proceedings.
Agricultural Gazette of New South Wales.
Junior Tree Warden.

Queensland:

Royal Society of Queensland: Proceedings.
Queensland Museum: Memoirs.
Queensland Naturalist.
North Queensland Naturalist

South Australian:

Royal Society of South Australia: Transactions.
South Australian Museum: Reports.
South Australian Naturalist.
South Australian Ornithologist.

Western Australian:

Western Australian Naturalist.

Tasmanian:

Royal Society of Tasmania: Papers and Proceedings,
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New Zealand:

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Dominion Museum, Wellington: Records.
Auckland Institute and Museum: Annual Reports.

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British Science News, London (formerly Monthly Science News).
Kew Bulletin (Royal Botanic Gardens, Kew).
Quekett Microscopical Club, London: Journal.

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Smithsonian Institute, Washington: Annual Reports.
Ohio Journal of Science: Bulletins.
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Bingham Oceanographic Society: Bulletin.
Plants and Gardens (Brooklyn Botanic Gardens).

Various:

Lingnan Science Journal (China).
Studia Botanica (Czechoslovakia).

WHAT, WHERE AND WHEN**General Excursions:**

- Saturday, July 10**—Kallista/Sherbrooke. Subjects: "Lyre-birds" and "Giant Eucalypts." Leader: Mr. A. G. Hooke. Train from Flinders Street 9.18 a.m. to Upper Ferntree Gully, thence motor bus to Kallista. Bring one meal. Afternoon excursionists meet party at Hairpin Bend, Clematis Avenue, about 2.30 p.m.
- Saturday, July 24**—Inverleigh. Parlour coach 180 miles, via Bacchus Marsh, Ballan, returning via Geelong. Subjects: "Birds, Historical, and Aboriginal Microliths." Leaders: To be announced at July meeting. Bring two meals, including picnic lunch at Reservoir in Brisbane Ranges. Reserved seat bookings, 17/- return, with Mr. A. A. Baker, 53 Carlisle Street, Preston, N.18.
- Saturday, August 7**—Museum of Applied Science. Subject: "Wax Modelling Demonstration" (of special interest to Botany members). Leader: Mr. R. H. Fowler. Meet Swanston Street entrance to National Museum 2.30 p.m. Intending excursionists must register names beforehand with Excursions Committee.

Group Fixtures:

- Saturday, July 10**—Geology Group Excursion to National Museum Laboratory. Subject: "Chemical Test Practice." Meet at Museum, Russell Street, 2.30 p.m.
- Saturday, July 17**—Marine Biology Group Excursion. Further particulars from Mrs. M. E. Freame (Tel. WA 2379).
- Saturday, July 17**—Botany Group Excursion to Ferry Creek via Upper Ferntree Gully. Subject: "Mosses and Hepatics." Leader: Mr. P. N. S. Bibby. Particulars from Mr. A. J. Swaby (XW 2669) or at general meeting. Train from Flinders Street at 9.18 a.m.
- Monday, July 26**—Botany Group. Royal Society's Hall, 8 p.m. Subject: "Mosses and Heathlands," by Mr. J. H. Willis, B.Sc.
- Tuesday, August 3**—Geology Group. Royal Society's Hall, 8 p.m. Study "Trilobites," by Mr. E. D. Gill, B.A. B.D.
- Thursday, August 5**—Wildflower Garden Group. Royal Society's Hall, 8 p.m. New members welcome.
- Friday, August 6**—Marine Biology Group. Royal Society's Hall, 7.45 p.m. New members invited. Further details from Hon. Sec. of Group, Miss W. Taylor, 13 Jolimont Square, Jolimont, C.2 (Tel. MY 4269—day only).

A. A. BAKER,

Excursion Secretary,

53 Carlisle St., Preston, N.18.

The Victorian Naturalist

Vol. 65.—No. 4

AUGUST 4, 1948

No. 776

PROCEEDINGS

The monthly meeting of the Club was held at the National Herbarium on Monday, July 12, 1948, the President, Mr. J. Ros Garnet, and about 180 members attending. Apologies for non-attendance were received from Messrs. P. Crosbie Morrison, J. H. Willis, G. N. Hyam and Allan Carter, and from Mrs. V. H. Miller, whose illness evoked an expression of sympathy.

The President spoke regarding the proposed excursion to Rushworth (September 30 to October 3), during which it is intended to make biological observations in the Rushworth, Waranga and Whroo areas. Mr. Baker spoke on the forthcoming trip to Inverleigh, announcing that a new scheme was to be tried out—the bus would stop at interesting spots on the road and members of the party would be asked to act as leader in turn. In this way members should gain experience in conducting an excursion. Mr. Baker appealed to members for additional organizers on the Excursions Committee.

Mr. Swaby reported that the response for helpers at the forthcoming Show in October had been very poor and again appealed for volunteers to share in the work. Members should notify the Secretary, without delay, of any Club property in their possession.

The President drew attention to the Conference on National Parks which would take place in the Lecture Room, Public Library, on July 28, at 7.45 p.m. Members are urged to attend this Conference and give the movement all possible support.

It was announced that Miss Raff had nominated Mrs. E. Coleman as the Club's nominee for the Natural History Medallion, 1948 (approved by Committee). Thanks were conveyed to Mr. H. P. Dickins for a copy of his booklet, *Victorian Orchids*, and to Mr. E. E. Lord for his book, *Shrubs and Trees for Australian Gardens*.

The following were elected as Ordinary Members: Miss I. G. Dunn, Miss Mavis Statkey, Mrs. J. T. Hamilton, Mr. and Mrs. C. E. Isaac, Mr. R. G. Thompson, Mr. D. G. Semmens and Mr. H. Haase; and as Country or Interstate Members: Messrs. B. Easterbrook and C. E. Chadwick.

Messrs. J. T. Hamilton, F. S. Colliver and A. H. Chisholm were elected to Honorary Membership. Mr. Hamilton and Mr. Chisholm, being present, received their Certificates and were congratulated by the President.

In appreciation of his splendid work as Honorary Editor, Mr. Chisholm was presented with a smoker's table, and the best wishes of members were conveyed to him by the President. Mr. Chisholm, in reply, thanked the Club; he was happy to be an Honorary Member of the Field Naturalists' Club of Victoria, his home State, as he was already one of the Queensland Club. He told members that the new edition of *The Australian Encyclopædia*, of which he had been appointed Editor, would be of considerable interest to naturalists, since it would contain articles, by recognized experts, on all phases of natural history.

The following nominations for membership were received: As Ordinary. Messrs. W. E. Day, L. G. Dale and I. Morrison; and as Country or Interstate, Mr. E. S. Smith (Christchurch, N.Z.).

Mr. A. N. Burns, Entomologist of the National Museum, took as his subject "Butterflies." Mr. Burns gave a brief survey of the position in the animal kingdom of these beautiful insects, followed by plates through the epidiascope. After the lecture members had an opportunity to admire the trays of beautifully mounted specimens which Mr. Burns had brought from his own collection.

Nature Notes

Miss Raff read an extract from an overseas publication which reported that, owing to severe winter in Vienna, the swallows had been unable to migrate south over the Alps, as is their custom. They had been collected and transported over the mountains into Italy by plane, train and other conveyances.

Mr. French reported having seen, in Maranoa Gardens, a magpie building its nest entirely of wire. Mr. A. H. Chisholm said that this was not uncommon.

Mr. Dickins remarked on the species of native plants still growing on Caulfield Racecourse—the last remnant of a once abundant flora.

Mr. A. H. Chisholm reported the cutting down of many trees in the wattle grove at Wattle Park and requested the Club to make enquiries into this matter, and if possible ensure that no further destruction occurred. He also showed some pictures of the helmeted honeyeater taken at Woori Yallock by Mr. Roy Cooper.

EXHIBITS

Mr. V. H. Miller: One of the Pencil-orchids—collected on Cabbage-tree Island, an uninhabited island just outside Port Stephens, N.S.W., by Dr. D'Ombraim twenty years ago; it has only just begun to bloom.

Mr. G. A. Hateley (Stawell): The Orange Banksia from W.A. (*B. prionotes*); the King Hakea from W.A. (*H. cucullata*); red-flowered variety of *Eucalyptus leucoxylois*; and the Mitre Gum, W.A. (*Eucalyptus mitrata*, syn. *E. coronata*).

Mr. R. D. Lee: Six mounted specimens of red seaweeds, collected at Middle Brighton.

Mr. R. C. Kershaw. Specimens of Tiger Cowrie (*Cypraea tigris* L.), including several juvenile specimens, one unusually large.

Messrs. C. French and R. Bury: Thirteen species of native flowers from Queensland, West Australia and Victoria—grown at Maranoa Gardens,

Garden Group (per Mr. R. Savage): *Grevillea pumila*; *G. luvifolia*; *G. Haackeriana*; *G. rosmarinifolia* (Hurstbridge); *G. lavandulacea*; *Eucalyptus leucocylon* "rosea"; *Cassia artemisioides*; *Actinostrobus* sp.; *Correa alba*; *Baeckea crassifolia*; *B. ramossissima*; and *Eriostemon obovatis*.

Mr. I. Hammet: *Grevillea macrostylis*; *Eriostemon obovatis*; *Coerea reflexa*; *C. pulchella*; *Diplazium grandiflorum*.

Mr. Richardson: Fossil *Tridacna* shell from Nauru, and oyster shell from the South Seas.

Mrs. M. E. Freamer: Tunicate from Williamstown.

NOTE ON SOME JUVENILE SPECIMENS OF THE TIGER COWRY (*Cypraea tigris*)

By R. C. KERSLAW, Melbourne.

Probably the most widely known of mollusca are the cowries, and doubtless the "Tiger Cowry" ranks among the best-known species. The layman, however, is possibly less familiar with the juvenile form, which, bearing as it does some resemblance to the *Oliva*, is harder to recognize.

At the July meeting of the Club the writer exhibited a series of Tiger Cowries, among which were several juvenile specimens. These had all reached a stage of growth at which they bear closer resemblance to the adult form than would a more youthful "Oliva-like" specimen. The exhibits showed forms approaching and including the fully developed adult.

The juvenile cowry has a thin, sharp outer lip, a prominent spire, and is covered with a thin epidermis. When fully developed, the lobes of the mantle have expanded over the shell, and have deposited a shining enamelled surface—so much a feature of the cowry shell. A line of brighter colour is usually observable traversing the dorsum of the shell, and is an indication of the position at which the mantle lobes meet.

The first of the juvenile specimens exhibited, upon which I will comment, showed a partially inflected outer lip with a few crenulations or teeth. The shell as a whole was thin and light, being approximately one-third the size of an adult specimen, and weighing half an ounce. Its dimensions were: length, 64 mm.; breadth, 45 mm.; height, 39 mm.

The second specimen I believe to be unusually large. It was slightly more advanced than the one described above, the outer lip somewhat more inflected, while both lips showed a complete though minute series of crenulations. The shell in this specimen was again rather fragile. The following dimensions, however, may prove interesting: length, 104 mm.; breadth, 76 mm.; height, 60 mm.; weight, 2 ounces.

The largest of the ten adult specimens exhibited compares with the preceding as follows: length, 102 mm.; breadth, 71 mm.; height, 56 mm.; weight, 5 ounces.

The third juvenile specimen showed an almost fully inflected outer lip, with a full though small series of crenulations on both lips. The shell was stronger and approximately two-thirds of the adult form.

Each of these specimens showed a depressed spire and enamelled surface, indicating their advanced stage of growth. All specimens were from the Barrier Reef and Fiji.

The adult Tiger Cowry may be thus briefly described (for comparison):

Shell convolute, ventricose; covered with shining enamel; base white; dorsum creamy, covered with light to dark brown and black spots or blotches; spire concealed; aperture long and narrow, with a short canal at each end; inner lip crenulated, outer lip inflected and crenulated.

ON THE NATURE AND DISTRIBUTION OF "MOONAH" (*Melaleuca pubescens* Schauer)

By JAMES H. WILLIS, National Herbarium, Melbourne

Introduction

Mr. J. M. Béchervaise,¹ in a recent description of Rodondo Island, stresses the dominant rôle of Moonah (*Melaleuca pubescens*) in the luxuriant vegetation that he found covering this mile-square, Bass-like rock. His many references to the tree, however, really apply to a related species, *M. armillaris* Sm., and I have already admitted with regret (*Vic. Nat.*, Vol. 64, p. 22, June 1947) culpability for this unfortunate error; Moonah does *not* occur on Rodondo, nor on any other island of Bass Strait.

During the last four years, *M. pubescens* has been mentioned^{6,7} as a frequent component of the lime-tolerant plant communities in southern districts of South Australia, notably on Eyre's Peninsula. Since the plant is also rather widespread in western Victoria, the time seems opportune to summarize any information at present available concerning its distribution. But, perhaps one should begin by describing the species briefly and indicating where its near affinities lie.

Description and Affinities

Habit.—A small spreading tree, 10-30 ft high, the rootstock frequently giving rise to several thick (to more than 12 in. diameter) trunks which may lean outwards or become contorted with age; foliage forming a dense umbrageous crown.

Bark.—Rough and dark greyish-brown throughout, imparting a sombre appearance to the tree.

Timber.—Pale pinkish-brown, very tough, hard and dense; air-dry weight about 35 lbs. per cubic foot (*vide* Ewart, *Fl. Vic.*, 1930, 863).

Leaves.—Alternate, shortly petiolate, flat, narrow-lanceolate, sometimes sharply acuminate, 5-15 mm. long, spreading, often more or less curved, coarser in coastal areas, veins and oil glands inconspicuous; young growth hoary, pubescent (hence the specific epithet).

Flowers.—Appearing in late spring or summer, white or creamy, in rather loose, glabrous or downy spikes (3-7 cm. long) just below the terminal shoots; sepals very short and obtuse, green or purplish, seldom persisting until the fruit matures; petals several times longer (to 3 mm.), round, clawed, white and translucent, becoming vertically rolled and reflexed; stamens creamy, in bundles of 8-12, two or three times as long as petals and united only at bases, which are sometimes reddish; anthers concolorous, oblong, 3-5 x 2-3 mm., smooth, dorsifixed, dehiscing longitudinally; pollen grains tetrahedral with rounded apices, smooth, 12-16 mic. wide (anther and pollen details taken from *Anglesca* material).

Fruits.—Persistent, ligneous, grey, smooth, globular or ovoid (3-6 mm. broad), usually contracted over the deeply inserted valves; seeds very numerous, reddish-brown, linear, clavate, apically truncate, verruculose, about 1 mm. long.

The species belongs to Bentham's series *Spiciflora*. Its closest congener is apparently the West Australian *M. Preissiana* Schauer,

which has been treated as conspecific, but differs in being a "paper-bark," laminating in thin pale sheets. *M. armillaris* Sm is related and very similar in appearance; it seems to replace *pubescens* along the coast from Genoa northward into Queensland, but its longer leaves are typically uncinuate with prominent oil glands, the shoots not downy, spikes denser, calyx lobes persisting in fruit, and the staminal bundles forming long ligulate claws exceeding the petals. Rorondo Island is a very isolated and remarkable habitat of the species. F. v. Mueller¹⁰ considered his *M. acuminata* to have definite affinities; but this slender shrub (to 5 ft.) bears usually opposite, broader, sharper leaves, the flowers in lateral clusters, and fruit depressedly truncate. *M. Duleana* Blakely⁴ (1941) from Central Australia was formerly included. *M. gemistifolia* Sm. (a "paper-bark" of eastern N.S.W. and Q'land.) has been confused with *pubescens*, while *M. parviflora*, var. *latifolia* Maiden and Betche, is, according to Mr. E. Cheel,⁵ probably referable to *M. lanceolata* Otto.

In Victoria, the (?) aboriginal name "Moonah" has been employed as a vernacular for many years. According to Brough Smyth, 1878, "Gutyamul" was used by the Lake Hindmarsh aborigines (N.W. Victoria), and "Cotumoll" of Lower Murray natives is doubtless a variant of the same word. "Wuta" was the name applied by tribes of the northern Flinders Ranges, South Australia, in which State the plant is better known as Black Tea-tree. Victorians prefer to reserve "tea-tree" for species of *Leptospermum*, not *Melaleuca*, and it is likely that they would vote solidly to retain Moonah as the standard common name of *M. pubescens*.

Historical

As noted by Cheel,⁵ "the name *pubescens* was established in 1843 by Schauer¹² on plants collected by Allan Cunningham during the year 1817." It is important that the type locality should be fixed as accurately as possible, but Schauer's only information is *In Nova Hollandia—A. Cunningham, Herb. No. 283, 1817*. Cunningham made at least two notable journeys in that year: inland with Surveyor Oxley from Port Jackson to as far as Booligal on the lower Lachlan, which was reached in July 1817; and south from Sydney to Twofold Bay, thence through Bass Strait and west along the southern coasts. Cheel⁵ mentions only the latter and says, "we may safely assume that specimens of *Melaleuca pubescens* Schauer were collected during this trip." As Cunningham did not leave Sydney until December 22, he would have only nine days in which to collect such material during 1817.

Melbourne Herbarium possesses a Cunningham specimen labelled "19. 1 Voy. Bass Straits," which must have come from somewhere on the Victorian coastline between San Remo and

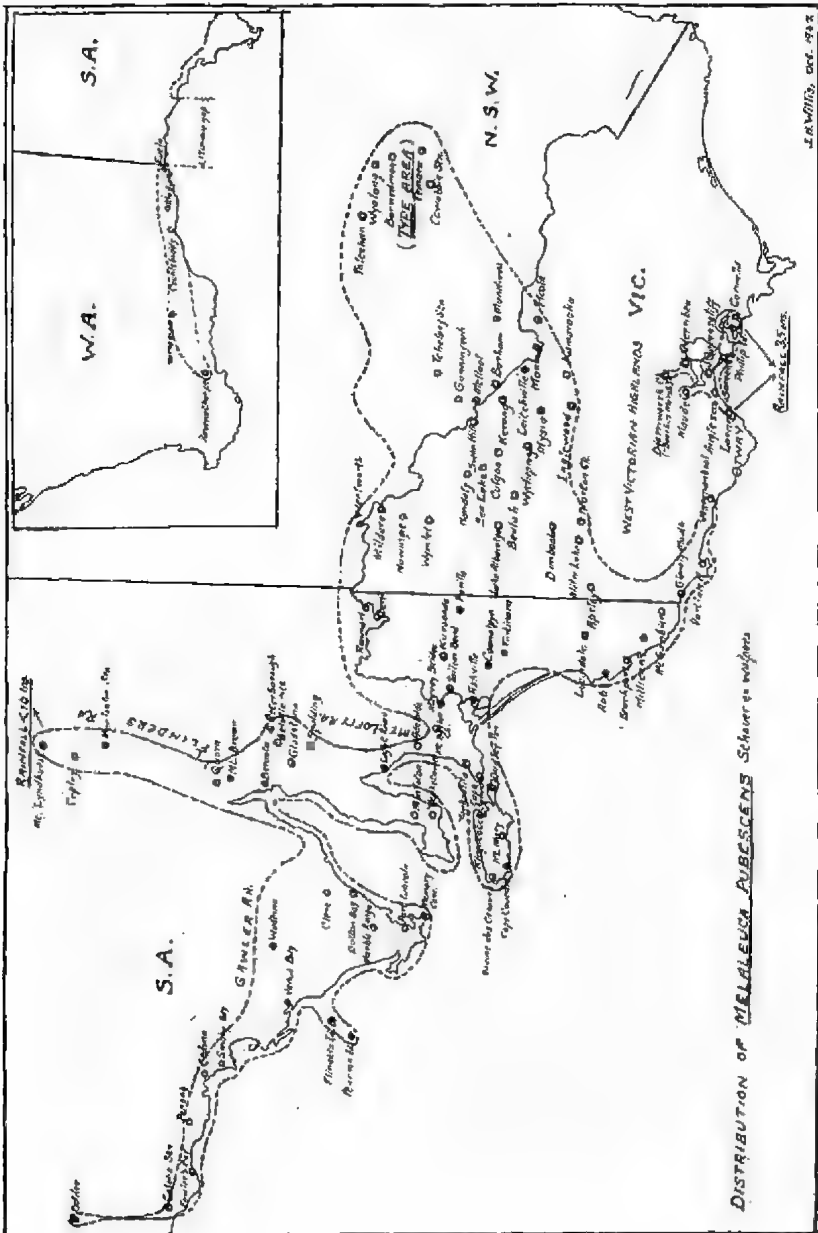
Cape Otway—it could not have been taken from any island in Bass Strait. In the same Herbarium, however, is another specimen of Cunningham's with the label "Interior N.S.W. 1817" (also, in pencil, "282, 1817"), doubtless gathered during the earlier journey to the Lachlan River, when he must have been very near, if not within, the known habitat around Wyalong. Surely there is better reason for assuming that *this* N.S.W. collection is a *topotype*, especially since the serial number immediately precedes that of the actual type (No. 283) which Schauer received. Bentham² cites neither of these 1817 collectings, so he had apparently never examined them.

Lindley⁸ had in 1839 published *Melaleuca parviflora* from the the Swan River, West Australia; but the name is antedated by both *M. parviflora* Otto ex Link 1822 and *M. parviflora* Reichenbach 1837, based upon different species, and it is thus illegitimate (Art. 61). Lindley's plant was re-described by Schauer¹³ in 1844 under the name *M. Preissiana*, and this was quite correctly adopted by Bentham² in the *Flora Australiensis* (1866); by the words *corrice librato solubili induto*, Schauer¹³ clearly indicates a bark of the laminating kind, and duplicate type specimens (including bark) are in the National Herbarium, Melbourne.

Bentham, however, lists the East Australian *M. pubescens* as a synonym under *M. Preissiana*. Because he considered them identical, he should have used the former epithet which is older. Since Bentham's work, many authors, including Mueller, Moore, Tate, Maiden, Ewart and Osborn, have freely used Lindley's illegitimate name *M. parviflora* both for the Moonah of eastern Australia and its western analogue. Now, according to Black,³ the East and West Australian plants are distinct species with entirely different types of bark, albeit very similar in other characteristics, and we should keep up the two names *M. pubescens* and *M. Preissiana*. Still another epithet must be mentioned: Schlechtendal's¹⁴ (wrongly called "Schlechter" by Cheel⁶) *M. curvifolia* 1847, based on Dr. H. Behr's material from Light River, South Australia. Many dryland examples of *M. pubescens* show more or less curving in the foliage, and it is doubtful whether *curvifolia* is worth retaining even under varietal rank.

Range

On the accompanying sketch map, small circles represent localities where *Melaleuca pubescens* has been noted; they are based either upon the existence of annotated herbarium material (housed at Melbourne and Sydney) or upon the observations of trustworthy botanists—mostly recorded in local floras. It must be understood that specimens are not to be found growing *everywhere* within the regions enclosed by the dotted line; very often, individual trees or clumps are many miles apart and seldom form



J. H. WILLIS, DEC. 1943

DISTRIBUTION OF *MELALEUCA PUBESCENS* SCHAUER EX WILLD.

a continuous community over wide areas, but the author has no records at present of any occurrence outside this provisional boundary line.

As to Western Australia, existing records are very doubtful on account of long confusion with the paper-bark *M. Preissiana* and, until quite recently, it was even assumed that *M. pubescens* of eastern States did not occur in the West. In August 1947, I had excellent opportunities for tracing Moonah west across Eyre's Peninsula to the fringe of the Nullarbor country near Colona station. Apparently it was absent from the Head of the Bight, but definitely reappeared at Eucla (170 miles away, over the W.A. border) and continued all along the Hampton Range scarp, at least to as far as Madura station. Thereafter I noted it again near Cocklebidy camp, around Norseman, and at Ravensthorpe beyond which the species was observed no more—I kept to the sand-heath plains toward Ongerup and the Stirling Range, where *M. Preissiana* was conspicuous in salty depressions.

Probably *M. pubescens* is not infrequent in that great Salmon Gum belt between the coastal sand plains and the arid zone along the Trans-Continental Railway line; it certainly enjoys a wide distribution in the Eucla Division, W.A., but authentic records are at present too meagre to form the basis of a western distribution map (see inset sketch of possible range in West Australia). I did not see Moonah anywhere in the South-west Division; but Mr. C. A. Gardner, Govt. Botanist at Perth, tells me that there is a small rough-barked *Melaleuca* on Rottnest Island and that it answers rather well to descriptions of the eastern *M. pubescens*. Until this island plant is carefully examined, we shall not know whether it constitutes an extraordinary isolated occurrence of Moonah or is some other related species.

Commencing at the arid Nullarbor Plain (a natural barrier to arboreal migration) and working easterly, we find an outlier of Moonah at Ooldea Soak—mentioned by various visitors to the spot—and other occurrences near Colona station and Fowler's Bay, on the west coast of South Australia. There is a fringing of it along many parts of the coast from Smoky and Venus Bays into Eyre's Peninsula. Here, Moonah spreads inland also, to Wudinna or beyond; together with *Casuarina stricta*, it forms, according to Crocker,⁷ "probably the most widespread association on Eyre's Peninsula."

Flinders Island and Pearson's Islets in the Investigator Group (18 miles, and more, off Cape Finniss) support dense forests of *M. pubescens*, which follows the western side of Spencer's Gulf from Cape Catastrophe at least as far as Cleve and Cowell. The Gawler Ranges define a boundary across Eyre's Peninsula and there are no records of the species north of it; but from Mt. Brown and Quorn at the head of Spencer's Gulf, there are occur-

rences along the western slopes of the Flinders Range to Copley and Mt Lyndhurst—presumably the northern limit of distribution. We have many localities on Yorke Peninsula, Kangaroo Island, and the limestone country between Adelaide and the Victorian border, particularly the raised beach zones behind Robe and Beachport.

In Victoria, Moonah encircles but avoids the Western Highlands. We have records from Portland, Apsley, Dimboola, and almost throughout the Murray Mallee plains, while a southern extension hugs the sea-front to the environs of Warrnambool. The Grampians are a barrier; so are the Otways, beyond which Moonah reappears at Lorrie, Anglesea, thence as an almost continuous belt above the sea cliffs to Barwon Heads, Queenscliff and Sorrento. There are isolated patches of it on the western shores of Port Phillip Bay, along the Djerriwarrh Creek (in company with *Eucalyptus Behriana*—a Mallee), on Phillip Island and, lastly, around Corinella and San Remo. No occurrence has been reported from Tasmania, nor from any island in Bass Strait.

North of the Divide, our records include Wycheproof, Inglewood, Kamarooka and Picola. Swinging east from Mildura, we meet scattered trees through parts of the Riverina, until the north-easterly limit of distribution is reached in the Wyalong-Temora district, N.S.W., where Moonah becomes conspicuous again.

It is puzzling to account for Maiden's⁹ statement, "All the colonies except Victoria," when the species is so well known from many parts of this State, though absent from Tasmania. Applying the "Age and Area" hypothesis one would look to Eyre's Peninsula, where Moonah is now so abundant, as a very probable centre of origin and source of migration toward the present extremes.

Ecological

Crocker* has established an association in which *Metaleuca pubescens* is the dominant tree, *Casuarina stricta* and *Bursaria spinosa* being locally important or even co-dominant. This is characterized by very shallow soils of the reddish-brown "terra rossa" type in which travertine limestones occur at or near the surface, and considerable areas in the far south-east of South Australia support a savannah woodland of *Metaleuca* with associated shrubs and grasses. On Eyre's Peninsula, as already noted,⁷ is a widespread *Casuarina stricta*-*Metaleuca pubescens* association, with the former species usually dominant, and in both regions the Moonah communities pass gradually into Mallee eucalypt scrubs. As it occurs in the Victorian Mallee, Moonah would probably fit into Crocker's concept of a calciphilous savannah woodland community, though the occurrences are mostly very small "islands" in the surrounding eucalypt forest, e.g. Red Gum forest along the flood plains of the Murray below Echuca, where it occupies higher

ground not subject to inundation. Dr. N. C. W. Beadle, Sydney (*in lit.*) also quotes "sandy 'islands' in the saltbush country" of south-western New South Wales. Referring to occurrences in western N.S.W., Mr. D. L. W. Henderson writes: "The soils whereon I have seen it growing between Moama and Stoney Crossing and about Wyalong and Taleeban are sandy red-brown earths of the 'mallee sandhill' type, not 'terra-rossas'."

The few coastal belts in Victoria are more in the nature of ecotones on consolidated dunes (also rich in lime) between cliff vegetation and *Eucalyptus* forest, which is apparently the climax community; but the species is found under such a variety of edaphic and climatic conditions that the factors controlling its distribution are anything but clear.

At the one climatic extreme, we have Mt. Lyndhurst (S.A.) with long hot summers and a rainfall below 10 inches; at the other, Torne and San Remo (Vic.), which are comparatively mild and cool, with rainfall about 35 inches. Throughout this range of climate, Moonah occurs at altitudes of little more than sea-level and probably always well beneath 1000 feet—it does not take kindly to the hills. As a general rule, the species is indicative of very shallow soil, as at Djerrivarrh Creek (Ordovician shales and sandstones) and on Mallee travertine; yet at Apsley (far western Victoria) and Picola (Goulburn Valley) it occurs on grassland and very open savannah respectively, both with a good depth of loamy soil.

Mr. Béchervaise¹ has expressed astonishment that such dense *Melaleuca* forest should cover Rodondo, while there is a total absence of arboreal (or even shrub) vegetation on neighbouring Bass Strait islands of similar size and geological structure—Anser, Moncoeur, Curtis, Hogan, etc. He attributes the present luxuriant growth on Rodondo to the existence of its *Melaleuca* canopy during many thousands of years, thus affording protection from gales to the smaller plants and enriching the soil with humus (to a depth of several feet in places). The surrounding islets apparently had no *Melaleuca armillaris* and have always been at the mercy of wind erosion. More surprising, perhaps, is the absence of this tree from continental and geologically identical Wilson's Promontory, less than 8 miles distant.

Except for occasional she-oaks (*Casuarina stricta*) and a small patch of tall eucalypts (*E. bicostata* and another species—probably *E. obliqua*) on the western side, Rodondo consists of practically pure stands of ancient and interlacing *Melaleuca* trees of prodigious size. Making due allowance for lower altitude (below 200 feet) and rainfall (15 inches), much greater size (14 square miles), more even contour and more variable soil (mostly calcified sand with limestone near the surface, but some granitic outcrops), Flinders Island off the South Australian coast presents a remark-

ably similar picture—now modified by farming with its attendant clearing and repeated scrub fires. Osborn¹¹ writes:

"The natural vegetation of Flinders Island is of a uniform type. Dune and cliff communities in their highest states tend to develop into a scrub woodland with *Melaleuca parviflora* [= *M. pubescens*]. Over the greater part of the area now left in its original state, this is the dominant plant. Indeed, at times, it almost forms a mono-specific community. . . . The trees grow close together. . . . The crown is very dense and umbrageous so that there is little or no ground flora, the surface of the soil being covered with a litter of fallen twigs and leaves. . . . On these islands, *M. parviflora* woodland appears to be a subclimax, but whether the climatic or edaphic factors inhibit further development towards the Mallee consociation, typical of most of the mainland areas with similar rainfall, it is not possible to say."



Melaleuca pubescens Schauer, 4 miles west of Nathalia, Goulburn Valley, Vic. (Girth at B.H., 45 in.; height, 25 ft.)

Photo: J. H. Willis.

Osborn regards the *Casuarina* consociates in the Investigator Group as indicative of better soils and more humid conditions—"a forest type that has reached its climatic limit."

On Rodondo, there is evidence of a development towards high eucalypt forest in a damp, sheltered gully above the steeper western cliffs (500 feet); so, in this sector at least, the *Melaleuca armillaris* would seem to be a subclimax community. *Casuarina stricta* does not form a consociate on better moister soils, as in the Investigator Group; it replaces *Melaleuca* only on the drier northern aspect of Rodondo. *M. armillaris*, however, is a tree of much wetter country than its congener and can hardly be considered as an ecological parallel.

Summary

Melaleuca pubescens Schauer is described and its near affinities indicated.

Historically, the site of Allan Cunningham's original collecting is considered and Wyalong district in New South Wales put forward as the most probable type area. Synonymy is discussed and mention made of the long confusion with *M. Preissiana* Schauer, of Western Australia only.

The known distribution (in Western Australia, South Australia, Victoria and New South Wales) is traced with respect to a map showing reliable records, and several barriers to migration are cited.

Reference is made to available information on the ecology of the species, which avoids mountainous areas and evinces a preference for limestone formations at or derived from the sea. There are occurrences on a wide variety of soils and the precise edaphic requirements are not yet understood.

The dominance of arboreal *Melaleuca* species on certain islands is made a matter of interest, and the *M. pubescens* woodland on Flinders Island (S.A.) is compared with that of *M. armillaris* recently examined on Rodondo, 8 miles south of Wilson's Promontory (Vic.)

Acknowledgments

For information as to the distribution of Moonah, the thanks of the author are gratefully tendered to Miss A. B. Adams (Melbourne), Dr. N. C. W. Beadle (Sydney), Messrs. J. M. Black (Adelaide), C. A. Gardner (Government Botanist, Perth) and D. L. W. Henderson (surveyor, N.S.W.)

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FERN CORRESPONDENT WANTED

Mr. Ewart G. Smith, Ironmonger, 147-151 High Street, Christchurch, C.I, New Zealand, has read the Club's Fern Handbook with pleasure; he is interested in the culture of ferns and would welcome a Victorian correspondent with like inclinations.

NEW BEES AND WASPS—PART VII

Two Undescribed Species of *Exoneura*, with Notes on Recent Collectings of several other *Exoneuræ* and the Extraordinary Appendages of Their Larvæ

By TAKLTON RAYMENT, F.R.Z.S.

Introductory

I have a correspondent, Norman W. Rodd, a chemist who is also an indefatigable collector of the native bees. Facing his home at Lane Cove, near Sydney, is a gully, steeply walled, with masses of the ubiquitous sandstone flung hither and thither as though broadcast with careless prodigality by some gigantic hand.

In this gully is found the typical xerophytic flora of the Sydney sandstone areas: a wattle or two; nodding blue-bells; beard-heath (*Leucopogon*); *Scaevola*; *Dianella*; *Olearia*; *Banksia*; *Correa*; *Epacris*; and, indeed, most of the other genera typical of such areas.

In these retreats, untouched by modern housing schemes, the collector finds many indigenous bees, for he is eager to assist in unravelling the story of *Exoneura*. He clammers down the gully, breaking off any likely looking sticks in the hope of finding yet another "nest." Of course he is rewarded, for he discovers in small dry twigs of wattle, *Lantana* and *Erythrina* "nests" which hitherto were unknown to science.

Well, the collector is elated by his success, for he finds adults, "nests," and larvæ, also other species at Lindfield, which is near the extreme head of Middle Harbour, and Brooklyn, near the Hawkesbury River, all these localities being in New South Wales.

Two of Mr. Rodd's collections proved to represent new species, and I propose the following names and append the specific descriptions. The short notes on other bees, together with the drawings of the larval forms, will assist the student in recognizing these extremely interesting but, nevertheless, critical species.

Exoneura angophorella, sp. nov. (Fam. Ceratinidae)

TYPE: Female—Length, 6 mm. Black head and thorax, red abdomen.

Head transverse, shining, but with a well-defined microscopic tessellated sculpture, and large punctures; anterior orbital margins converging slightly below; clypeus with the cross-bar of a hooked "T" above, and a wide suffused bar of yellow along the anterior margin, a small yellow dot laterally; front of the scapes ferruginous; labrum reddish; mandibles black with a median red patch, and a small yellow patch basally.

Mesothorax shining, but tessellated, sculpture still evident; considerable white plumose hair on the pleura; tubercles black, with a thick fringe of white hair; tegulae apricot colour, as are all the axillae.

Each segment of the reddish-ferruginous abdomen has a band of diffused blackish colour.

Legs ferruginous, with very distinctive black posterior tibiae and tarsi with black hair; median tarsi dark with coppery hair. Wings with nervures sepia, and pterostigma dark umber-brown.

Locality: Lane Cove, Sydney, October 6, 1946. In stems of *Lantana*.

Approaches *E. hackeri* Ckll. and *angophorae* Ckll., and more definitely *albolineata* Ckll.

By the larvae appendages there is some relationship to *E. roddiana*; there is a like lack of "fingers" but there are *two* slender arms, and no nodes along the segments of the abdomen.

Exoneura sub-baculifera, sp. nov.

TYPE: (in the collection of the author): Female—Length, 6.5 mm. Black head and thorax, red abdomen.

Head oily-bright with a tessellate sculpture; face deeply excavated around the bases of the scapes, clypeus with a yellow "T" with a thin stem; scapes obscurely red in front, flagellum black; labrum obscurely reddish; mandibles black.

Mesothorax shining, but with tessellate sculpture still evident; much white hair on pleura; tegulae blackish; tubercles black.

Each segment of the abdomen with a band of suffused dusky colour (as in *angophorella*, but abdomen darker red); a microscopic rather coarse lineation, and numerous short stout hairs almost like peg-hairs.

Posterior legs red, with much long black hair which also covers the hind tarsi; other legs mostly reddish, with some black on the femora. Nervures and pterostigma reddish.

Locality: Lindfield, October 5, 1946. In stems of *Erythrina*.

In the absence of the larvae, this species, and also *E. angophorella*, would most certainly be determined as *angophorae*. Indeed, it would now appear to be unwise, in the absence of larvae, to describe as new any specimens in the group.

The large teat-like protuberance on the head of the larvae is indeed remarkable, and is an extreme development of the cephalic nod of *E. baculifera* Ckll.

Rodd suggests that the unique appendage of the larvae may be an exudatorium, such as are present on certain ant larvae, i.e. *Pachysima latifrons*, the adults of which lick off an exudate from the appendages, and appear to enjoy such lipoids, for ant larvae are known to exude fatty substances. Rodd thinks that even the male *Exoneura* may receive some of the exudate, and this may account for the presence of so many males in the nests of the species with appendages, and none in the nests of bees, the larva of which are without such exudatoria.

So far, I have not been able to study exhaustively the appendages of the *Exoneurae*. Dr. Hans Brauns, too, observed the larvae of

one group of *Allodape* to hold the pollen-pudding between what Friese terms the "pseudopodia," and Wheeler himself prefers this term, and says that the "arms" of *Allodape ceratinoides* hold the pudding to the buccal parts. Holmgren suggested that the several castes in certain ant colonies may be due to "exudate hunger," i.e. food castration.

When examined critically, the appendages of the *Exoneuræ* suggest pseudopodia rather than exudatoria, and I would say they are analogous, but not homologous, with the "legs" of caterpillars, since both are derived from the three thoracic segments. The teat-like protuberance on the head of the larvae may, however, prove to be an exudatorium as Rodd claims.

Exoneura roddiana normani, subsp. nov.

A series of adults of both sexes, reveals a subspecies with the red legs deeply suffused with blackish or even all black; clypeal stripe subobsolete, or even obsolete, giving an entirely black face; pterostigma blackish. Male more typical, but yellow of face brighter. Larvae and pupae are typical, the latter having one slender "arm" but no "fingers."

Locality: Lane Cove, Sydney, November 20, 1946.

TYPE and ALLOTYPE in the collection of the author.

New Records of Other Species and Description of Male
E. excavata

1. *E. albolineata* Ckll. (described from Ulong, Dorrigo, N.S.W.)

*New record*¹: Lane Cove, Sydney, October 5, 1946.

A series of females and larvae in a stem of *Lantana*. The cream-coloured clypeal mark has hooked extensions above; the coxae are black, femora only partly black, tibiae and tarsi red; pterostigma sepia. The larvae have one lateral appendage, bifurcate, with one very large basal "finger" and the three apical nodes developed to same length—a varietal form.

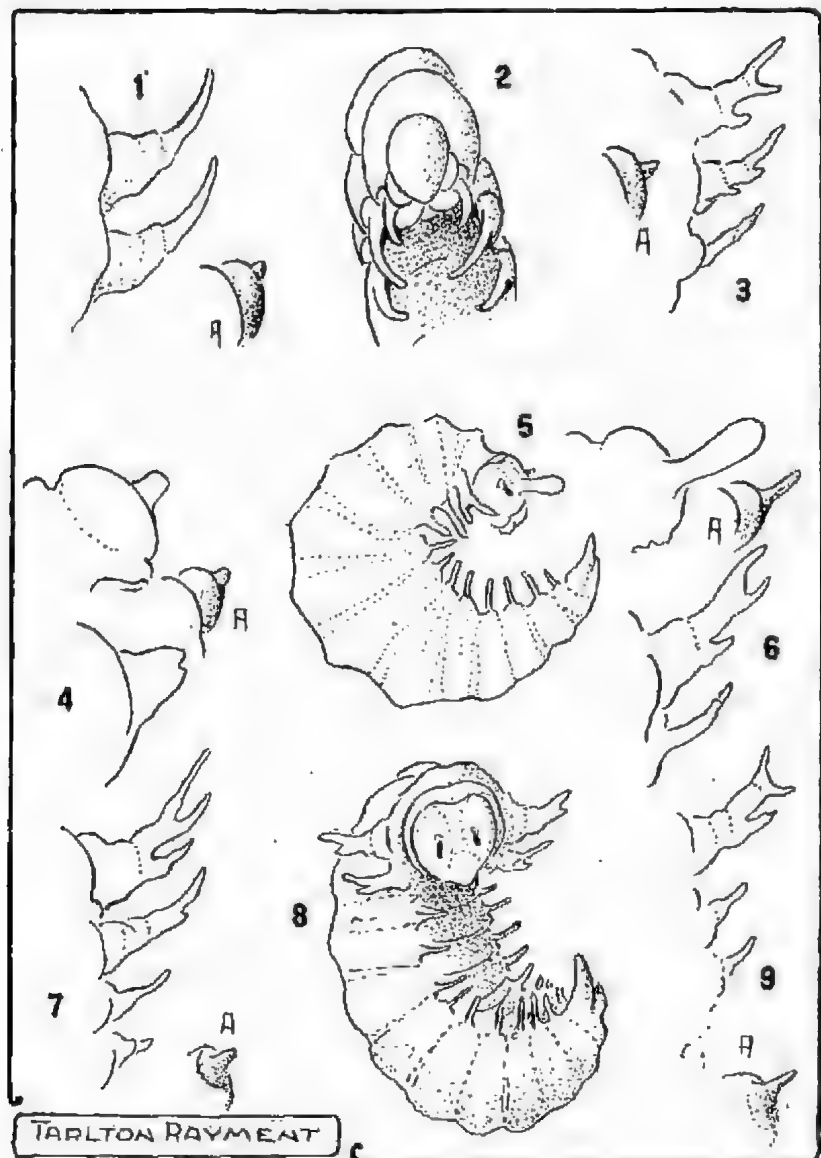
*New record*²: Brooklyn, N.S.W., October 7, 1946.

A series of females, and larvae in a stem of *Lantana*, not typical, but no more than varietal forms, for the clypeal mark varies widely; indeed, one or two females have a subobsolete stripe, and others a bright-cream "T" on the clypeus. The lateral face-marks may be long or reduced to mere creamy spots, and one female had an entirely black excavated "face." The larvae, however, are all typical.

2. *E. angophoræ* Ckll. (described from Cunn, Sydney—Alex Holmes)

New records: Lane Cove, Sydney (July 1946). Lindfield, Sydney (October 5, 1946).

A series of females and larvae in a stem of *Erythrina*. The clypeal mark is very variable, being a bright stripe of cream, a



1, Lateral processes of *E. ungophorella*, sp. nov. 2, Diagonal ventral view of apical processes of *E. albolineata*, variety. 3, Lateral processes of *E. hamulata*, Ckll. 4, Cephalic node, and rudimentary lateral appendage, of *E. baculifera*, Ckll. 5, Lateral view of larvae of *E. sub-baculifera*, sp. nov. 6, Cephalic protuberance enlarged, and lateral processes, of *E. sub-baculifera*. 7, Lateral processes of *E. robusta*. 8, Ventral view of larva of *E. albolineata*, variety. 9, Lateral processes of *E. albolineata*, Ckll. ("A" in all diagrams indicates a node of the abdominal segments.)

subobsolete line, or it may fail altogether, leaving the "face" entirely black. The larvae lack the distinctive thoracic appendages of *E. hamulata*, and have only a few short nodes on the segments. The dark mass of stercoral debris in the larval mesenteron is more evident in this species, and this is significant, for Rodd's specimens, collected in July, had several larvae of all ages feeding together on the one communal, rather crumbly pollen-mass.

This is in sharp contrast to the progressive feeding habits of *E. hamulata*, and brings *angophorae* closer to the habit of certain other wild bees, and so establishes the second parallel with Brauns's African *Allodape*.

The African *Allodape* construct nests in tubes excavated in stems, favouring such plants as *Iris*, *Rosa*, *Aloe*, *Rubus*, *Amaryllis*, and many others where a suitable tube may be bored into the pithy interior. Strangely, *A. pringlei* Cam. prefers to excavate a shaft and gallery in the ground, and both sexes are present in the nests at night. There is not any sign of individual cells, or chambers, in the lumen of the tube, and, later, the larvae appear to hold on to the wall by the long pointed "tail" end, a feature and habit common to the larvae of all the *Exoneurae* studied by the author.

Did I tell you that the eggs of *E. roddiana* are deposited, just inside the entrance to the tube, in a low spiral line? Well, the eggs of *E. angophorae* are deposited in a higgledy-piggledy mass at the base of the lumen, which measured 3.5 mm. in diameter. The length could not be ascertained, since the collector had broken the stem during his explorations.

The collector sends a note on the hatching: "I have a little information on the period of incubation of the eggs of *Exoneurae*. On August 17, I took a female and a cluster of ten eggs from a stem of *Lantana*, and placed some of them in a gelatine capsule. These hatched between August 31 and September 6, during my absence from home."

That is a very long period compared with the three days for eggs of the honey-bee. Other collections of nests contained several pupae, but apart from the short "cobby" stature, do not present any prominent characteristics, for they are truly typical of the bees.

3. *E. baculifera* Ckll. (described from National Park, Queensland)
New record: Lindfield, October 5, 1946.

A series of females and larvae, which have a small cephalic node, but only the rudiment of a lateral appendage. In a stem of *Erythrina*.

4. *E. excavata* Ckll. (described from National Park, Queensland)
New record: Brooklyn, N.S.W., October 7, 1946.

A large series of typical females. The face is entirely black in both sexes. A description of the allotype is appended. In stems of *Lantana*. No larvae available for study.

ALLOTYPE (in collection of the author): Male—Length, 7.5 mm. Black, with red abdomen.

Head black, with much long black hair on the entirely black face, which is greatly constricted by the strong development of the large compound eyes; mandibles reddish apically.

Mesothorax shining, with much long black hair; scutella similar; metathorax with long smoky hair laterally; tegulae blackish, polished; tubercles blackish.

Abdomen dark-chestnut red, the two basal segments black, others with a wide blackish band, and much blackish hair.

Legs black, tibiae and tarsi red, anterior femora with long black hair, short black hair and some coppery-coloured on others. Nervures and pterostigma reddish.

5. *E. hamulata* Ckll. (widely distributed over eastern Australia)

New record: Brooklyn, N.S.W., October 7, 1946.

A series of females and larvae typical in all characters, the latter exactly as in the Victorian specimens illustrated recently (q.v. Part III, *Victorian Naturalist*, July 1946). Three of the appendages bear prominent "fingers." Segments 8-9 lack nodes. In stems of *Lantana*.

In a second series, from the same locality, the larvae lack the appendages, but a note of warning to taxonomists should be sounded here—the larvae should be fully developed for the appendages to be studied critically, as they do not appear in the very young, and are completely absorbed as metamorphosis approaches.

6. *E. robusta* Ckll. (described from National Park, Queensland)

New record: Lindfield, October 5, 1946.

A series of females and larvae, which have the three lateral appendages very like those of *E. hamulata*, to which they are indeed close. The face-marks are variable as noted by Cockerell. The legs of these are redder than the type. In stems of *Spartium junceum*.

Changing the Loaf of Bread

In an endeavour to ascertain whether or not the larvae of *E. angophorae* could survive on pollen, without any progressive feeding of regurgitated "pap" by the mother, I removed the larvae from the care of the adults, and transferred them to a pudding of pollen taken from a comb of the honey-bees. The quality and quantity of the food was thus considerably altered.

Working on the rule that one cell of pollen is sufficient to produce one adult bee, two cells were emptied. The store was a very mixed one, for it consisted of many spherical, spiky, orange-coloured granules of *Cryptostemma*; a number of larger triangular grains of *Eucalyptus*; numerous smaller triangular ones, and many spherical creamy-coloured granules from some unknown species, but probably cultivated fruit-trees; also a number of white elliptical

grains. The pollen was worked up into a moist cake with honey and the larvae transferred to it with a sable-hair pencil, apparently without injury.

How do I know that?

I accept as a general law in biology that an animal's interest in food diminishes according to the gravity of the injury sustained. Well, the larvae immediately buried their mandibulae in the food, and ate avidly. That was at 2 p.m. on a Wednesday.

Observed under the microscope, by transmitted light, the mandibles were seen to be biting off large "mouthfuls" of the orange-coloured food, which could be traced passing along the oesophagus to the mesenteron. A copious flow of some colourless secretion could be seen issuing from the mouth, forming numbers of microscopic bubbles, and mixing with the store as each larva continued its meal.

From six to eight "mouthfuls" were swallowed in quick succession and then the creatures rested for several minutes before resuming. All ate the strange food with evident relish. At 10 p.m. on the following Friday, they were still vigorous; that is, they had been feeding with hearty appetites for 56 hours. Unfortunately, later in the night, the larvae "crawled" out of the wooden container, and could not be found, thus bringing the experiment to an unsatisfactory conclusion. However, it is hoped to have better success when more larvae are again available. It was very evident that the legless larvae could move from place to place.

I returned to Sandringham on July 8, 1946, after having visited the sandstone gully at Lane Cove exactly a month before. In my bags was a number of dry twigs of *Acacia* containing the "nests" of various *Eronetræ*. Unfortunately, a serious illness in the family intervened, and I could not examine the twigs until early in September.

The sticks were enclosed in a tight box, so imagine my astonishment when, 90 days later, I opened the box, and discovered several adults and larvae still alive and well! All were positively without food during that long interval. I accept, then, Norman Rodd's observation that the *Eronetræ* are capable of surviving long periods of abstention.

There is a third group of *Eronetræ*, as I had anticipated, where each larva receives its own individual pollen-pudding. These species establish beyond all doubt the third true and surprising parallel with Brauns's African *Allodape*. In a letter just to hand, Rodd says: "I have recently opened a stick-nest of *E. roddiana* Rayn., and found that each larva was supplied with a substantial individual pollen-pudding held in the ventral curve of the abdomen. The several specimens now sent to you contained varying amounts of pollen-stores, either communal or individual, according to how the larvae were disposed in the tube."

A GLOSSARY OF TYPE NOMENCLATURE

Compiled by A. N. CARTER, Melbourne

The frequent allusions to "type nomenclature" in present-day scientific literature has brought requests for a glossary of these terms in some publication readily available to Australian readers, for the only papers dealing fully with the subject are in overseas publications possessed by very few Australian libraries.

Only terms of important application are here presented, and worthy of repetition is Dr. D. L. Frizzell's recommendation "that the general use of type terms be restricted to *genotype*, *syntype*, *holotype*, *paratype*, *lectotype*, *neotype*, *hypotype*, *topotype*, *homœotype* and *plastotype*."

Alloparalectotype: Any specimen, from an author's original series, of the opposite sex to that of the holotype, described in detail subsequently to the original publication of the species.

Allotype: A paratype which is of the opposite sex to that of the holotype.

Androtype: The type specimen of the male of a species.

Apothype: The specimen supplying full details of a species whose previous description was inadequate and whose primary types were imperfect. Really an unnecessary term, this is synonymous with *hypotype* (q.v.).

Clastotype: Portion of a holotype. This is a botanical term, usually applied to fragmentary material.

Clonotype: A plant, or part thereof, propagated vegetatively from a plant which furnished a holotype. This is a botanical term.

Cotype: One of several specimens, upon which a species is based, the author not having selected a holotype and paratypes. The term is synonymous with *syntype* (q.v.), which is the correct term to use in such a case, by virtue of its prior introduction.

Genotype—I: The species designated as possessing all the characters of the genus to which it belongs. In accordance with the International Rules of Zoological Nomenclature, Article 30, a genotype may be:

- (i) Type by original designation.
- (ii) Type by subsequent designation.
- (iii) Type by elimination.
- (iv) Type by absolute tautonymy.
- (v) Type by virtual tautonymy.
- (vi) Type by monotypy.

Genotype—II: The total gene composition of an organism. With this circumscription, the word is in common use in genetics, though it is not likely to be confused with the word's true nomenclatural use.

Gynatype: The type specimen of the female of a species

Haplotype: A species becoming a genotype by virtue of its being the only species in the genus at the time of the latter's erection.

Haptotype: An icotype, collected simultaneously with the holotype and bearing the same collection number as the holotype, yet not certainly taken from the plant which furnished the holotype. This is a botanical term.

Heterotypical: A term applicable to a genus to which are referred several species which have no true generic relationships.

Holotype: The single specimen, complete or fragmentary, upon which a species is founded.

Homotype: Any specimen compared and pronounced to be identical with the holotype, lectotype, paratypes, or syntypes of the species by a specialist in that particular group of organisms.

Hypotype: Any specimen described or figured in literature by the same or another author in order to extend or correct the knowledge of the species under consideration. In many older publications, the term *plesio-type* (q.v.) was used in this sense.

Icotype: Any specimen, fully representative of the species to which it belongs, used for the identification of that species, but not necessarily cited in literature.

Iconotype: A drawing or photograph of a type.

Ideotype: Any specimen, other than a topotype, named by the author of the species to which it belongs.

Isotype: A botanical term, proposed by Furtado to mean: "A specimen collected from the same plant as the type (i.e., *holotype*), at the same time and bearing the same collection number."

Lectoallotype: Any specimen from the original material chosen in conjunction with a lectotype, subsequently to the original description, and of the opposite sex to that of the lectotype.

Lectotype: A syntype, designated subsequently to the original description, to take the place of a holotype in the event of one not having been selected.

Logotype: Genotype by subsequent designation.

Morotype: Part of the same organism from which a holotype was obtained. This term applies to perennial plants and lower animals propagated by asexual means.

Metatype: Any specimen, necessarily a topotype, named by the author of the species to which it belongs.

Monotype: A unique holotype. This is the only correct sense of the word, although the term may be encountered, used in the sense: "Genotype of a monotypical genus."

Monotypical: A term applicable to a genus which included only a single species at the time of original publication. The use of the term *haplotypical* (q.v.) is to be preferred.

Morphotype: The type specimen of one form of a dimorphic or polymorphic species.

Neotype: A new type specimen, so designated in the event of the loss or destruction of the original type material. It is desirable that a neotype should come from the original type locality. The term is generally understood to mean "a new holotype," though it can also apply to other primary types.

Nepiontype: The type of the larva of a species.

Onomatype: Any specimen mentioned in a printed article, without adding to the knowledge of the species.

Orthotype: Genotype by original designation.

Paralectotype: A syntype later designated as a paratype.

Paratype: Any specimen, other than the holotype, used to found a species. A paratype must be described or enumerated in the original description, but need not come from the same type locality. In bacteriology, the term is sometimes used to define an abnormal form of a species.

Phenotype: The outward appearance of an organism, irrespective of its gene composition. This is a term in current use in genetics and not a nomenclatural term.

Plastotype: Any artificial specimen prepared from a type specimen, by moulding, electrical deposition of metal, etc. The meaning of the term does not include models of type specimens.

Plesiotype: The use of this term has lately dropped out of use, due to confusion of its use. Strictly, it means a species related to a genotype, but occurring in a different geological formation or a different faunal region. It has also been used in the sense that *hypotype* (q.v.) is now used; and to mean a described or figured specimen, not necessarily from the type locality, identified by comparison with the primary types or original figure.

Primary Types: A collective term including the holotype and paratypes or the syntypes (*Proterotypes*).

Spermatype: A plant, or part thereof, grown from the seed of a type plant—a botanical term.

Supplementary Type: A general term synonymous with *hypotype* (q.v.).

Syntype: Any one specimen of a series used to found a species, no holotype and paratypes having been selected by the author.

The term is synonymous with *cotype* (q.v.), the use of which latter term should be suppressed:

Tautotype: Genotype by absolute tautonymy.

Tectoholotype: A mounted section, upon which a specific description is based.

Tectohypotype: A section, description of which increases the knowledge of the species.

Tectoparatype: A section, described in conjunction with a holotype.

Tectosyntype: One of several described sections upon which a species is based, no holotype and paratypes having been selected.

Tectotype: The general term for a prepared section described after microscopical examination.

Topotype: Any specimen of a species from its type locality.

Type Locality: The locality from which the holotype of a species was obtained.

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PROPOSED SHOW DAY EXCURSION

It is intended to have an extended excursion from September 28 to 31 inclusive (Show Day and the week-end following) to Waranga, Rushworth and Whroo. The purpose is to carry out a general biological survey of the district and those of us who are acquainted with the area can assure likely participants that it is rich in bird-life—both inland and aquatic; its geological and wildflower attractions are notable and entomologists and ethnologists will not be disappointed in material for study.

It seems that the Waranga Shire Council and Rushworth Progress Association are interested in our proposed visit and we should endeavour to make the excursion an event worthy of the Club.

Members who can possibly take the Friday following Show Day as an additional holiday and who are likely to be able to join the party are urged to notify the President (who is acting as general leader) as soon as possible so that preliminary arrangements can be made. It is expected that the journey to and from Rushworth will be made by a normal service route, that accommodation at hotels will be available and that transport to and from the places of special interest will be arranged locally. The total cost is not yet determinable, but intending excursionists may form a preliminary estimate from the 2nd class return rail fare (about £1), hotel accommodation for 3½ to 4 days and a maximum of about 10/- worth of travel during the survey.

A. A. BAKER.

ZOOLOGICAL NOTES ON THE NORTHERN TERRITORY (June 1944 to September 1945)

By LIONEL GILBERT, Naliac, N.S.W.

I. SAVANNAH WOODLAND

(a) *At Cape Dan, Arnhem Land*

The largest animal that I found here was the wallaby, and it was fairly numerous. The aborigines hunted them on a small scale, but the use of spears had largely given way to the shotgun, and the natives used their hunting skill only to creep up within very close range of the prey. When on "walkabout," however, spears were again employed.

One day the natives killed a female wallaby, and in the pouch was found a young one which was brought to camp and adopted as a pet. An improvised marsupium was made by hanging a small sugar-bag from the foot of a bed, and into this the young wallaby hopped whenever "at a loose end." At night he hopped head first into the bag; the head emerged almost immediately, and sleep soon followed. Of an evening, the young marsupial was taken out for exercise, and he was quite agreeable to hop obediently after one, before going to his sugar-bag. This pet was fed on dilute condensed milk for a time, and then he commenced to eat grass. All appeared to be going well; until one morning he failed to emerge from his "marsupium," having died during the night. Apparently the synthetic feeding at an early stage of development was not sufficient for our jney's needs.

Other marsupials included possums and so-called "flying squirrels" (phalangers). These were often seen at night, either climbing trees with great agility, or, as in the case of the latter animal, gliding from one tree to another with the lateral membranes outstretched. The natives were experts at seeking out these animals and capturing them. Phalangers were fairly plentiful on Melville Island also.

No dingoes were noted hereabouts, either by sight or sound, and the only other mammals were the dogs of native camps and a herd of goats which flourished, especially during the "wet" when grass was thick and high. In Pandanus thickets might be found the brightly coloured Pandanus snake, while in the more open forest occasional green tree snakes quickly slithered up trees if disturbed, and would soon be camouflaged, almost perfectly, in the foliage. Other reptiles included a small grey rock lizard about eight inches long, which was fairly plentiful, and the Frill-necked Lizard (*Chlamydosaurus kingii*), which was not so numerous. There were some goannas also, but the only kind seen was a large grey one in a native's "tucker bag." Although Grass Pythons were rather common in the south, none was observed here.

Insects and arachnids were extremely numerous, more especially the former. While mosquitoes were not so plentiful in the more open places, where sea breezes blew, the mangrove swamps teemed with them. There were representatives of the genera *Anopheles*, *Aedes* and *Culex*, and large grey ones like the notorious Hexham Grey, which had a very thick proboscis. Fortunately, these were not common.

Behind the mangrove swamps lay extensive tidal sand flats, and from these, sandflies swarmed at dusk, especially if the tide were low. Although not many mosquitoes braved the more open areas, it seemed that sandflies flocked there. When working at night, it was usually necessary either to have suitable clothes on, if possible, to have a fan blowing continually in order to keep these pests away. Smoke fires had but little effect. Sandfly bites quickly became poisoned if scratched, although some were not susceptible to such poisoning. Perhaps the rapidity of infection was due to the warm, humid air—a favourable medium for the development and reproduction of bacteria; no matter what small cuts or abrasions one might have, they very often became festered, whereas sores of the same size would normally have passed away quickly.

Dogs in the camp were well populated with fleas which, no doubt, they brought with them; but in addition there was a species of small dark grass flea—in such great numbers at one native camp that a stroll past the paperbark mia-mias would literally cluster one's boots and socks with them. The bite was short and sharp, yet the fleas were so small that it was difficult to catch them in wool. Apparently the natives did not notice these parasites or, at least, they did not regard their presence as meriting any such disturbance as the jumping, scratching, and fire-making of the poor white man, who vainly tried to gain relief.

Wild bees were in evidence from the number of trees chopped down by natives for the wild honey ("sugar-bag"). These insects doubtless obtained their requirements in nectar and pollen from *Eucalyptus*, *Sterculia*, *Acacia*, *Loranthus* and *Grevillea* species—most of these were plentiful throughout the forests, while there was much *Melaleuca Leucodendron* near the swamps.

Introduced cockroaches, the brown and fleet-footed *Periplaneta americana*, were altogether too plentiful, and myriads of them were abroad at night. Stores had to be watched carefully, not only on account of these cockroaches, but because of the very effective species of termite that abounded. The area did not possess those giant ant hills of the savannah farther south, but apparently the termites here made their nests in logs and roots. At night, they could be heard working in the timbers of hut posts and rafters. The work never ceased, but was more noticeable in the stillness of night, and the "chewing" noise ceased within a piece of wood only when nothing but the shell remained.

In the trees were nests of the green tree ant, *Oecophylla smaragdina*, var. *virescens*. This is a pretty insect, from half to an inch long and with an abdomen of beautiful light green, looking almost translucent. The green tree ant does not seem fastidious in its choice of tree or in the height of its nest, providing that it is out of harm's way, but it is quite constant in one practice—to bite mercilessly anyone who dares disturb them. The nests are constructed in a most ingenious manner. Leaves are held together by certain ants, while other workers hold the larvae of young ants in their mandibles, using these living "needles" to provide the thread and "sew" together the leaves so patiently held by the other adults! Unfortunately, however, such clever insects do not remain in their nests, but are very prone to fall upon any traveller who may bump the nest or its support.

The Arachnida are represented by many species of spiders. One type looked rather fearsome, having a very large grey abdomen and longish legs. This one sometimes had the unpleasant habit of finding a boot at night and using it as a nest. Next morning the unfortunate owner of the "nest" had an anxious time; but the bites, though very painful for the moment, had no bad after-effects. Like most Australian spiders, this one was apparently non-poisonous. There were many other types of arboreal and ground spiders, but none of such great size.

In damper parts of the savannahs, within half a mile or so of the swamps, land molluscs lived; but only their dry shells were found. They were unlike the introduced garden snail in thickness of shell, size, and colour.

Centipedes and other myriopods were found only when long-standing debris was disturbed, or when logs were being split for firewood. A split log would sometimes yield centipedes nearly a foot long, and, more rarely, a scorpion might be found in the same places.

Land birds were not very plentiful. Perhaps there was not sufficient terrestrial food and permanent fresh water to encourage migration from farther south where lagoons and creeks were plentiful. Seabirds were often noted, foraging on the coral reefs at low tide, while, farther out, others would be obtaining fish from numerous schools frequenting the shallows.

(b) *At Southport and Environs*

Wallabies were scarcer in this region because of the greater human population. However, possums were fairly numerous and their tell-tale scratches were noted on many trees. Marsupial Native Cats, although not often seen, were present. Dogs sometimes captured them after hollow logs were brought in for firewood. A freshly killed specimen still had several young clinging to the teats in her longitudinal pouch. The babies were about

half an inch long, white, hairless, with eyes and ears barely formed, forelegs fairly well developed but imperfect hindlegs and tail. The teats extended well down the throats of the still living young which were removed only with difficulty. The teats of many marsupials not only serve to feed the immature young, but also offer support and anchorage. This "cat" was light brown with white spots and may have been a species of *Dasyurus*.

When the eucalypts were in flower, great crowds of "flying foxes" thronged the trees seeking nectar. They maintained an incessant babbling cacophony as they struggled for better places in the trees. A small "fox" flew into a hut one night, and the light was put out after he had made several vain attempts to escape, so that the bat's "ear-radar" device soon had him back into the open. When in the light, his flight seemed to be guided mainly by trial and error.

Chief among other mammals were dingoes, often heard howling in their usual eerie manner at night. Stray individuals prowled around the camp, and one of these was shot; it was of the usual tan colour with fair coat, but not in very good condition. Once only did we see a dingo in daylight, as he drank at a creek—possibly a nocturnal stray from the pack, otherwise he might not have been seen at all. This animal was immediately chased by the camp's dingo-dog and, at a distance, it was difficult to distinguish the two. The quarry was interesting since, when picked up, he was in a very sorry state with a great wound in the foreleg. Whether full-blooded dingo or half-breed, we did not know, but he had the colour and build of *Canis dingo*, though young. Upon arrival in camp, he exhibited some strange characteristics; he did not mix with the other dogs, and invariably had his ears well back and tail forever between his legs when in the camp.

If called, this timid captive would come, but very slowly as he scraped himself along the ground all the way. When the other dogs were feeding after tea, "Snooks" the dingo would always be last to eat, and waited in the background until other dogs had finished. No resistance was offered when anyone, or another dog, took anything from him whilst eating, but whether this was due to the cowardice attributed to dingoes or his utter lack of confidence was not clear. If robbed, he would quietly go and seek another bone.

During the wet season, "Snooks" was sometimes brought into the hut to sleep under shelter. He did not refuse to be carried in, but later he would creep out of the hut and curl up in an exposed place to sleep all night with the rain pouring down. Civilized amenities simply had no appeal to this strange dog; but, when taken for a walk in the bush, he immediately became a transformed animal—the ears were pricked, the tail more erect, and the walk more lively.

When the savannah grass was up to ten or twelve feet high during the "wet," "Snooks" would race ahead and, soon, all one would see was the tan, lean form leaping over the grass. Such leaps might be taken over vegetation only four or five feet high, but grass of any height was considered a suitable hurdle and often a very fleeting glimpse was caught of the dog as he crashed into grass much too tall. This had no effect on his speed or attitude, however, as his energy was endless in the bush. If offered food during a long, hunger-provoking excursion, "Snooks" accepted with the utmost gentleness. Back in camp, he always reverted to his usual retiring and apparently sullen disposition, remaining so until the next bush excursion.

The dogs required careful attention on account of vast numbers of ticks which were picked up in dozens from the ground and grass. Every day, ticks would be found somewhere on the dogs, usually in the ears or between the toes where it was difficult for a dog to remove them unaided. On one occasion, 24 ticks of all sizes were removed from a single dog's ears. The maximum size of these troublesome arachnids was about that of a large corn grain; then, being absolutely full of blood, they became lethargic. Fortunately, these ticks were not very penetrating, although they took such a firm grip that a piece of skin was usually withdrawn with the tick. Once again, "Snooks's" bushcraft stood by him, and he rarely had a tick on his body. Either he managed to avoid the pests or had some knack of removing them. Other arachnids included the Red-back Spider (*Latrodectus hasseltii*), but a bite from one had no harmful effects after treated with ammonia.

In addition to those reptiles at Cape Don, reptilian life here included the large Grass Pythons, of which eight to nine feet examples were seen; there are records of much larger specimens. At Birdum, a considerable distance south, these snakes were often seen making their way across the roads. There was a variety of smaller snakes too, and when beautiful red mistletoe (*Loranthus* sp.) was being collected at Manton River, near the Dam, a small snake (light brown with stripes) was disturbed. It seemed to have been eating honey in the blooms and may have been some kind of tiger snake. It was thought that birds which were pecking at the flowers were in search of nectar, but probably they were attacking the snake.

Along the freshwater creeks lived a remarkable species of water dragon which grew to some 18 inches or so. When disturbed during their sun-basking, these lizards invariably made a charge at the creek and, if possible, would race out along a branch overhanging the water, then dive with a great splash. The reptile then swam underwater, at a rapid rate, to the other bank where, in the shade of a Pandanus palm (*P. aquaticus*), its nose would emerge above the surface, care being taken to keep the rest of the

body well concealed until danger had passed. If no branch were available, the dive, with possibly a little more force, was made from the bank. Such lizards never ventured far from their place of refuge, and were never surprised any more than a few yards from the water.

In some freshwater rivers lived the small Johnston's Crocodile (*Crocodilus johnstoni*), and the decomposed remains of one were found in shallow water in the Blackmore River. The skull of this, containing most of the sharp round teeth, was able to be cleaned and reconstructed. The rest of the body was too far advanced in decomposition to give any accurate estimation of the size of the reptile, but it was probably about three feet long and a young one.

Many of the rivers contained sufficient fish to support a nimble crocodile, but from the human point of view they were too wary. One fish, found dead in Berry Creek, was quite large and rather like a mullet; there were several smaller varieties too. Some of the schools of smaller fish showed little concern when the legs of a swimmer were lowered into the water, and actually swam around them. If a leg moved, the little fish retreated but a few inches, and then renewed the investigation. In one part of the Darwin River, where the current was fast, some freshwater shrimps were found; but no other crustaceans were seen, although crayfish probably lived in the permanent waterholes. Some parts of the rivers did not entirely dry up during the "dry" (between March and November), and there would be a chain of permanent waterholes along the river beds. Such holes could always be recognized if there were bivalve molluscs about and in some places these were quite plentiful.

Insects here consisted mainly of the same species as at Cape Don. Because of the absence of extensive sand flats in this area, the mosquitoes were far more numerous than sandflies; nets were necessary all through the year, as there was always some water about. Green tree ants were also as plentiful as before and ever ready to attack the intruder. Other tree ants were plentiful too, but these did not build nests. Some trees were inhabited as well by tree-spiders—small and inoffensive.

During the wet season, bushes in some places would glisten at night on account of the moisture and the tiny lights of fire-flies. Admiring such beautiful creatures of the dark, with their tiny points of light moving over foliage or through the air, one receives disappointment and surprise should one of these insects be caught and examined—it is small, quite plain and inconspicuous yet free it, and it becomes a natural wonder once more. March Flies (Fam. *Bibionidae*) were always ready to avail themselves of the opportunities offered by a swimmer and, in fact, when the body was wet they seemed to be more plentiful and savage. Perhaps the light reflected from globules of water on the skin attracted them. Other types of flies were plentiful also.

This district had large numbers of termitaria of two kinds. The tall, bulky, irregular ones were the more common, and were scattered liberally throughout the savannah woodland. The interior of these, on being broken, was found to be honeycombed with passages, and considerable grass had been used in the composition so that they smelled rather like horse manure. Some of these great structures were ten feet high and often terminated in a few slender pinnacles giving them a castle-like appearance. There was no mistaking the magnetic ant-hills, because from even a few yards away they look like headstones in a cemetery. Those we saw were grouped together over a wide area in a swampy location, and the average height of these thin slab-like structures was five to seven feet. Termites of both these types, and probably others, were very active and trees with any dead wood did not last long; nor did wooden structures: tarry products allayed the attack for a time.

Mud wasps were quite plentiful, and were often to be seen along the banks of creeks and waterholes gathering mud for their nest-building. One wasp was noted making her nest on a wall near a red tin, and she had made several trips in and out during the day, each time returning with a small quantity of mud. The red tin was removed and the wasp's return awaited. She soon came back and found the wall all right, but failed to locate her nest. Apparently the tin, either by reason of its colour, size, shape, or more probably, its shadow, was the landmark from which bearings were taken. These mud wasps built their nests in a variety of places—under bridges they were particularly plentiful, but even clothes hanging on a line were never scorned as a likely place; more adventurous wasps sought out the nutzles of 303 rifles and built nests there.

Birds were more plentiful here. The nectar from such trees as *Grevillea chrysodendron* and *Loranthus* species, the berries of the latter, the numerous forms of insect and arachnid life, and the permanent lagoons all seemed to provide for their needs. Cape Don lacked permanent waterholes or creeks and had only a few native wells. Ground quail, shags, a white cockatoo, and a large brown (apparently semi-aquatic) bird were all seen in one afternoon along the banks of a Berry Creek tributary. In more open areas the Blue-winged Kookaburra (*Dacelo leachi*) might be observed occasionally, though it lacks the ability to "laugh." Emus were also seen, only much farther south in semi-desert country.

In some water-lily lagoons, which were well-grown with reeds in addition to water lilies, small freshwater sponges lived, attached to the lower parts of the reed stalks. These sponges grew right round the reeds, and were very soft and delicate. When dry, the skeleton was almost too fragile to be handled. In life, the sponges are green, being tinted with colonies of algae, but the true colour is probably light brown. Leeches were common.

BOTANY GROUP EXCURSION TO PORT MELBOURNE

(Salt-marsh Association)

On May 12, 1945, a party of botany students, led by Dr. R. T. Patton of the University, observed a solitary specimen of the Salt Plagiath (*Plagianthus spicatus*) at Fishermen's Bend, Port Melbourne—a waste area bounded by the Yarra and the bay foreshore, which might be termed Melbourne's doornat. Almost exactly three years later (15/5/48), when 21 members of the Club Botany Group visited this locality, a robust single example of the plant was found by Miss Dorothy Kidd within about 50 yards of the beach. Hitherto, the species had been noted in similar terrain on the western side of the Bay at Sealholme; but it is much more common in salt-marshes at Tooradin.

Another interesting find by Miss M. Allender was a small patch of the diminutive Creeping Monkey-flower (*Minulus repens*), showing small blotched flowers of pale violet-blue. Near a lagoon the party came across a section covered with fleshy-leaved growth of the goodeniaceous Swamp-wood (*Sollima radicans*).

On flat expanses of high salinity, remarkably pure salt-marsh communities were encountered: glassworts, noon-flowers, sea-leath, salt-grass and sea-blite, in dense mats of vividly coloured foliage. Where the ground was slightly higher, along the road edges, and on hummocks banked up by the wind, a different kind of vegetation was in evidence—principally grasses and salt-bushes.

The areas of a lesser salinity had been lustily invaded by many introduced aliens. Two of these, seen in flower, were the African Thistle (*Berkheya rigida*) and *Galenia* (*G. secunda*), the latter competed with native Lagoon Salt-bush (*Atriplex Muelleri*). The yellow-flowered African Thistle is probably an early introduction brought by old sailing vessels that came via the Cape of Good Hope. The plant does not appear to be aggressive and has not penetrated very far inland. Returning homeward by the Williamstown ferry road, we observed the African Thistle to be very prevalent on the seaward side. On the landward side of the road, however, its ascendancy was challenged by the cosmopolitan Spiff Rush (*Juncus acutus*). This *Juncus* is widespread in the State, notably in old mining districts like Bendigo, where it performs a useful service in combating erosion.

Despite its rather drab appearance, with accumulations of rubbish, the Bend has a distinct appeal, not only for botany, but also for ornithology. A dead Hoary-headed Grebe was picked up by Mr. N. Walters, and several other birds were seen. Ornithologists regularly visit the locality—a small party was met that afternoon—and from their diligent observations an impressive amount of data is being accumulated. The Bend is ideal for botanical enthusiasts to undertake similar work with the flora, both indigenous and exotic.

H. C. E. STEWART.

M.W.W.C. HUT AT BRITANNIA CREEK

The Secretary of the Melbourne Women's Walking Club has kindly notified us that their hut at Britannia Creek is available to members of the F.N.C.V. for a small charge, i.e. 1/6 per night or 5/- per week per person, or 10/6 for a party for a week-end. The hut is approximately 12 ft. x 24 ft. and will comfortably hold at least six people. It is in a lovely position, four miles along a fairly good road which leaves the main Warburton Road about four miles before reaching that town. Bookings should be made with the Secretary, M.W.W.C., 12 Grange Road, Kew, W.A. 2664.

WHAT, WHERE AND WHEN

General Excursions:

- Saturday, August 7—Museum of Applied Science. Subject: "Wax Modelling Demonstration." Leader: Mr. R. H. Fowler. Meet 2.30 p.m. at Swanston Street entrance to Museum. (Attendance list is now closed.)
- Sunday, August 15—Lockwood. Subject: "Early Orchids." Leader: Mrs. J. Pinches. Train from Flinders Street 8.48 a.m., thence road bus to Belgrave. Bring one meal. (Note.—This excursion altered from Sat. 14th, as appearing in *Wild Life*.)
- Saturday, August 28—Wattle Park. Subject: "The Birds of Wattle Park." Leader: Miss M. L. Wigan. Meet 2.30 p.m. at Kiosk in Park. Take Wattle Park train from city at Batman Avenue.
- Saturday, September 11—Botanic Gardens. Subject: "Australian Trees, Spring" (third of series for beginners and visitors). Leader: Mr. P. Bibby. Meet at Herbarium entrance to Gardens, 2.30 p.m.

Special Announcements:

- Saturday, September 18—Parlour coach all-day excursion to Vaughan. Subject "Fairy Waxflower." Leader: Mr. Ivo C. Hammet. Reserved seat bookings, 17/6 return, with Mr. H. Stewart, 14 Bayview Terrace, Ascot Vale (Tel. FU 022, Ext. 457). Six seats for junior members at 10/- each. Early reservation desired.

Group Fixtures:

- September 30-October 3—Rushworth. Subject: Botany and General. Parlour coach from Melbourne, with hotel accommodation at Rushworth. Further details from Leader, Mr. J. Ros Garnet. Intending excursionists should register names without delay to allow of final arrangements.
- Friday, August 6—Marine Biology Group. Royal Society's Hall, 7.45 p.m. Members of the Club who are interested in any form of Marine Life are invited to take part in these meetings.
- Saturday, August 21—Botany Group excursion to Black Rock and Cheltenham. Subject: "Heathlands." Leader: Mr. A. J. Swaby. Open invitation to all members for this excursion, as heath flora is expected to be good. Meet at Black Rock train terminus, 2.30 p.m.
- Monday, August 23—Botany Group. Royal Society's Hall, 8 p.m. Subject: "Gymnosperms," by Mr. J. H. Willis, B.Sc.
- Thursday, September 2—Wild-flower Garden Group. Royal Society's Hall, 8 p.m.
- Friday, September 3—Marine Biology Group. Royal Society's Hall, 7.45 p.m.
- Tuesday, September 7—Geology Group. Royal Society's Hall, 8 p.m. Subject: "Rivers and River Terraces," by Mr. T. C. Bryan.

A. A. BAKER,

Excursion Secretary,

53 Carlisle St., Preston, N.18.

SOCIAL NOTE

Fellow members of the F.N.C. extend to Mrs. Dorothy Sides, daughter of Mr. and Mrs. T. H. Sarovich, all good wishes and "bon voyage" for her trip to England and the Continent.

After completing a Nutrition Survey of Australia for the Institute of Anatomy, Mrs. Sides has been engaged in research on the Disintegration of Concrete with the Melbourne and Metropolitan Board of Works. She has resigned recently, and anticipates being away for nearly two years.

The Victorian Naturalist

Vol. 65.—No. 5 SEPTEMBER 8, 1948

No. 777

PROCEEDINGS

The monthly meeting of the Club was held at the National Herbarium on Monday, August 9, 1948. The President, Mr. J. Ros Garnet, and about 160 members attended. Apologies for non-attendance were received from Messrs. H. C. E. Stewart and A. B. Court (who was in hospital).

Mr. Swaby spoke regarding the forthcoming Show in October, stating that the section for Garden-grown Native Plants would be in the hands of the Wildflower Garden Group, Marine Biology in charge of that Group, General Botany in the Botany Group, Geology under Mr. Baker and the Geology Group, Spiders under Mr. Dunn, and Photographs under Miss Watson, Mr. Lee and Mr. Reeves; all these sections would need assistants. Anyone exhibiting anything is requested to get labels ready in plenty of time—the plant labels to show grower's name, suburb, and brief notes on soil, aspect, culture, etc. There would be a Club excursion on the preceding Saturday to Labertouche to collect flowers, etc. Mr. Gabriel will be unable to show his shells personally, but has kindly offered to lend his collection if someone will look after it. Miss Wigan and Mr. Chalk will supervise the ornithological section.

The President announced with regret the death of Miss Macfie's sister. A letter of condolence had been sent.

The President advised that the "Save the Forests" Campaign Committee had invited the Club to stage an exhibit at the Royal Show and also give help and advice in setting up its own exhibit.

New Nomination Forms would shortly be available, which must be used for all future nominations. It is desired to restrict membership to those really interested in Natural History.

A book had been received from the Fisheries and Game Department on fish-farming.

As this number goes to press, we receive the regretful news of the death, on August 15, of Mrs. Blanche E. Miller—an honorary and valued member of the Club since 1924. The late Mrs. Miller rendered many notable services to our F.N.C., had a facile pen and will be remembered also for her writings, particularly "Early Years of the *Victorian Naturalist*," published in the journal for June, 1934. The sympathy of fellow members goes out to her husband, Mr. V. H. Miller (St. Kilda) and it is hoped later to publish an appreciation of her life and work.

A conference regarding National Parks had been held, and although time did not permit the agenda being completed, it was felt on the whole that the meeting had been successful. All delegates present had been in agreement that our National Parks and National Reserves should be controlled by one authority. It has now been left to a committee to formulate a scheme for submission to the Government.

The following were elected as Ordinary Members: Messrs. L. G. Dale, W. F. Day, and I. Moorisen; and as Country or Interstate Members: Messrs. J. J. Flahavin and E. G. Smith.

A telegram was read from Mr. F. S. Collier accepting with much pleasure the Honorary Membership conferred upon him at the last meeting.

The following nominations for membership were received. As Ordinary, Mrs. E. K. Lording, Hood St., North Essendon, as Country, Mr. John Young, 62 Victoria Av., Chatswood, N.S.W.

Mr. Garnet again asked for volunteers to join the Excursions Committee.

DISCOVERIES OF GREAT INTEREST

The first speaker in this Symposium was Mr. C. J. Gabriel, who told us of a very important "find" he had made in Westernport Bay near the Cowes Jetty. The little shell caused great discussion among many learned conchologists abroad, but was finally put in a new genus, as *Larinopsis turbinata*. Another shell described was *Humphreya strangei*, the only good specimen of which was given by Mr. Gabriel to the South Kensington Museum of Natural History.

Mr. R. Dunn showed a slide of the spider *Saitis pavonis* (the latter word meaning "peacock") and described its extraordinary courtship dance.

Miss J. Raff gave an interesting lecture on the three types of water insects: ones that lived on the surface of the water, breathing free air; another, the "incomplete aquatic" type, that retained contact with the air, though usually submerged; and the third that was entirely aquatic and completed its larval life beneath the surface.

Mr. J. Willis told us how in 1929 he had found plants of a strange *Astelia* that grew 6 ft. tall in the Powelltown-Beenak district. There are nine species of the genus in New Zealand, but this plant was the first giant species to be recorded for Australia. It grows in the dense shade of boggy mountain gullies near their sources. *Astelia* (*Liliaceae*) with two dozen species, has a circum-polar distribution, being found in South America, Falklands, Réunion, Chatham and Campbell Islands, New Zealand, New Caledonia, S.E. Australia, New Guinea, Tahiti, Hawaii and the Marquesas.

Mr. A. Baker showed specimens of "imprisoned rocks," worn into smooth surfaces and many curious angles by the action of water in a confined space (pot-holes, etc.).

Mr. R. Lee spoke on seaweeds, and showed slides to illustrate his short talk. These plants are conveniently divided into three sections—the reds, browns, and greens. They differ from land plants in having neither vascular structure, flowers nor roots, reproduction being by water-borne spores, and very complicated.

Mr. Crosbie Morrison showed a film of the fruit-eating bat ("flying fox") and pointed out the comfortable manner in which it wrapped itself up in its wings and rocked itself to sleep.

Mr. A. D. Hardy spoke on auto-parasitism of a giant dodder-laurel (*Cassytha melanantha*), and showed that by experiment it had been proved that the haustoria on the twining stem *did* penetrate into its own tissue. He also reported the case of a "Bewildered Grey Box," which had sent down a branch 30 ft. long towards the ground. The foliage on this branch appeared to be that of grey box, but the flowers and buds were something between a grey and yellow box!

Mr. A. Swaly made some interesting comments on *Anquillaria dioica* (Early Nancy), *Burchardia umbellata* (Milkmaids) and *Dichopogon strictus* (Chocolate Lily); with regard to the purposes of certain floral appendages.

Mr. Willis read a note from Mr. C. French telling how in 1892, on an excursion to Oakleigh, he had discovered beneath some tea-tree a patch of Golden Leek-orchids (*Prasophyllum Dixonii*) and *Corybas unguiculatus*, a small helmet-orchid—both new records for mainland Australia, and the former new to science.

[The type of *Prasophyllum Dixonii*, in Melbourne Herbarium, has been critically examined recently by Mr. W. H. Nicholls, who pronounces it to be merely a pale form of *P. nigricans*; so the species must lapse into synonymy.—Ed.]

Mr. Muir, of Dimboola, reported that the habitat of *Prasophyllum fusco-viride* (Dusky Leek-orchid) in Victoria has been extended by another 40 miles. It is now known from Dimboola (the type area), Diapur, Portland, from Yorke and Eyre Peninsulas in South Australia, and from near Dripstone, on the central-western slopes of N.S.W.

ORCHID DISCOVERIES OF SIXTY YEARS AGO

By T. S. HART, Croydon.

During a walk through well known country at Cheltenham in December, 1888, I visited a remarkable circular hollow known to us as "the amphitheatre." A small area of flat ground encircling the lagoon afforded specimens of the orchid *Cryptostylis subulata*, until then not known to me. Hence it became the subject of one of my first attempts at identification with the Baron's *Key to*

Victorian Plants, which had just been published. *Orthoceras* was found there a few days later. As it happened, these two orchids were particularly easy to name. Dr. C. S. Sutton apparently did not locate this occurrence. It was not Cheltenham Park, but a water reserve off Wetherall Road nearby. It passed into private hands about 30 years ago.

I recall also a squat form of the greenhood orchid *Pterostylis cucullata*, found in 1892 on the low cliff at Hampton. Plants were to be seen as late as 1912, but traffic and other causes have probably obliterated this patch long since. The soil is quite different from the ordinary sandy soil of the district and carried a few other unusual plants. The Baron, I think, noted the orchid as at "Brighton Bluff"; actually, it is on the long gentle curve between Brighton and Picnic Point.

Many years ago I found close to Centre Road, Clarinda, a small *Caladenia* whose labellum clearly put it with *congesta*, but not the much larger *C. congesta* known to me. I showed it to the Baron and did not understand him further, in my inexperience, than a small form related to *C. congesta*; "possibly," I have in my notes, "a new variety." Last spring, while looking at fresh *C. iridescens*, the thought struck me, "that looks like the labellum of my Clarinda orchid."

EXHIBITS

Miss E. Raff: *Acacia leprosa*, garden-grown at Hawthorn.

Mr. J. S. Seaton: *Leptospermum scoparium*, var. "*Lambethii*," garden-grown at Caulfield.

Mr. Allan Carter: Cone shells—*Conus marmoratus* L., SW Pacific; *C. capitaneus* L., N. Qld.; *C. senator* L., Barrier Reef; *C. princeps* L., Mexico; *C. aulicus* L., Qld.; *C. virga* L., Philippines; *C. quernicus* Hwass., Philippines; *C. literatus* L., Philippines; *C. quernicus* Lam., Victoria; and *C. stellatus* Reeve, Qld.

Mr. K. Atkins: Collection of *Acacias* from Botanic Gardens—*A. adunca*, *A. alata*, *A. Baileyana*, *A. colamifolia*, *A. decurrens*, *A. elongata*, *A. Howittii*, *A. Jonesii*, *A. longifolia*, *A. myrtifolia*, *A. prostrata*, *A. pycnantha*, *A. ruficoma*, *A. vermiciflua* and *A. vestita*.

Mr. and Mrs. Eric Muir (of Dimboola): Four cases of mounted eucalypt fruits and buds.

FEATHERTAIL NOTE

When walking down a bush track at Katorama one night in August, I heard a rustle in the scrub and shone my torch light among the bushes. There was a little Pygmy Phalanger or "Feathertail" gliding from branch to branch (on a *Pultenaea* bush). In order to examine its feather-like tail, I was able to approach within a few feet of the tiny creature. I then stepped back as it glided from the bush to a gum tree about a yard away and so disappeared. After watching that beautiful little sprite for the first time, I felt happy to have seen one of Nature's most charming pictures.

F. M. CHUBB.

CONTRIBUTIONS TO THE FLORA OF SOUTH
AUSTRALIA—I

By DR. ERWIN GAUBA, Research, Vic.

A sojourn in Loveday, near Barnera, South Australia, afforded me opportunities for botanizing in and around this irrigation settlement. Of my rich collection I will publish here only those plants which are new to science or new for that State, or, at least, new for this particular district. Some critical notes on certain plants will also be added.

Loveday is a semi-arid Mallee district of reddish sandy-loamy soils with an average annual rainfall of about 10 inches. The dominant plant community may be considered in the light of Wood's classification as a *Eucalyptus oleosa-Myoporum platycarpum* society, though it bears everywhere very definite traces of anthropogenous disturbance. Nevertheless, besides the two leading trees, the characteristic representatives of this society's shrub layer (e.g., *Grevillea Hueyckii*, *Pittosporum phylliroides*, *Cassia Sturtii*, *C. crenophila*, *Acacia rigens*, *Heterodendron oleifolium*, etc.) are present everywhere. *Acacia rigens* (with *Triodia irritans* in the undergrowth) appears often as a pure community on the sand ridges.

In certain places, the abundance of *Atriplex stipitata* is noteworthy—a plant which is generally characteristic of drier conditions. This may explain the fact that some plants, known hitherto from the Far North only, occur also around Loveday.

My thanks are due to the staff of the National Herbarium of Victoria, especially to Mr. J. H. Willis, for constant helpfulness in providing me with the necessary literature and in enabling me to examine relevant material, including several basic types.

GRAMINEAE

Panicum decompositum R.Br., var. *biflorum* Gauba, var. nov.

Spiculae biflorae; flus inferior masculus, superior hermaphroditus. Antherae floris masculi 3, lineares, 1½ mm. longae, palea superior inferiorem aequans vel paulo brevior, bicarinata, hyalina.

Common on the bank of the Murray River opposite Moorook (TYPE—leg. E. Gauba, 26.11.44) together with *Paspalidium jubiflorum* and *Eragrostis australasica*. Between the large tussocks of these grasses the superb *Swainsona Greyana* is frequent. Type material has been lodged in the National Herbarium of Victoria.

Typical *Panicum decompositum* is quoted by all authors as having the spikelets with one (bisexual) flower only. We read, for instance, in Bentham's *Flora Australiensis* (VII, 1878, p. 489); "... the 3rd (glume) with a palea from ½ to ⅔ its length,

but no stamens."* In all my specimens the anthers of the male flower are identical with those of the bisexual flower, produce normal pollen grains and open by longitudinal slits, therefore—as far as can be ascertained under the microscope—ready for pollination and fertilization. They ripen after the anthers of the bisexual flower have withered.

It would be more correct to consider the "third glume"—in spite of its morphological identity with the second one—as the flowering glume (*palea inferior*) of the male flower.

Sporobolus Mitchellii (Trin.) C. E. Hubbard.

Found on the bank of the Murray River opposite Moorook (26.11.44).

J. M. Black (in *Flora of S.A.*) also quotes this grass from the River Murray, but with "stems erect or flexuous, 30-50 cm. high." My specimens represent a very tender form with thin creeping stems up to two feet long, rooting at the nodes. In its vegetative parts it is not unlike the forms of Couch-grass (*Cynodon dactylon*) from dry localities.

Enneapogon avenaceus (Lindl.) C. E. Hubbard.

New for this area, the species was hitherto recorded from Flinders Range northward and westward only; but in Loveday it is frequent in sandy soils (17.2.1944).

Leptochloa digitata (R.Br.) Domin.

New for this area, the species was until now known only from the Far North and North-East. In Loveday it affects sandy soils, but is not common (25.3.1944).

LILIACEAE

Corynotheca lateriflora (R.Br.) F.v.M. em. Gauba.

Diagnosis nova completa

Planta perennis, viridis, glabra, multicaulis, 20-70 cm. alta, radicis fibris fasciculatis, collo residuo (vaginis) foliorum basaliurn mortuorum scarioso-uvicis, nitidis, demum in fibris solutis vestito.

Caulis numerosi, basi vaginis usque ad 15 cm. longis involucreta, inferne simplices, arcuate vel flexuose ascendentes, teretes vel compressi, interdum torti, striati vel sulcati, superne iteratim et intricatissime ramosi. Ramuli ultimi ordinis erecto-patentes vel paullum avertati, tenues, rigiduli, striatuli, usque ad 25 cm. longi, tota longitudine floriferi.

Folia basalia numerosa, rigida, linearia, plana vel longitudine ± plicata, ad 40 cm. longa et 7 mm. lata, margine sparse scabridula. Folia caulina (infra ramificationem) ad nodos incrassatos sita, pauca (1-2), basilibus

*In the typical, the *palea superior* of the empty lower flower is without any function and therefore generally more or less rudimentary. Nevertheless, I found it in a specimen from Murrumbidgee (*leg. Bennett, 1866*) as long as the "third glume" and bicarinate.

similia (graminea), usque ad 25 cm. longa, basi scariosa semiamplexicauli. Folia ramos suffulcrantia valde reducta, infimo (1-2) interdum foliis caulinis similia, linearia (ad 22 cm. longa) vel subulata, cetera subito decrescentia et in bracteas inconspicuas, acuminatas scariosas transientia.

Bracteae florales secus ramulas usque ad 2 cm. inter se distantes, semiamplexicaules, scariosae, acuminatae, cordatae, usque ad 2 mm. longae-latae, trinerviae, nervi apicem versus confluentes. Bracteolae 3-4 in axillis brevitarum floralium subocculatae, albo-hyalinae, triangulari-cordatae, minervinae, usque 1½ mm. longae-latae, persistentes.

Flores terni vel quaterni in axillis bracteolarum dispositi sed succedenter florentes. Perigonium mutans vel pendulum. 5-6 mm. longum, angusto-vel campanulato-obovatum, raro ut videtur ± stellatum explanatum, post anthesin spiritaliter contortum, deciduum. Phylla 6 usque ad basin prope libera, in medio nervis tribus porcellis longitudinaliter percursa, inter nervos viridia vel luteo-viridia, margine luteo-albo-hyalino, raspe (in vivo) roseo-vel luteo colore suffusa; phylla exteriora linearia, ca 1 mm. lata, apice cucullata vel cucullato-mucronulata, inter nervos interdum rubido-striatula; interiora oblongo-linearia, exterioribus paullo breviora et latiora, apice subcucullata vel rotundata vel leviter emarginata. Stamina 6 perianthio ad basin breviter affixa, filamenta plana, glabra, lutea, versus basin apicemque attenuata, exteriora ca 2½ mm., interiora 3 mm. longa. Antherae oblongae, 4-3 mm. longae, dorso ad basin versatilibus fixae, in statu maturo apice reflexae. Stylus indivisus, filiformis, 2½-3 mm. longus. Ovarium oblongum 1-1½ mm. longum, trilobulare, loculis bi-ovulatis, ovula inferiora pendula, superiora recta. Pedicelli floriferi filiformes usque ad 2 (2½) mm. longi, primo erecto-patentes, deinde cernui vel penduli. Pedicelli fructiferi paullo longiores (usque ad 3 mm.), indurati, sub apice articulati, supra articulationem incrassati et residuo perianthii scariosis coronati, posthac recurvato-flexi, persistentes.

Capsula 3-4 mm. longa, membranacea, trilobularis, sed plerumque abortu bi-vel unilobularis, loculi di-vel abortu monospermi, quia de causa capsulae forma variabilis: capsula monosperma clavata et plerumque indehiscens, capsulae 2-5 (variosae 6-) spermac ambitu piriformes, ovatae vel oblongae, ± trilobae, in medio constrictae, ex parte vel in toto dehiscentes. Semina oblonga, 2 mm. longa, testa crustacea, nigra, sub lente tuberculis minutis in lineis subundulatis dispositis dense obsita. Caruncula valida, crassiuscula, irregulariter lobata vel crenulata.

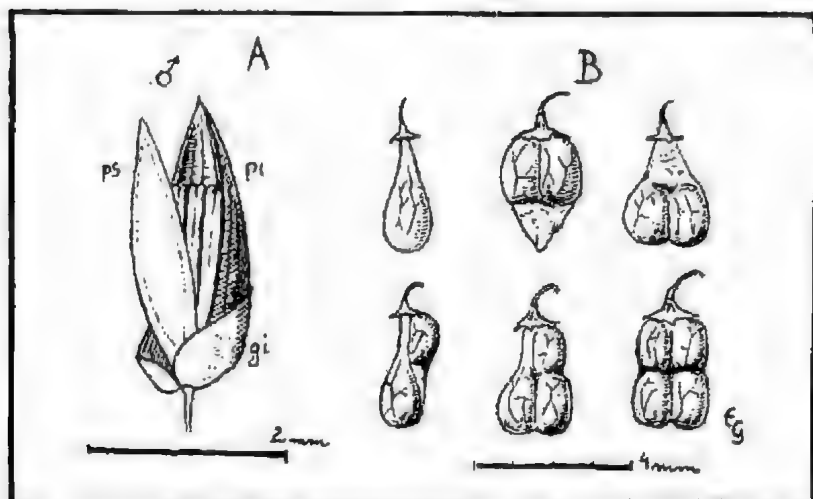
+ *laevisperma* Gauba, var. nov.

Testa nitida laevissima vel sparse minutissime punctato-tuberculata. Tracti arenarii prope ripas inhabitans.—Mt. Dispersion, River Murray, N.S.W., Fr. Mueller, Dec. 1853. (HOLO-TYPUS, in Herb. Melb.)

The species was first discovered by R. Brown on islands of the Gulf of Carpentaria (N.T.) and was published as *Caesia lateriflora* in his *Prodromus Florae Nov. Holl.* (1810, p. 277). The diagnosis is not only very incomplete but erroneous too, for instance by the statement "*filamentis hispidulis*." This mistake is retained in Mueller's *Fragmenta Phyt. Austr.* (VII, Jan. 1870, p. 62), where "*filamenta barbollata*" are quoted, but E. Baker ("*Revision of the Genera and Species of Anthericaceae, etc.*," in *Jour. Lin. Soc.*, XV, 1877, p. 360) notes in the diagnosis for our genus "*filamenta nuda*," just as Bentham and Mueller (*Flora Aust.*, VII, 1878, p. 49) write "*filaments glabrous*." In the Melbourne National

Herbarium, I checked over the numerous specimens from very different localities, including an apparent type specimen collected by Brown on the "Islands of the Gulf of Carpentaria" (1803), and in all cases I found the filaments to be glabrous.

The different statements about leaves introduce another uncertainty. We read in Bentham and Mueller (*l.c.*, p. 49): "Leaves very rarely seen at the base of the stem, very narrow, almost subulate, and only two or three inches long." E. Baker (*l.c.*, p. 360) writes: "*folia basalia filiformia glabra 4-6 poll. longa.*" C.



A: *Panicum decompositum* R.Br., var. *biflorum* Gauba. Spikelet with the lower male flower (the upper bisexual omitted). gi = gluma inferior; pi = palea inferior; ps = palea superior.

B: *Corynoltheca lateriflora* (R.Br.) F.v.M. Some capsule forms from the specimens of Loveday (S.A.).

Moore (*Handbook Flora N.S.W.*, 1893) notes: "Radical leaves almost subulate, a few inches long, early withering away." Most of the Loveday specimens which I kept under observation during three months (October-December) have had through the flowering and fruiting season well developed grass-like leaves, up to 40 cm. long and up to 7 mm. broad.

All authors describe the fruit as being 1- or 2-seeded, indehiscent or sub-indehiscent, and by Bentham and Mueller (*l.c.*, p. 49) it is described as "an obovoid nutlet, little more than 1 line long." Because of this character, Mueller decided to separate our plant from the genus *Caesia*, establishing for it the genus *Corynoltheca* (in *Fragm.*, VII, 1870). Under the diagnosis of this new genus, we read in *Flora Australiensis* (VII, p. 49): "fruit a single ovoid

indehiscent 1-seeded nutlet." Now, in my Loveday samples the "one-seeded nutlets" are very frequent, but there are also 3- to 5-seeded capsules which open more or less easily (loculicidally) and scatter the seeds. On the other hand, I observed in Victorian *Caesia vittata* (from Research) that the few-seeded capsules open only incompletely or not at all. Therefore, there is really no essential difference between *Caesia* and *Corynotheca* and it would be much better to adopt Baker's point of view, returning the three *Corynotheca* species of Mueller to *Caesia* (as section *Corynotheca*).

With regard to the structure of the testa, we find a further contradiction. In the *Fragmenta* Mueller quotes "*semina . . . laevissima*," but in *Flora Australiensis* we read that the seeds of *Corynotheca ocanthoclada* are "rather more distinctly granulate than in *C. lateriflora*." The fact is, that besides specimens with rugulose seeds—typical for *Caesia* and *Corynotheca* species—there are also forms of our plant with a perfectly smooth and shining seedcoat.

All these contradictions, together with the brevity of the original description, call for a new diagnosis, and the foregoing is based on my numerous and complete samples from Loveday.

J. M. Black (in *Flora S.A.*, Part I, sec. ed., 1943) intimates that *Corynotheca micrantha* (Lindl.) Macbride may be expected to occur in South Australia, because it is found at Barrow Range close to the western border. Nevertheless, this species has not yet been recorded from the State, but in its place I now register *Corynotheca lateriflora* as the first representative of this genus in South Australia.

In the Loveday district I found *C. lateriflora* in one locality only, viz., on sand-ridges within the Mallee, but here very abundant and in association with other psammophilous species, e.g., *Triodia irritans*, *Stipa Drummondii*, *St. scabra*, *Zygophyllum ammodendron*, *Podolepis capillaris*, *Myriocephalus Sturtii*, etc.

By the development of adventitious roots from the higher nodes, when buried by drifting sand, this plant is highly adapted for thriving in such mobile soils.

In the National Herbarium, Melbourne, the new variety *laevisperma* is represented by samples with the following labels: "Drift sand on the Murray"; "Sand dunes on the Murray towards Mt. Dispersion, N.S.W., Dec., 53" (TYPE); "Ashburton River, W.A." [Mt. Dispersion is a point on the Murray opposite Kulkyn Station, so the variety should be looked for in Kulkyn Forest and other Murray lands of far N.W. Victoria.]

(To be continued.)

MOVEMENT IN PLANTS

By EDITH COLEMAN, Blackburn, Vic.

Until comparatively recently we were taught that animals differ from plants in their power of movement. We know now that plants do not lack this power when movement is useful to them. The microscope has shown that they are intensely active within. Visible external movements are endless.

In the garden, light-seeking and light-avoiding movements are constantly seen. Climbing plants bridge great gaps, feats of engineering, by coiling back upon themselves. In seedlings, the slow movement of an arched stem that breaks the ground through which cotyledons are drawn is as powerful, relatively, as that of the fruiting body of a mushroom, which is capable of lifting cement slabs. On my walls I am continually replacing heavy stones pushed off by the growth of "Cobweb" *Sempervivum*.

In certain growth-movements of stems and peduncles, change of direction may take place several times. One need only cite the straightening of the down-curved stalk of the poppy head, thus lifting it where the open flower will be fully exposed to sunlight and insect attention, or the downward curving of bell- and trumpet-flowers which would otherwise fill with rain and dew to the detriment of essential organs. Apart from such ordinary growth-movements, certain periodic, heliotropic or geotropic movements seem almost purposive, in view of the benefits secured by them.

It is interesting to note the punctuality of periodic movements—the daytime opening and closing of such flowers as *Goatshead*, *Chicory* or *Tigridias*, the evening opening and daytime closing in *Evening Primroses*, *Lychnis* and *Nicotiana*. The last-named are melancholy daytime flowers, but see them at dusk! White flowers have become beckoning lamps which the swift hawk-moth will not miss when lured from afar by their delicious perfume.

Even the dark-red *Nicotiana* is evening-pollinated. It opens its fragrant "taverns" only at dusk. We wonder how the moth can find a doorway until we note that the anthers have now opened and have exuded a ring of pale pollen—a golden eye in the dark. Dark purple *petunias*, too, open their anthers at dusk, guiding the swift pollinators. One sees a long proboscis coil and uncoil as it dips into flower after flower.

Quiet moments spent in watching such movements as these are among the most satisfying of garden delights.

Then there are the so-called sleep movements of plants, a study in themselves. One sees them in many wattles and other legumes. One of the best is seen in *Acacia Farnesiana*, the only indigenous wattle we share with the Old World. In this the leaflets fold so

closely at dusk as to spoil the beauty of the plant, making it look quite bedraggled. Although sleep movement in clovers and wood-sorrel are pronounced, they do not afford so sorry a spectacle.

Other visible movements are those of the Sensitive Plant (*Mimosa pudica*), in which the leaflets close at a touch, or even a breath; and those of Sundews whose sensitiveness to external stimuli seems very like our own nervous responses. The movements of lilies are interesting processes to watch, and to time, for



Hive bee, showing pollen "baskets" (*corbicula* of her thighs) piled up with *Cytisus* pollen.

they are as exact as if run to schedule. One of the best to study is the Swamp or Panther Lily (*L. pardalinum*). An inflorescence should be cut in bud, before bees have had access to the flowers. Placed in water on the dining table, few movements will be lost, so much of our days being spent at meals! At first the buds are pendant, like eardrops, on "hair-pin" curved peduncles; then we see the lips of the perianth part, the rising and recurving of each segment, the recurving of the "hairpin" peduncle to lift the now open flower into its characteristic poise.

More movements follow. Each large oblong anther, which lies flat and rigid against the filament, is seen to curve. A black line down the centre opens into a narrow slit through which pollen protrudes. You and I cannot curve that anther. It waits for the swelling grains of pollen to do so. The curving has freed the

anther from the filament, and it now swings freely ("versatile"), trembling with every movement of the stem. No black line is now visible. Each anther is an oblong mass of pollen, adding so much to the beauty of the flower. Every movement is so punctual, and so exact, that the lily has become for the watcher an almost conscious actor on the great stage of life.

One might write for a week without exhausting the number of slow but certain plant movements seen in a garden. It is when we come to those which facilitate, or prevent, pollination that we reach the incredible. One need only cite the ten stamens in *Kalmia*, held under tension until released by the touch of an insect; the irritable stamens in *Berberis*, which spring up against the pistil, dusting with pollen the bee which caused the movement; the two stigmatic flaps in *Mimulus* which lie expanded until touched, when they close together, closing over any grains of pollen that may be left on them. Movement of irritable stamens in *Opuntia*, *Cistus* and *Helianthemum*, and others may all be seen without a lens.

Then there are the movements of pollinated flowers, the "no beer" signs of floral "taverns," the turning down of clover florets, and fall of the lip in Snapdragons so that the bee wastes no time in visiting "dry" houses.

Movement in the Brooms (*Spartium*, *Genista* and *Cytisus* species) is almost uncanny. In *Cytisus*, despite the double explosion which dusts her above and below, the bee will continue to despoil the exposed anthers until her pollen-baskets (*corbicula*) are loaded. One may watch her at close range while she works, but when she can pile no more on her panniers she becomes shy, as if she knows the value of her loads.

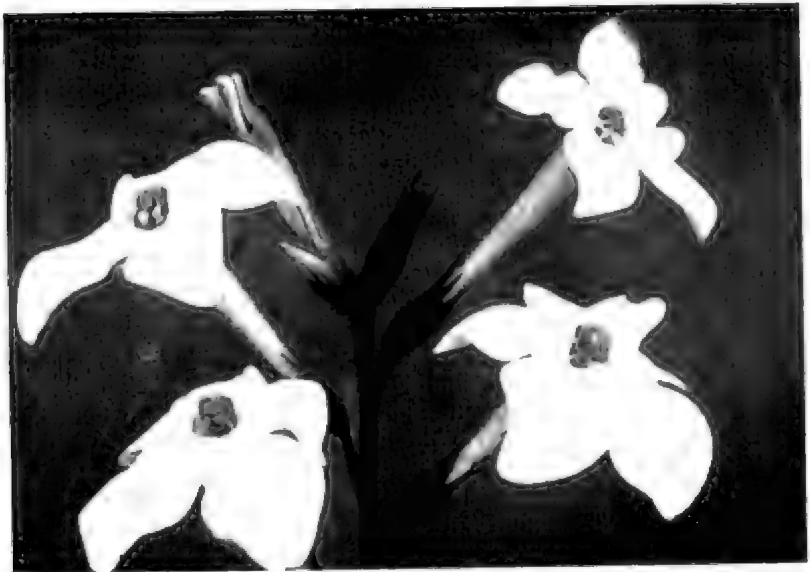
I grow dozens of Brooms, not for the groves whose shadow, Shakespeare tells us, the dismissed bachelor loves, "being lass-lorn"; nor for the myriad flowers that flood the bushes in spring until they "rain" butterflies of every hue; but for the pleasure of watching those uncanny explosions which follow the bee's entrance into an unvisited flower. I love to watch her despoiling the anthers of their orange pollen, scratching as if life depended upon speed.

And as she flies off to the hive with her precious orange loads (Virgil's "stones") or red, brown, gold, yellow or cream loads from other flowers, I have no doubt whatever that these are the "stones" which the ancients believed were weights to aid her balance in windy weather. In Virgil's words:

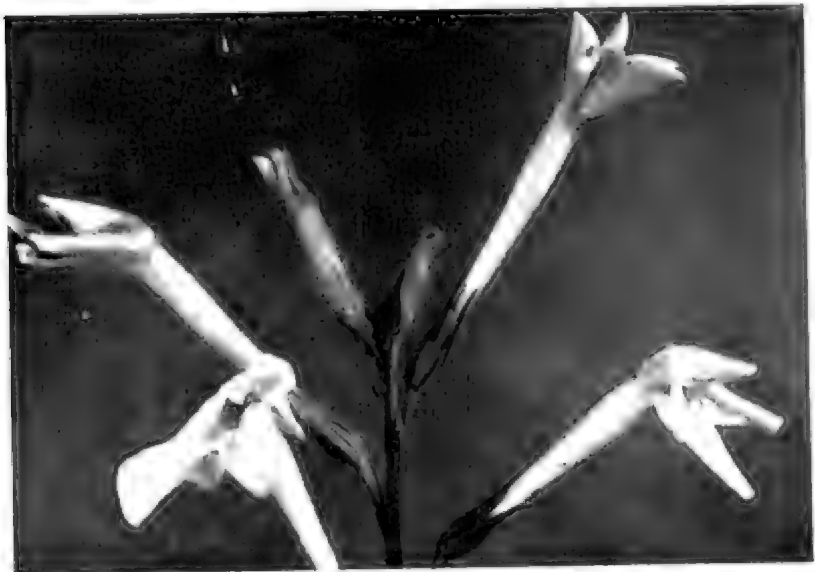
And often they carry up little stones, as unstable boats carry ballast when the wave tosses them about; with these they poise themselves through the empty clouds. [Giles' Transl.]

I think, too, that these masses of pollen explain Virgil's views on reproduction of bees: "But themselves gather their young ones with their mouth from leaves and from sweet herbs; themselves

PLATE II



When the very famous garden variety "*Victoria*" opens in photograph 1 of Plate I, you are looking for the night. Note how the petals and leaf impeding the "corolla" all fold at all "times" the leaves of the "day" (19)



The same flowers at 10 am when closing for the day - "Victoria" has miserably shut

Photos: F. Coltrane

supply a king and little citizens." (By the ancients the sex of the queen bee was confused.) They witnessed pollen carried into the hives, and saw it in the waxen cells. Young bees emerged from many cells. The assumption that they were produced from pollen was only less absurd than a belief in their birth from dead oxen.

Few nature lovers, except the very young, are disciples of the Linnæan school which taught that the best botanist was he who knew most plants, as opposed to the Cuvierians whose students should know more about a few. Certainly in the garden one derives greater pleasure in close intimacy with a few plants, rather than a nodding acquaintance with many.

One of the best forms of gardening, surely, is to know plants as living, moving, acting *individuals*, rather than patches of colour—to know what plants do, how they live, rather than their relationships.

To quote the late Prof. J. Arthur Thomson:

"While we cannot have too much science, it is, for ordinary men and women, unwholesome to keep continually looking out at one window, and to keep the shutters on the others. . . . Science requires to be kept in touch with our life and our dreams; with our doing and our feeling; with our practice and our poetry."

Beautiful words, so applicable to man's work in his garden!

AUSTRALIAN BARNACLE THREATENS TO BECOME A PEST

In the Science column of a recent number of the *Illustrated London News* there appears an interesting article by Dr. J. P. Harding on one of our shell-like barnacles, *Elminius modestus*.

This form is commonly found here encrusting mussels, etc., in our rock pools. Having reached the southern coast of England, it is threatening to become a pest in the muddy estuaries there, for, writes Dr. Harding, "not only does it foul the bottoms of barges and yachts in our estuaries much more than native barnacles do, but it also has a more serious effect on our shell-fish industry." It is reported as being the predominant organism in the lower reaches of the Colne, Crouch, Blackwater and Thames.

Apparently *Elminius* is one of the barnacles that can withstand muddy conditions, and it has thus been able to establish itself in these estuaries. Also, it is noted, its breeding season extends over a much longer period than is the case with British related forms. These two factors are quoted as the chief causes for its rapid establishment in new surroundings.

Owing to its longer breeding period, a coat of anti-fouling paint used on craft in the spring, to prevent native barnacles from settling, does not retain its efficiency as a repelling agent against the Australian form, which continues to breed throughout the summer months.

Regarding the shell-fish industry, winkles and oysters are becoming encrusted with the barnacle, and extra labour will be necessary to scrape the oysters sufficiently clean for market purposes, if the trouble increases. Chiefly, however, it is as a "competitor for food and especially living-space" that *Elminius* will prove disastrous.

J. W. RAFF.

NOTES ON THE POLLINATION OF TRIGGER-PLANTS

By TARLTON RAYMENT, F.R.Z.S., Melbourne.

The author has been able to make a few observations on the pollination of certain species of *Stylidium* owing to the courtesy of Rica Erickson, Bulgart, Western Australia, and Hugh C. E. Stewart, of Melbourne.

Broadly, it would seem that many bees in several genera trip the trigger of the Victorian species of the Grass Trigger-plant, *Stylidium graminifolium*, but the Western Australian species appear to be pollinated by four genera of flies.

Rica Erickson is working with the author on a paper on the pollination of the Western Trigger-plants, and the descriptions of the pollinators are for the time in abeyance. However, a note on the pollen-grains may not be out of place here.

Microscopical study of a series of the plants revealed the fact that, while the pollen-grains are alike in form, and cannot be separated on the structure, yet the colours are distinctive but not conspicuous. It was found that some are a delicate green, others a faint pink, a few are golden, others white; but unless care be taken, all appear to be pale-green.

However, the author was able to deduce, from the colours of the pollen-grains adhering to the hairs of the body, that certain flies had tripped three species of *Stylidium*. Observations in the field at a later date proved this deduction to be correct.

Another interesting fact that emerges from the study is the varying manner in which the several insects are struck by the anthers of the different Triggers. The further discussion of "sensitivity" must also be deferred to a later date, but the several methods are full of interest.

The Victorian species, *Stylidium graminifolium*, thrives in the alpine regions as well as it does along the lower littoral, and all the bees were collected by Mr. Stewart at Mount Buffalo, Victoria, in December 1947-January 1948.

The author experimented on a number of plants collected at Dandenong, Victoria, by Mr. Owen Dawson, and it was found that when the flowers on a stalk had been "tripped" with a pin, all had regained their original "ready" position within fifteen minutes.

Although the style and anthers quickly return to the "ready," no amount of stimulation will cause them to "fire" until sufficient "shot," i.e., ripe pollen-grains, has accumulated to make the discharge worthwhile.

When the anthers are again gravid with ripe grains, the sensitivity of the style increases, so that at its zenith any slight stimulus is sufficient to bring about a discharge, and the ripe granules are then sometimes spread like a veritable shower of "shrapnel."

Certain of the insects are stung by the accuracy of the "broad-side," and literally fall down off the plants, and some little time elapses before they recover sufficiently to clean the "powder" off the eyes and other inconvenient parts of the body.

Some of the Western Trigger-plants actually hold the visitor down for some little time, and the small insect is unable to release itself until the style begins to lift on its return to the "ready" position.

It is certain that many more interesting observations await those who make a close study of these unique plants, and the author would be glad to receive specimens of the Victorian species, other than *Stylidium graninifolium*, together with the name of the locality, date, etc., and also any insects observed to "trip" the trigger mechanism. Mr. H. C. E. Stewart has kindly undertaken to transmit to the author any specimens handed to him at Club meetings or excursions.

The Victorian species include *Stylidium perpusillum*, *S. despectum*, *S. saboliferum* (found only in the Grampians), and *S. calcarratum* (rare), also the two Styleworts, *Levenhookia dubia* and *L. Sondari*.

Systematic botanists regard the *Stylidiaceae* as very highly developed dicotyledonous plants, some authorities ranking the family next to the *Compositae*. In both these families, insect pollination appears to be highly specialized.

The famous Ferdinand von Mueller gave considerable attention to Australian *Stylidiaceae*, and listed approximately 100 species, the majority being native to Western Australia. His *Iconography* of these plants was, unfortunately, never completed, the First Decade only being published, with detailed figures of ten species.

EXCURSION TO CROYDON AND RINGWOOD

By T. S. HART, Croydon.

About five members met at Croydon for the morning excursion on October 4, 1947, and proceeded to Bayswater Road, near the main road bridge, where there is a fine natural avenue mostly of Silver-leaf Stringybark (*Eucalyptus cinerea*, var. *multiflora* of some, or *E. cephalocarpa* for those who consider it a good species). These trees occur along a low terrace in the Croydon Valley and can be easily located from a passing train as it descends along the hillside: the bluish colour makes them readily observable.

Turning across grass paddocks toward the railway, we found conditions very wet underfoot from earlier showers, and rain soon started again, increasing in intensity so that further observations were difficult. Special local features included abundant plants of a Flat pea, commonly regarded as a trailing form of *Platylobium formosum*, but very different in aspect from the more typical shrubby form of this species as seen near Bairnsdale.

The two plants called *Acacia juniperina* were also seen; the typical form a shrub of a few feet, with pale flowers in autumn and winter the other the variety *Brownii* (or *Acacia Brownii* as a distinct species?), which is a low-spreading growth with bright yellow flowers in spring.

RE-APPEARANCE OF A "LOST" ORCHID

(Prasophyllum brachystachyum Lindl.)

By W. H. NICHOLLS, Melbourne.

The writer has long sought this diminutive and comparatively rare orchid in Victoria—but in vain! Specimens claimed to be Lindley's plant had been collected in three localities, viz., Green Gully, near Newstead; Ringwood; Croydon.

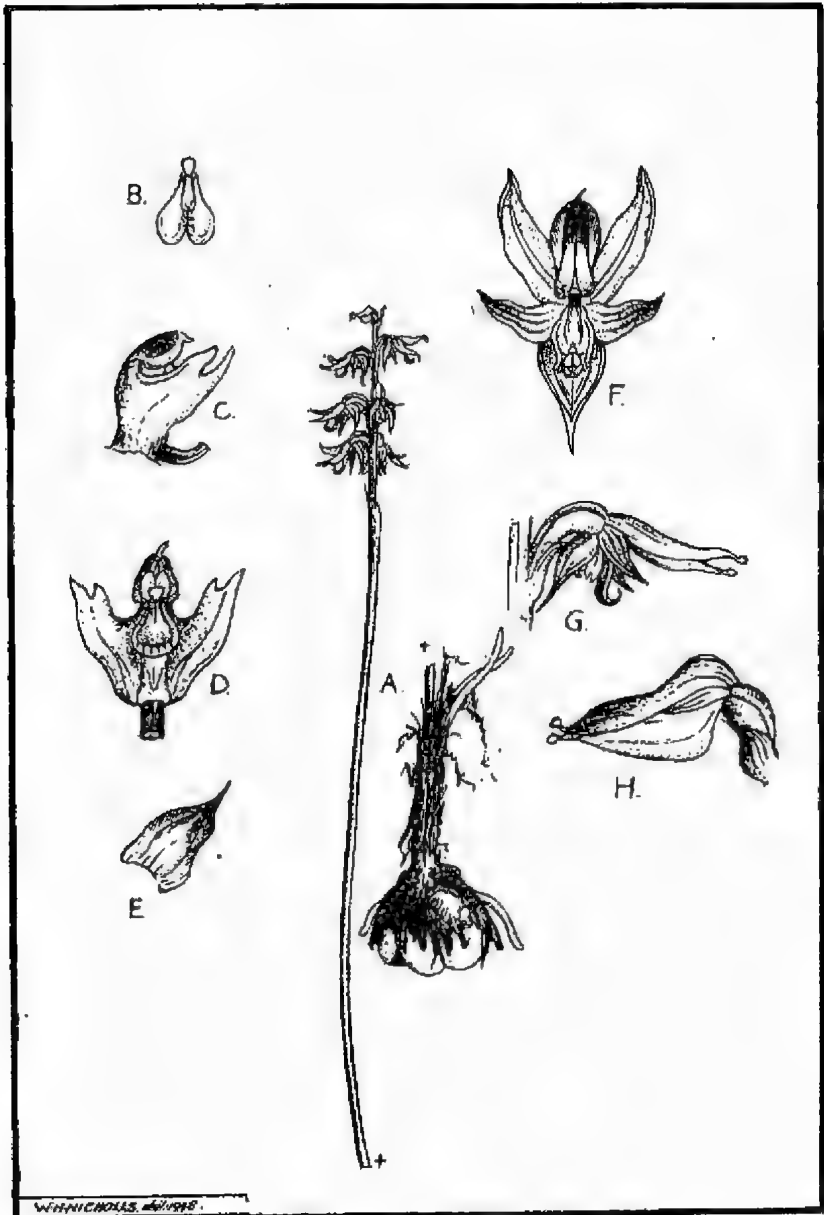
Specimens in the National Herbarium, Melbourne (collectors, Gustav Weindorfer and Dr. C. S. Sutton) are from "Green Gully, near Newstead." In *The Orchids of Victoria* (E. E. Pescott, 1928, p. 37), Ringwood is cited as a habitat, while Dr. Rogers records a specimen from near Croydon (see Rogers' collection of Miss Rosa Fiveash's orchid paintings in the University Museum, Adelaide). Dr. Rogers' Croydon specimen was referred to in a letter that I had from him, and I have also viewed Miss Fiveash's painting. Dr. Rogers made it plain in his communication that the name he had given this specimen (which he personally collected) was tentative only. He was always sceptical concerning the existence of *P. brachystachyum* as a valid species.

A critical examination of Newstead material proved every specimen to be *P. nigricans* R.Br., and the Ringwood specimens are undoubtedly *P. despectans* Hk.f.—the exact spot of collecting was diligently combed and Hooker's species was found to be the only *Prasophyllum* in evidence; it occurred in great abundance. The Croydon collection (a solitary example) is also *P. despectans*. In flowers of this specimen the labella (in every instance) possess sharply serrate lateral margins; but this feature is not at all unusual in the species, although generally found only in individual blooms. Thus, all mainland records of *P. brachystachyum* must be discredited.

Authentic specimens of *Prasophyllum brachystachyum* have not been collected, as far as I am aware, since the days of Ronald Gunn—that very thorough collector of Tasmanian plants. Rodway (*Tas. Fl.*, 1903, p. 194) records the following habitats for this little *Genoplesium*: "Waterworks (Hobart); Kingston; Circular Head and Rocky Cape." [Circular Head is the Type locality.]

Mr. Harold Trethewie, of Stanley, found excellent material of the true *P. brachystachyum* in his district during 1946. He writes: "In the field it is often mistaken for *P. Archeri* Hk.f. owing to its short spike of flowers."

P. Archeri and *P. brachystachyum* are outwardly very similar, the very brief flower spike being a salient characteristic of both species; but the labellum and column appendages of *P. Archeri* are always ciliate.



Prasophyllum brachystachyum Lindl.

A--Typical specimen; B--Pollinia; C--Column (side view); D--Column (from front); E--Petal; F--Flower; G--Flower (side view); H--Characteristic bud. (Note definite gland-tipped lateral sepals in Figs. G, H.)

An amended description of P. brachystachyum Lindl.

A slender plant 9-12 cm high, closely allied morphologically to *P. rufum* R.Br., but is readily recognized by its short spike of larger, brighter red flowers, with the lateral sepals united at their base. Flowers 5-9 (in my specimens), green with purplish-brown markings or greenish-yellow with very deep purplish and crimson markings, with the lateral sepals sometimes almost wholly yellow (a colour given in the original description). *Dorsal sepal* cucullate, acute or acuminate; lateral sepals broad-lanceolate, connate at the base, sometimes with small green glands at the apices (apparent in bud-stage, disappearing at maturity in most flowers). *Petals* lanceolate-acuminate. *Labellum* articulate on a short basal projection of the column, thick and fleshy, lanceolate, curved, margins quite entire; callous part not prominently raised, but continuing to the tip, channelled from the base upwards, tip acute. *Column appendages* comparatively large, bifid. *Anthor joint* short.

Flowering: March, April, May

Distribution: Tasmania (Waterworks at Hobart; Kingston; Circular Head, embracing Stanley; Rocky Cape; Hampshire Hills).

MEISSNER OR MEISNER?

In the *Naturalist* for April, 1943 (LIX, p. 212), I discussed the spelling of the surname of Karl Friedrich Meisner, famous botanist of Basle, Switzerland (1800-1874) and concluded that it should be spelt with a single "s"—not with double "ss", as was done by Bentham, Mueller, and succeeding Australian botanists. Now, I am inclined to doubt that my case is so "clear-cut and unassailable" for a return to the single "s".

Mr. S. T. Blake, in a recent letter from the Brisbane Herbarium, says: "There is a footnote on page 1 of De Candolle's *Prodromus*, XV (1), which reads, '*Actore C. F. Meissner prof. Basil. (obus incorrecte Meisner)*.' This is surely proof enough that the double 's' is correct." I am afraid my previous searches through literature in this connection were superficial, since I missed Mr. Blake's reference and also failed to consult the obituary notice for Professor Meisner in the *Journal of Botany* (XII, 1874, p. 191), which begins thus: "Karl Friedrich Meisner, or, as he recently spelt his name, Meissner," etc.

Consultation of Meisner's first important publication, *Monographie Generis Polygoni Prodromus* (1826) discloses that he was then spelling his name with a single "s"; so apparently, as the *Journal of Botany* suggests, Meisner altered the spelling himself later in life—why, we shall probably never know. If anyone deliberately changes the spelling of his name, then I suppose that we have no choice but to perpetuate the emendation; so Meissner (with a second "s") must henceforth be adopted. No alteration to our Australian Census is involved, because this form was used by Bentham and Mueller.

J. H. WILLIS.

POMADERRIS MATERIAL URGENTLY NEEDED

Mr. N. A. Wakefield, State School, Cann River (via Orhost) writes: "I am anxious to obtain *Pomaderris* specimens (from anywhere in Australasia), dried or preferably fresh, and, if possible, at the stage where the flowers are just opening and also when the fruits are just mature. The Victorian material I need particularly is of *P. elachophylla*, *P. subrepanda*, *P. vacciniifolia*, *P. ledifolia* (so called) forms, *P. physicifolia* forms; and, otherwise, I would be most interested in any specimens collected in north-eastern New South Wales or Queensland."

NATURAL HISTORY OF A GHOST TOWN

By LIONEL GILBERT, Nabiac, N.S.W.

Australia, like most other countries, has its share of so-called "ghost towns"—places once famed for mining wealth, but now almost or wholly deserted. Such places, with their history, ruins and silence, have a fascination all their own.

About ten miles west of Gloucester, N.S.W., nestling in the mountains, is the small town of Copeland. Once it was a thriving gold-mining centre with some two thousand people seeking a living in the forest by mining for alluvial or reef gold, according to their means. Now, the pursuit of gold belongs mainly to the past—the thousands are gone, so have the eleven hotels, and of the hundred or so people who remain, few do much gold seeking.

In its prime, during the 'eighties and 'nineties, Copeland's fields poured out much gold, both in quartz and as the raw metal; but now, although pecuniary wealth may not be plentiful, there is abundant wealth still available to the naturalist. The town, with its one main street, is set amid beautiful surroundings. Very steep slopes rise on either side, and along the valley between are a pretty creek, the road and a few buildings, including a school erected in the late 'seventies. Farther up the slopes on either side, and up the creek-bed, is dense rain forest, while at the very tops of the slopes, where the soil is not so rich and the location more exposed, is hardwood forest. Of these two vegetational types the rain forest provides the more interest. It would seem that the settlement itself was built in an area cleared of the same dense vegetation which is now gradually regaining its lost ground.

Being close to the Barrington area, Copeland has periods of intense cold during winter, when snow feeds the Barrington River; it receives about 40 inches of rain a year, which favours the development of rain forests. One of the main occupations of the town's present-day population is the production of citrus fruit, and some very fine orchards are growing on the very steep slopes cleared of rain forest. Apples are produced on "the tops." Many of the lemon, orange and mandarin trees are very old—some perhaps 50 or 60 years—and are covered with lichens and climbing ferns (*Cyclophorus* sp.). Scattered among trees of the not-so-well-kept orchards grow *Cassia australis*, *Pimelea hystrix* (which the locals say is a good substitute for wine), *Halichryson albicans*, *H. bracteatum* and *Homalanthus populneus*. Around the edges of such orchards the rain forest slowly takes back its ground and engulfs the bordering trees. It is interesting to note that such trees, once surrounded by the forest, seem to bear sweeter fruit and are unaffected by such diseases as red scale. However, these trees do not bear as heavily as those still in the open.

The more valuable "softwoods" must have been very plentiful here once, for the last of the hotels to be demolished yielded weatherboards made of Red Cedar (*Cedrela australis*). Brown Beech is not so plentifully represented, but is present with Rosewood. To-day, hardwood is lumbered chiefly on "the tops"—woods like white mahogany, turpentine, blue gum, large-fruited grey gum, and others. It would seem that at least two beautiful Red Cedar trees at Copeland will not feel the axe—these are very conspicuous, because all round them has been cleared. In the early days they were used as hitching posts for horses, and the wood has now grown over numerous horse-shoes, nails, rings, etc., hammered into them long ago; it would be courting disaster to mill them!

All day long the sounds of bell-birds tinkle, while the lugger call of the whip-bird is almost as constant. From the close hardwood forest come the crying calls of koala bears as they are swayed to and fro in the trees. It would seem, too, that there is a bird which mimics the koala—possibly

the lyre-bird—because the "bears" are by no means plentiful, yet one often hears the crying sound from a number of different quarters, and these are by no means fixed, thus giving the impression that a bird, or birds, moves from place to place making the same sound as the marsupials. Other birds frequenting the rain forests are parrots of various kinds, flock pigeons (which come into the forests when brush figs are ripe), wonga pigeons and scrub turkeys.

Where the creek runs through rain forest the scene is very beautiful, and one morning a lyre-bird was seen making its way very hurriedly over staves in the creek-bed. It is never safe to wander far from any of the tracks in Copeland, whether through forest or in the more open areas, because of the vast number of abandoned diggings everywhere. Some are perpendicular shafts, now filled with water and snake-ridden; some are shallow excavations, others great depressions, while in places the edges of the road and tracks are undermined. These old diggings, when overgrown with lantana or vines (*Smilax*, *Mitis*, *Stephania*, etc.), are perfect traps, and there have been losses of stock because of them. Ticks and leeches at certain times of the year cause further difficulty.

Some very fine specimen trees are to be seen along the creek—a Brush Wilga (*Geijera salicifolia*), "Australian Frangipanni" (*Hymenosporum flavum*), Samppaper Pig (*Ficus stephanocarpa*), Brush Box (*Tristania conferta*), Red Cedar (*Cedrela australis*), and many others. Growing amongst stones along the water-course were many ferns—*Adiantum*, *Drosera*, *Athyrium* etc., and Gunjevoi Lilies (*Alocasia macrorrhiza*), with their great hastate leaves and greenish-yellow spathes. Stinging Trees (*Loportea gigas*) are also in evidence, while the usual great colonies of epiphytic orchids, such as *Dendrobium speciosum*, are abundant overhead. Most of the trees become overgrown with *Flagellaria indica*, *Geitonoplesium cymosum*, *Smilax australis*, *Clematis glychoides* or similar plants, and among the smaller terrestrials are great numbers of fungi and mosses. Only one colony of Mistletoe was seen, and this was *Loranthus conopseus*.

Some of the larger old shafts are most interesting—the forest is gradually closing in on these, with their great heaps of ore, twisted rails and upturned trucks nearby. One such shaft was a horizontal one leading into the mountain, and through this blew an icy blast along the damp tunnel. At the front were tons of ore glistening with iron pyrites. Apparently the reef gold in places was washed out during the course of time to become alluvial gold farther down the valley—even now careful investigation of the contents of cracks in stones of the creek-bed may yield a few grains after careful panning; lack of water is the main trouble.

At certain times of the year dingoes howl in their dozens around the old settlement, and there are a few foxes. Possums are not so plentiful as they used to be, nor are the small wallabies, but rabbits have taken control of cleared areas away from the rain forests.

White Cedars (*Melia azedarach*, var. *australasica*) have sometimes caused concern in many areas. The fruits are poisonous, yet are eaten by the Black Magpie. These birds often frequent pig pens, and either excrete or discharge the berries of white cedar in these pens, leaving them to be eaten by the pigs, which die very soon after. Children eating such berries have been made seriously ill. It would seem that magpies can consume the outer flesh of the fruit, but not the actual seed.

Copeland, with its charming scenery, provided the setting for the film *Hills of Hate* many years ago and, later, *Rangle River* was filmed in the vicinity, in any case, whether the elusive gold be re-discovered there in quantity or not, this little town with its memories and wealth in natural history can still provide one with delight and I recommend it to all nature lovers. In conclusion, I should like to acknowledge valuable assistance obtained from Mr. Jack Bitney of Nahiac.

THE CLASSIFICATION AND DISTRIBUTION OF BUTTERFLIES

By A. N. BURNS, National Museum, Melbourne.

Position in the Animal Kingdom

Phylum: *Arthropoda* (Jointed moving bodies).

Class: *Insecta*.

Subclass: *Apterygota* (incl. *Thysanura*, *Protrura*, *Collembola*).

Subclass: *Pterygota*.

Order: *Lepidoptera*. Sub-Order: *Heteroptera* (Moths).

Sub-Order: *Rhopalocera* (Butterflies).

Families of Rhopalocera:

- (1) *Papilionidae*. Swallow Tails.
- (2) *Pieridae*. Whites and Yellows.
- (3) *Danaidae*. Danaids.
- (4) *Nymphalidae*. Nymphs.
- (5) *Satyridae*. Browns.
- (6) *Erycinidae*. Erycinids.
- (7) *Amathusidae*. Owls.
- (8) *Lycenidae*. Blue, Coppers and Hairstreaks.
- (9) *Hesperiidae*. Skippers and Darters.

Typical Life Histories

Papilionidae: Egg usually round, deposited singly. Larva, usually larger at anterior end, often with fleshy spines. Pupa, attached by tail and central girdle.

Pieridae: Eggs often laid in groups, higher than broad. Larva may or may not be gregarious, cylindrical, usually with scattered fine hairs. Pupa, attached by tail and central girdle.

Danaidae: Egg rounded, laid singly. Larva, with long fleshy filaments, body striped. Pupa, suspended by tail, often metallic in colour.

Nymphalidae: Egg rounded, ribbed, laid singly. Larva, cylindrical, with numerous branched spines, rarely gregarious. Pupa, often spiny, suspended by tail.

Satyridae: Egg rounded, laid singly. Larva, cylindrical, head and tail bifid, body surface rough. Pupa, usually green or brown, suspended by tail.

Erycinidae: Life history not known.

Amathusidae: Life history not definitely known.

Lycenidae: Egg laid singly or in groups, rounded and ribbed or pitted. Larva, flat, slug-like, deeply segmented, possesses secretor glands at anal extremity which exude sweet substance so that larvae are often attended by ants, may even occur in ants' nests. Feed by night and hide during day. Pupa, attached by tail and central girdle, without prominences, sometimes also attended by ants.

Hesperiidae: Egg large and round, may be smooth or ribbed. Larva, cylindrical, usually smooth or with very fine hairs; shelters within folded leaves which it draws together with silk. Pupa, long, with a "cap" or operculum; attached by tail, in some also with a central girdle, and found in similar situations as the larva.

Distribution of Butterflies

Most Australian species occur within the coastal belt, the number increasing as one goes farther north. A few species are alpine only, others frequent the dry interior, several are essentially coastal. Forest and jungle country harbour by far the greatest number. In Victoria there are nearly 100 species, and in Australia (with subspecies) over 400. Males often resort to hilltops or open glades; females may be found only near the food plant. There may be a single brood, or several during the year. A species in Queensland, which also occurs in Victoria, may have two or even three broods in the northern State but only one in Victoria. Many species, however, have a definite spring and autumn brood.

"EDIBLE PLANTS IN NORTH QUEENSLAND"

A brochure under the above title is a very valuable recent addition to our scanty knowledge of the economic properties of Australian plants. The authors, Club member Dr. H. Flecker, C. B. and S. E. Stephens, well known members of the North Queensland Naturalists' Club, state that much of their information has been "collected from aboriginal inhabitants of the area and confirmed by trial." (We are relieved, for the authors' sake, that each recipe was "confirmed"!)

A list of 295 plants is divided into six sections, the contents of each being arranged systematically under families. The sections are:

1. One hundred and fifty-eight plants known to the authors to be edible without any treatment, or with only simple cooking.
2. Plants known to the authors to be edible after preparation such as soaking, roasting and pounding. [Surely not "soasting, pounding and washing" as mentioned, in that order, by the authors.]
3. Plants known to be eaten in times of famine. These contain unmentioned poisonous principles removed by the afore-mentioned treatment.
4. Plants reported to be edible, but of which the authors have had no experience.
5. Edible plants commonly cultivated and often found wild in the tropics, such as sugar-cane, tomato, taro, sweet potato, various beans, rice, etc.
6. Plants reported edible by other authorities, but known to the authors as poisonous (the Finger Cherry has been known to cause blindness).

Until recently, India was almost self-supporting in food, but has now practically ceased exporting and become an importer. Since a dangerous position is developing in world food production, any information on such problems is of value.

Priced at 2/-, the brochure contains twenty pages of considerable interest to members, and is obtainable from Mr. J. Wyer, "Lochinvar," 253 Sheridan Street, Cairns, North Queensland.

P. K. MORRIS.

JUNIOR EXCURSION TO KEILOR

On Saturday, June 19, seventy members and friends were conveyed in ten cars and Mr. Fisch's truck to Keilor, where lunch was enjoyed at Arundel Bridge before journeying to the caves. Thereafter the Juniors, armed with hammers and picks, found some interesting fossils, including lamp-shells and sea-urchins. Earlier they had examined a colony of mud wasps.

M. E. FREAME, Hon. Sec., Hawthorn Junior F.N.C.

BAG-MOTHS ATTACKED BY SHRIKE-TITS

It is commonly concluded that caterpillars of the bag- or case-moth do not move about during mid-winter. My observations, however, fail to bear out that supposition. The first week in July, 1943, was singularly cold and gusty, yet in my garden at Toorak, Victoria, I had ample evidence of the ability of the caterpillars to travel freely. On one occasion I transposed a case of Saunders' Bag-moth, at the three-year-old stage, from a *Crataegus* to a *Coprosma*, a distance of some five feet or more. The following day I observed that the caterpillar had returned to its original position on the *Crataegus*, at a height of, say, six feet. A two-year caterpillar has moved its case several feet higher on a leafless crab-apple tree. There is, therefore, no doubt of the ability of the caterpillars to change their position even in the coldest Melbourne winter.

It was interesting to see the Eastern Shrike-Tit (*Falcunculus frontatus*) attempting to extract the caterpillars from their cases during the same month. A pair of these birds made very determined efforts for nearly an hour to peck the cases to pieces. The snap of their beaks could be heard for some distance, but while I could not tell whether or not they were successful, I could see that the lower end of one case was open, and if the caterpillar was injured by the onslaught of the birds, it would fall to the bottom of the case, whence it could easily be extracted by the bird's beak.

On a more recent morning, two Shrike-Tits attacked two "Bags" on my *Prunus* tree. These three-year-old moths were the survivors of a hatching in my garden during the spring of 1945, and I had them under observation, hoping to see another hatching this year. The Shrike-Tits attacked vigorously for nearly an hour and then flew away. When I examined the Bags, I found that they were frayed and split down one side and that the caterpillars had "flown" away with the birds.

LYNETTE YOUNG.

MYSTERY WINTER WALK

On Saturday, June 26, a full bus-load of members attended the outing to the State Forest Reserve at Tonimbuk (north of Tynong) and enjoyed a delightful walk in showery conditions for about six miles.

Although the forest had been repeatedly burnt and the timber extensively milled, many relics of former forest "giants" remained. Mountain Grey Gum (*E. goniacalyx*) was the dominant tree, mingling variously with *E. obliqua*, *E. scabra*, *E. taminialis*, *E. dives* and *E. radiata*, while *E. cephalocarpa* was more at home on swampy ground.

Where the forest cover was light, *Pultenaca angustifolia*, *P. scabra*, *P. Goumii*, *P. juniperina* and *Banksia collina* had grown profusely and in such a delightful "garden" that the party was sorry it was not springtime.

The Rosy Heath-myrtle, just showing flowers on the northern slopes of Mt. Towt, preferred the edge of the road cutting.

This district is notable for the widespread occurrence of the otherwise very localized *Pultenaca Weindorferi*, found at its best along Snell's Road and also as the westward record of *Acacia botrycephala*, of which but a single plant was noticed.

Acacias were represented by twelve species while, surprisingly, only occasional orchid plants were seen, without flowers.

Smaller birds were fairly plentiful, being particularly gregarious in one flowering eucalypt and a pair of Wedge-tailed Eagles were seen soaring as the party "de-bussed".

COLIN F. LEWIS.

WHAT, WHERE AND WHEN**General Excursions:**

Saturday, September 31—Botanic Gardens. Subject: "Australian Trees, Spring" (third of series for beginners and visitors). Leader: Mr. P. Bibby. Meet at main gate ("F"), at Herbarium entrance to Gardens, 2.30 p.m.

Saturday, September 18—Vaughan. Subject: "Fairy Waxflower." Leader: Mr. Ivo C. Hammet. Calderwood's parlour coach leaves Batman Avenue 8.30 a.m. 180-mile trip. Arrive Vaughan, via Daylesford, for picnic lunch; botanic walk through area; rejoin coach at Fryerstown; tea before 5 p.m., when coach leaves on return via Chewton and Kyneton. Bring two meals. Reserved seat preliminary bookings, 17/6 return, must be confirmed on or before Sept. 13 with Mr. H. Stewart, 14 Bay-view Terrace, Ascot Vale (Tel. FU 022, Ext. 457), otherwise bookings cancelled. Six seats available for junior members at 10/- return.

Sunday, September 26—Kalarana. Subject: "Elementary Botany for Juniors and Beginners." Leader: Mr. Frank Child. Train from Flinders Street 9.15 a.m. to Croydon, thence bus to Montrose; leader will meet party at "Old Mountain Road," Montrose. Bring two meals.

Thursday, September 30 to Sunday, October 3—Four-day excursion to Rushworth. Subject: "Botanical and General Nature Survey of District." Leader: Mr. J. Ros Garnet. Bus will leave Spencer Street (opposite M. & M.B.W.) at 9.15 a.m. Accommodation has been arranged.

Saturday, October 2—Montrose to Mt. Evelyn. Subjects: General Flowering Plants and Birds of Area. Leader: Mr. T. S. Hart, M.A. Train from Flinders Street 10.10 a.m. to Croydon, thence service bus to Montrose, walk to Mt. Evelyn reserve. Bring two meals.

Saturday, October 9—Plenty Gorge. Invitation to all members by Geology and Botany Groups, who will act as leaders. Train 9.5 a.m. from Princes Bridge to South Morang; change at Thomastown (or 1.20 p.m. from Spencer Street). Locality has a special botanical interest. Bring two meals.

Special Announcement:

October 19 to 21 (Tuesday to Thursday inclusive)—Three-day Australian Nature Exhibition at Hawthorn Town Hall. Active assistance of every member desired to ensure success of Exhibition. Director Mr. A. J. Swaby (Tel. XW 2559), 17 Avondale Street, Hampton.

Group Fixtures:

Saturday, September 18—Botany Group excursion. Particulars at Group monthly meeting.

Monday, September 27—Botany Group. Royal Society's Hall, 8 p.m. Subject: "Isolated Communities and Steppe Flora" (or alternative subject by arrangement).

Friday, October 1—Marine Biology Group. Royal Society's Hall, 7.45 p.m. Particulars from Hon. Sec. of Group, Miss W. Taylor, 13 Jolimont Square, Jolimont, C.2 (or from Tel. WA 2379).

Tuesday, October 5—Geology Group. Royal Society's Hall, 8 p.m. Subject: Preliminary to a Review of the Melbourne District Geology.

Thursday, October 7—Wildflower Garden Group. Royal Society's Hall 8 p.m. New members cordially invited to join.

A. A. BAKER,

Excursion Secretary,

53 Carlisle St., Preston, N.18.

The Victorian Naturalist

Vol. 65.—No. 6

OCTOBER 7, 1948

No. 778

PROCEEDINGS

The monthly meeting of the Club was held at the National Herbarium on Monday, September 13, 1948. The President, Mr. J. Ros Garnet, and more than 200 members attended. Apologies for non-attendance were received from Miss Ina Watson, Miss M. L. Wigan, Mr. and Mrs. E. S. Hanks, Mr. P. Crosbie Morrison, Miss Florence Smith and Mrs. Cochrane, all of whom were attending the R.A.O.U. Conference in Western Australia.

The President drew attention to Mrs. Blanche E. Miller's recent death, and members stood in silence for a moment as a mark of respect to her memory.

It was announced that the Gould League is shortly to publish a booklet of 32 pages (price 6d.) and the Hon. Secretary of the League has offered to reserve a number of these for F.N.C. members.

The Rev. H. M. R. Rupp from Northbridge, N.S.W., Mr. Noel Learmonth from Portland and Mr. H. Best were cordially welcomed to the meeting.

Mr. Swaby spoke regarding the Show during October, and again appealed for helpers. The President announced the resignation of Mr. A. Baker as Secretary of the Excursions Committee; Mr. H. C. E. Stewart would act as Secretary for the time being, but it was intended to form a larger Committee than previously in order to spread the work. Several members had offered assistance.

The following were elected as Ordinary Members: Mrs. E. K. Lording and Mrs. Anne Macky; and as Interstate Member: Mr. John Young.

The following nominations for membership were received—Ordinary: Mr. Tarlton Rayment, 8 Bath St., Sandringham, S.8; Mr. T. E. George, 17 Ashley St., Reservoir, N.19, and Mr. A. H. Bradfield, 83 Kent St., Ascot Vale. Country: Mr. B. B. Given, Box 305 P.O., Hamilton, Vic.

NATURE NOTES

The President reported having received from a correspondent the interesting news that wombats were still to be seen at Wattle Park.

Miss Adams had heard a Tawny Frogmouth calling at about 11 p.m. from a Moreton Bay Fig-tree in Charnwood Grove, St. Kilda.

"GREEN GOLD"

The principal subject for the evening was the screening of a recent Forests Commission film under the above title. This portrayed, in natural colour, the various branches of the Commission's activity—mountain road-making, fire-fighting, re-forestation, work at the Creswick training school, etc. It was followed with great interest by members, and a hearty vote of thanks was accorded the Commission through Mr. Mervyn Bill, who introduced and supervised this excellent film (moved by Mr. J. H. Willis, seconded by Dr. M. Chattaway).

MUELLER COMMEMORATIVE STAMP

On this very day, a special postage stamp commemorating Baron von Mueller's life and work had been issued by the Postmaster-General, and, in honour of the Baron, his friends Mr. H. Best and Rev. H. M. R. Rupp had been invited to address the meeting.

Mr. Best had first heard of the Baron in 1874, while at school in Germany; but it was not until 1887 that he met the great scientist in Melbourne, when Baron von Mueller was elected to the Committee of the German Club. Mr. Best spoke of the Baron's kindness—not only in material things, but also in giving generously of his time, knowledge and spiritual help. He gave intimate details of the botanist's declining years, which were too often saddened with official difficulties, and, with a savouring of humour, showed us "Mueller, the Man."

Rev. Rupp told us how his first meeting with Baron von Mueller went back to 1892, when he was a University undergraduate. He had a letter of introduction to the Baron from the Rev. J. Bracebridge Wilson, and was overwhelmed with the help and encouragement received. The Baron did an immense amount of work, writing in English, German, French or Latin, and was never tired of extolling the glories of our Australian flora.

EXHIBITS

Mr. H. Stewart: *Ophioglossum coriaceum*, "Adders-tongue," from Huntly North (near Bendigo).

Mr. K. Atkins: Plants in bloom from Botanic Gardens—*Acacia cyanophylla*, *A. pulchella*, *A. verniciflua*, *Bauera sessiliflora*, *Commersonia Praseri*, *Glochidion Ferdinandii* (foliage), *Micromyrtus ciliatus*, *Pittosporum bicolor*, *Pomaderris elliptica* and *Pultenaea daphnoides*.

Mr. H. P. Dickens: Twenty specimens of Ferns collected by John Barker, 1858.

Messrs. C. French and R. Bury: 15 native plants cultivated in Maranoa Gardens.

Mr. R. S. Savage: *McLalena "pseudo-incana"*, *Boronia "lutea"*, *Pultenaea stricta*.

Mr. C. J. Gabriel: Series of opercula, with corresponding shells, from various localities, including—*Polinices didymus* Chem. (Vic.), *P. conicus* Lam. (Vic.), *Turbo petiolatus* Sby. (Qld.), *Turbo jordani* Kiefer (W. Aust.) and *Rostellaria delicatula* Nevill (Persian Gulf).

Mr. Alan N. Carter: Mutton-fish shells—*Haliotis australis*, Gmel. (N.Z.), *H. virginea* Gmel. (N.Z.), *H. iris* Martyn (N.Z.), *H. cyclobates* Peron (S.A.), *H. narvosa improbula* Iredale (S.A.), *H. asinina* Linne (Qld.) and *H. scalaris* Leach (W.A.).

Mr. R. C. Kershaw: Specimens of land shells, including—*Achatina acuta* Fer. (Mauritius), *A. zebra* Chem. (Sth. Africa), *Thersites semicastanea* Pir. (New Britain), *T. silvani* Pet. (Solomons), *Pythia albovaricosus* Pir. (Solomons), *Auricula midae* Linne (Nth. Australia), *Bulinus decollatus* (Bermuda), *Papuina boivini* Pet. (Solomons), *Paryphanta atramentaria* Shutt. (Lorne, Vic.) and *P. compacta* Cox and Hedley (Lorne, Vic.).

Mr. J. H. Willis (on behalf of National Herbarium): Various relics of Baron von Mueller, including the Certificates of Knighthood (K.C.M.G.), Barony (Württemberg), and Legion of Honour (France), the Clarke Medal, Box-wood printing blocks, early personal notebooks, and sundry photographs.

Mr. H. Best: Sculptured bronze tankard from Munich, bearing the following inscription—"Von M. F. Bahse an Baron Mueller, April 1889."

Mr. G. M. Bryning: Four- and five-leaved clovers,

BRITISH NATIVE FLOWERING PLANTS

(A Review)

From the earliest times when the first herbals were formulated, until today, the number and scope of works on the botany of Great Britain have been legion. Yet, strangely, no complete sequence of illustrations (uniformly treated and with appropriate dissections) of the British flora is known to us. Consequently, Stella Ross-Craig, F.L.S., of the Herbarium, Royal Botanic Gardens, Kew, has set out to provide a standard set of line drawings of all the accepted native plants of the British Isles—a formidable venture when more than 1,500 species have to be considered. The first two parts of this work, which will take several years to complete, have just been issued by the publishers, G. Bell and Sons Ltd., London, under the title *Drawings of British Plants*. Part I comprises 39 examples of *Ranunculaceae*, and Part II illustrates *Berberidaceae*, *Papaveraceae*, and *Fumariaceae*, represented by 22 plates.

Miss Ross-Craig's graphic skill is of a high order, combining a judicious blend of artistic perception with accurate observation and delineation of the subject treated. The structural parts are so clearly shown that descriptions are superfluous. Where warranted, many plants have their underground parts outlined, whilst aquatic subjects, for example the several Crowfoots and Water-lilies, are deftly figured with the addition of a few lines to leave no doubt as to their habitat. Moreover, subtle specific differences of such plants as *Thalictrum* (the Meadow Rues) and *Fumaria*, are made so plain in the drawings that one does not need to wade laboriously through any detailed verbiage.

Australians will recognize some species that have been introduced and cultivated here, others have become escapees or even pests. The very first illustration, the familiar and much-loved "Traveller's Joy" (*Clematis vitalba*), expresses a happy augury for the quality we can expect from Stella Ross-Craig, in the large number of plants she has essayed to figure.

In a foreword, Sir Edward Salisbury, F.R.S., Director of the Royal Botanic Gardens, Kew, avers that: "A flora is never completely definitive, and from time to time the need arises for a new survey embracing the accretions of the years. The flora of Britain, like its people, is not the product of a single event, but of a process continuing in the present as in the past, though varying in degree with time."

The eventual acquisition of the complete parts of these plant drawings will form a valuable iconographical adjunct to the F.N.C. library.

H. C. E. STEWART.

FERDINAND VON MUELLER, THE MAN

(An Address at the F.N.C. Meeting, September 13, 1948, to mark the appearance—that day—of the Mueller Commemorative Postage Stamp)

By H. BEST, St. Kilda

The task I have set myself is not to present to you Baron von Mueller, the Scientist, for that has often been done before and by much abler men than myself; but Baron von Mueller, the Man.

Elbert Hubbard, the American philosopher, said: "It is a fine thing to be a great scientist, but finer still to be a great man." And, in my humble opinion, the Baron *was* a great man—great, kind, generous, simple and essentially human. To word-paint him for you, as I would like you to see him, I would need to have at my command the oratory of a Demosthenes, the flowery speech of an Alfred Deakin (or the easy-flowing descriptive language of a Crosbie Morrison)—and I don't think any of us have forgotten the lovely address Mr. J. H. Willis delivered before the Club on November 10, last year.



The Mueller Commemorative Stamp

The first time I heard of Mueller was in 1874 in Germany, when, as an eleven-year-old schoolboy in a lesson on botany, I listened to our teacher mention Dr. Ferdinand Mueller, the eminent botanist who was doing such wonderful work in that far-off wonderful country, Australia. For, even at that time, Baron von Mueller was well known all over the old world as a botanist of note. Let me quote from a German paper of the time:

In 1847 Mueller arrived in Australia and at once revelled in the idea to explore the Australian flora. Without waiting for Government assistance, he began exploring the greatest part of South Australia—1847-52. After travelling thousands of miles he came to Victoria, where the then Governor, La Trobe, appointed him Government Botanist. In 1855-56, with Gregory and others, but this time assisted by the Government, he explored the greater part of North-Western Australia and into parts never before trodden by white men. In 1857 he was appointed Director of the Botanic Gardens in Melbourne. As such, he founded a Museum, into which he incorporated the extensive collection of his plants. He also, mostly of his own means, started a Botanical Library, spending also much of his time in introducing useful trees and flowers into Australia. The colony also has to thank him for a most valuable

collection of oils, gummata, paper trials of indigenous plants, resins, etc. etc. Also, as author, he made a name for himself. We have before us seven volumes of the *Fragmenta Phytographiæ Australiæ*, 1858-1871. Besides these, he wrote two volumes on the Australian flora, profusely illustrated.

But really admirable energy he displayed in the collection of material for that great work, *Flora Australiensis*, of which so far six to seven volumes have been published by Bentham, in collaboration with Dr. Mueller. Honour to such indefatigable endeavours!

[*Horticultural Lexikon*, 1874.]

Little did I think, at that time, that I was ever to become a citizen of this (to me) mysterious country where, we were told, the trees shed their bark instead of leaves, where all the animals carried their young in pouches, where the many multi-coloured birds were absolutely without song, and so forth. Little did I think that I was ever to become personally acquainted with this so much admired man—that, in years to come in Melbourne, I was to be honoured with the task of proposing the toast at his 70th birthday. But it came to pass. Again, I quote from a contemporary paper:

The hall of the Turn Verein was the scene of a very pleasant gathering yesterday, when the members entertained Baron von Mueller in student fashion at a "commers" night. The chair was occupied by Herr W. Wiesbaden, president of the society, and among the guests were the German consul, Mr. Brahe, and Mr. Pantou, P.M. In the course of the evening an interesting programme of vocal and instrumental music was rendered by the orchestra and liedertafel of the society; but the event of the occasion was the presentation to Baron von Mueller of a splendidly framed and illuminated address, in which happy allusion was made to the consistent friendship which the Baron had displayed to the society during the past quarter of a century, to his efforts in the cause of the German community, and to his distinguished position in the world of science. His health was then proposed by Herr Heinrich Best, and drunk with students' honours. In the course of his reply, Baron von Mueller referred to the compliment paid him as an honour beyond his deserts, and said that among other honours which had been showered upon him was his election as a member of the Institute of France. It was sad to reflect that the late M. Pasteur had been one of the warmest supporters of his election. The health of the president was also honoured, and after other toasts the gathering dispersed.

The large Turn Verein Hall was crowded out; many of Melbourne's notabilities were present—and I must admit I felt very proud of myself that night. In his reply to the toast, the Baron referred to many interesting episodes of his eventful travellings all over Australia, and laid great stress upon the fact that he was elected a Member of the Pasteur Institute—a much coveted honour by scientists—and that the great Pasteur himself had nominated him.

The first time I met the Baron personally was at a Smoke Night of the now defunct Turn Verein, German Gymnastic Club, late

in '87. when I was introduced to him as the latest addition to the Committee. Shortly after that I was deputed by my Committee to interview the Baron regarding a Christmas tree, and this led to my first visit to the Baron's humble home in Arnold Street, South Yarra. The forerunner of many others, this visit, at first, was not looked upon with much favour by the Baron's factotum, George, or, as the Baron called him, "Shorshe." But it was not very long ere I was received with a smile and the aside, "I'll have a nice cup of coffee ready before you go, Sir!" As he confided later on to me, "I thought you also were one of those people who come often, bring nothing and take a lot away." I felt flattered!

The Baron's wants were very simple, very simple indeed. He thought of nothing else but his Department and his beloved science. He paid very little attention to his personal appearance. His dress-suit was a particular headache to "Shorshe." It was dyed, it was turned and dyed again; "Shorshe" had to remove spots and brush it until it was practically threadbare. "Look at this," he said one day to me, "isn't it awful! And the Master says he can't afford a new one."

The Baron was just as kindhearted as he was great: nobody ever came to his door that he did not leave without moral or material help. His generosity was made use of by many unscrupulous persons, also by others who should have known better. He often showed me complainingly some guinea or half-guinea tickets left with him by fashionable ladies for disposal—"Oh, the dear old Baron will get rid of them for us!" I shocked the Baron one day when I said to him, and I fear with an unparliamentary adjective or two, "Why don't you send them back!" "But, my dear Mr. Best, I could not possibly do that"—and here the ever-present fear of losing his position showed itself unmistakably—"it might offend the ladies and they might use their influence to harm me in my, as you know, precarious position." This constant fear, in fact an obsession, dangled like the Sword of Damocles over my charming old friend's head, causing him many a bitter hour. One can read it in letters to me—letters and some relics that I placed in the hands of the Herbarium authorities several years ago.

Being well acquainted at the time with Mr. George Turner, M.L.A., later Sir George, I mentioned to him one day the Baron's worries; he said, "You can tell the dear old chap from me that his position is as safe as the Bank of England." This assurance seemed like sunshine to the Baron: but his mind was soon clouded over again by Departmental worries, of which he had more than enough, and slowly, relentlessly his physical health was also undermined.

Subjects we often discussed were the badly managed and much neglected Forestry Department, the deplorable devastation of

timberlands, the lack of effective water conservation, and so on. On one of these occasions, he rose, went into his library and came back with a volume of Alexander von Humboldt's *Cosmos* in his hand. Turning a few leaves and finding what he wanted, he said, "Now listen to what this eminent naturalist had to say in 1848, after his three years voyaging all over the world—'Men of all climes seem bent to bring down upon their descendants two calamities at once, the want of fuel and the want of water, through the wholesale destruction of forests.'" "In spite of all my preaching," the Baron continued, "this deplorable habit has taken root here, too, and my dear Australian friends seem to be bent on learning by the hard road." He ended up by saying, "In the old European countries, it has been found that one-fifth of the country must be forest, in order to ensure the best climatic conditions." In a little work by Ellwood Cooper, *Forest Culture and Eucalyptus Trees* (practically the work of the Baron himself), is an excellent article dealing with this very question. Asking him one day something about *Sequoia gigantea*, I was presented, much to my delight, with an autographed copy of this same little book.

Another favourite theme of Mueller's was the planting of a timber-belt as breakwind across the exposed Werribee plains, but nothing came of it.

As far as I know, the Baron was master of several languages, including English, German, French, Latin and Danish. English he spoke with a highly pronounced German accent. He was a corresponding member of an amazingly large number of scientific bodies all over the world, and his actual correspondence was enormous—some 3000 letters a year.

One Saturday afternoon I called on him. It was a European mail day and there was a big pile of parcels and letters. The Baron had just started opening them when he said, "My dear Mr. Best, there are two or three letters that must have immediate attention, so I will ask you to excuse me for a quarter of an hour or twenty minutes." I wanted to leave, but he would not hear of it; so I settled myself comfortably with a book and a smoke, knowing full well that he would quite forget me for a while. But, when that short "quarter of an hour" had grown into nearly two hours, I thought it time to let him know that I was still in the house. I got up, coughed—the Baron turned quickly around with, "Oh, my dear Mr. Best, a thousand pardons, I had quite forgotten you." The usual cup of coffee was ordered and, before leaving, I glanced at the number of letters written; there were some twenty of them. I marvelled. His letters, as a rule, were as short as his speeches were long. He had the gift of saying a lot in a few short sentences. He also had a marvellous memory. I had proof of this on various occasions. He asked me once to get him a book from his library. I found it almost in the very spot he had indi-

cated, while the heavy dust was certain proof that it had not been handled for months, perhaps years.

His hour-long, noteless speeches and lectures are also proof of this assertion. His lectures were often embellished with suitable quotations from well-known poets.

Many people thought the Baron vain. I am not quite sure on this point; but I am certain that he was very, very jealous of his reputation as a scientist, and received a profound shock when he was rudely deprived of the Directorship of the Botanic Gardens in June 1873. If this can be put down to vanity, *volens-volens*, I have to admit it. The loss of the Directorship was a terrible blow to his sensitive nature. He thought it a grave injustice—painful to him even after twenty years. It was in '93, in a thoughtless moment, that I referred to it; if I were to live for another 100 years, I never could forget the anguished picture my foolishness had conjured up. The Baron stared at me for a few moments, then sank back in his chair, sobbing as if his heart would break. Saying things to myself—things I could not say in a Sunday School—I quietly left. I don't think he noticed me going, and I never dared mention the Gardens again.

As a counter to this sad happening, and the only time I really saw the Baron laugh heartily, was when he related the following incident to me. "On Thursday last, I was at a Government House Party; during a conversation with some ladies, one of them suddenly said, 'My dear Baron, I think you should marry.' Quite surprised, I said, 'But, my dear Madam, I wonder if a lady could be found to honour me with her hand.' 'You leave that to me,' she replied. 'I know better.' 'Well, this is very flattering to me, but, my dear Madam, *have* you considered my position? I am a Baron and a Baroness would need to give house-parties, dinner-parties and such-like. My humble home and meagre salary would never permit that sort of thing. But, on the other hand, if you could find a lady so inclined, with, say, £2000 a year as dowry, I might give it consideration.'" Still chuckling, he ended up by saying, "I don't think I'll hear any more about this marriage business."

Now we come to the second week of October 1896, when the sad news spread over Melbourne, and the country in general—Baron von Mueller seriously ill, not expected to live! His friends and admirers were dumbfounded—it all came so suddenly. I called at Arnold Street, but the Baron was too ill, nobody was allowed to see him.

October 10 announced the death of this distinguished and beloved scientist—apoplexy had suddenly ended the glorious life of one of the finest characters that ever graced this land of ours.

A few days afterwards large numbers of mourners assembled at Arnold Street to pay their last respects to the departed scientist.

The cortege wended its way along St. Kilda Road, Wellington Street, and Dandenong Road to the St. Kilda Cemetery. The *Turn Verein* Orchestra headed the funeral procession, playing at intervals the "Dead March in Saul," whilst large numbers of mourners followed the hearse on foot and in vehicles of various kinds.

At the graveside some fine orations were delivered, the final sentence in one of which impressed me deeply—"Today, we buried a good man; to many, he was more." What a wealth of meaning in those few simple words. Yes, to many he *was* more. His great, kind heart beat for the world, and his beloved Australia in particular.

That day closed the chapter, as Mary Carr said in that fine article which appeared last year in the *Sun* newspaper (April 12). That day the grave closed over all that was earthly of the kindest of men, a "mental giant with the heart of a child."

Now the question arose—a suitable Memorial to the memory of this extraordinary man. A Committee was formed, "The Baron von Mueller Grave Monument Fund." It was decided to raise £500 for the purpose. The three executive officers were the late scientist, Sir Baldwin Spencer, late Mr. W. Wiesbaden (President of the *Turn Verein*) and myself. We called for donations which, at first, rolled in very nicely, but gradually fell away to nothing. After about three years' hard collecting, we had some £400 at our disposal. It so happened, at that time, that a prominent footballer broke his leg and in a little over three months more than £600 was found for his injury. That nettled us! A letter was written to the Press in which great stress was laid on the fact that it seemed our community admired brawn more than brain. The Government came to our aid, raising the sum to the desired £500. The result is the Monument as it now stands in the St. Kilda Cemetery, to the Memory of a really great man.

Virtute Ingenioque Valemus!

BIRD BOGEYS

In order to save a few figs for the family I hung some "Wedge-tailed Eagles" on long poles, and attached them to the tree. They were made of large fungi (*Boletus portentosus*, of which there are many in the garden every year) with moulted fowls' feathers stuck into them. Not a bird went near the figs for some weeks. Then it rained heavily and the "eagles" wore a bedraggled look. Yet still, a sparrow was the only bird who braved them. The apricots were saved by the tall cobweb brush and a nucraft model of "Horatio," David Fleay's Wedge-tailed Eagle.

I recently moved the "eagles" to a Sturmer apple tree which, being near the back door, is always the last to be attacked; but, like all my bogeys, and they are legion, the "eagles" are now flouted. Do birds remember? We shall see next year when I set up more "eagles."

E.C.

INTERESTING MOVEMENT IN SCENTED ALOCASIA, A. ODORA (Roxb.) C. Koch, 1854

[Syns. *Arum odoratum* Roxb., *Colocasia odora* Hort.]

By EDITH COLEMAN, Blackburni, Vic.

Some of the most interesting of all plant movements are related to pollination, and one of the most curious is seen in the Scented Alocasia (*A. odora*) of tropical Himalaya, Formosa and the Philippines, a member of the *Araceae*.

In the White Arum (*Zantedeschia aethiopica*) pollination is effected in an orthodox manner by hive bees which visit the orange-coloured spadix for abundant pollen (*Vict. Nat.*, Jan. 1937). In the two common "Wake-robins" (*Arum maculatum* and *A. italicum*) it is brought about by small winged insects which are trapped in the spathe, and released after a short period (*Vict. Nat.*, Feb. 1937). In the small Corsican Arum (*Arisarum vulgare*) the adaptation is for insect pollination; but, as the species appears to be infertile in my garden, I assume that its "official" pollinator has not been introduced.

Although flesh flies are attracted to the handsome Black-arum (*Dracunculus vulgaris*), they do not appear to pollinate the flowers; but, as two or more spikes have so rarely been in flower at the one period, I write with no certainty on this point. Its odour is not nearly so objectionable as that of *Arum dracunculus*, which makes its presence known from afar. Hosts of carrion flies flock to the source of that intolerable odour. They deposit eggs on the spadix which do not hatch out. This Arum has a dark red velvety spathe, up to 25 inches in length, with crenate margins. It is really a handsome thing, but, "handsome is as handsome does."

There can be few plants that emit such an offensive odour—almost as evil as that of the Hairy or Dead-horse Arum (*Heli-codictyon crinitum*) so feelingly described by E. A. Bowles:

The most femish plant I know, the sort of thing that Beelzebub might pluck to make a bouquet for his mother-in-law—a mingling of unwholesome greens, purples and pallid pinks, the livery of putrescence, in fact. And it possesses an odour to match the colouring. It only exhales its stench for a few hours after opening, and during that time it is better to stand far off and look at it through the telescope.

But the handsome *Arum dracunculus* remains offensive for several days. Long after the spathe had been cut, measured and examined under the microscope, the spadix still called, offensively, for visitors.

The eggs of flies attracted to the Hairy Arum do hatch out, to starve in the absence of flesh food. (Those deposited on my beautiful but odorous *Stapelias* dry up—useless to both plants and insects.) There appears to be no benefit to the flies in any

of these evil-smelling Arums, although they may cross-pollinate a few flowers in going from spathe to spathe.

Three other lurid Arums have set no seed in my garden. In the Snake-lily (*A. cornutum*) the spadix elongates into snake-like form, bursting from the spathe at an early stage to lie on the ground in realistic snake fashion.

In the Lizard-arum (*Sauronutum guttatum*) and Devil's-tongue (*Amorphophallus Rivieri*) the handsome pellate leaves appear after the flowers. I have seen no insects visiting these.

It is pleasant to turn to a sweetly scented Arum, the "Scented Alocasia" (*Alocasia odora*). It is in the spathe of this that a remarkable movement is seen which must have an important bearing on pollination. The female flowers, which, as in other Arums, are on the lowest part of the spadix, mature first. After a certain period during which they should have been pollinated, the spathe closes in at its constricted part and, twelve hours later, has formed a collar or shelf above the now fully enclosed female flowers.

Two hours after this the male flowers above the collar commence to shed pollen—only to fall on the "shelf." Were such large quantities to fall on the female flowers, even if un-pollinated, they would become clogged, and in the closed cylinder would probably become moist, and decay. Lodged on the shelf it remains dry and is readily picked up by insects which still respond to the sweet perfume, and will be carried to female flowers on a younger spadix where the spathe has not yet closed in to form a barrier. The pollen falls as dry dust; but, under the microscope, it is seen to lie in chains and small masses of bead-like grains which, having an adhesive exine, cling together.

Unlike those of other Arums, the spathe becomes rigid, as it withers and does not fall until rains have softened it. Were the seeds fertile, it would probably split open later to expose the fruits, and facilitate their dispersal by birds. In the twelve years during which I have watched this Alocasia it has produced no fertile seeds. I have occasionally seen ants on the skins, and once (16/3/37) I saw a few thrip-like insects within a spathe.

As in so many plants, life of the male flowers is short. With the shedding of pollen they have served their purpose, and the part of the spadix bearing them now withers. The sweet scent lasts for several days. It would probably cease with effective pollination.

The spadix is the most important feature in these curious Arums. Those who would assign a special benefit to the plant in every structure evolved, must find this organ puzzling, at times—as, for instance, in the Snake-lily, where it lengthens to 18 inches. One wonders whether, indeed, there is any value to the plant, commensurate with the expenditure in producing it.

Up to a point, a spadix of reasonable height should be useful.

It serves first as a flag. On it flowers are massed, making pollination an easy matter once insects are lured to the minute male and female flowers. These, although often produced in juxtaposition, are effectively separated by their maturity periods.

The enveloping spathe gives not only shelter but warmth. It has been shown, first by Lamarck in 1770, that most flowers, at the height of their flowering period, are slightly warmer than the surrounding air. So, when flowers are massed, as in Arums, the rise in temperature should be considerable.

Lamarck's theories were elaborated by other botanists who found a rise of temperature in many Arums. According to Brongniart (1834), the temperature in *Alocasia* (*Colocasia*) *odora* was 19.8 degrees (Fahr.) above that of the conservatory in which it grew. Other workers (1828) had measured a rise of 50 degrees (Fahr.) above that of the surrounding air—measured by means of a thermo-electric apparatus. In *Arum cordifolium* a rise of 54 degrees was noted!

Warm air rises. The rise in temperature should thus aid in dispersing scent signals. I should be interested to learn whether other growers of these interesting plants have noted fertile seed.

EXPLANATION OF PLATE III

1st fig.—spadix with receptive female flowers below, immature male flowers above and, beyond arrow, infertile male flowers; 2nd fig.—female flowers receptive, spathe open to insects; 3rd fig.—spathe closed in to form a shelf, male flowers shedding pollen which cannot reach female flowers; 4th and 5th figs.—pollen from male flowers falling on shelf, females will receive none of it.

SELECTIVE PROPAGATION OF NATIVE SHRUBS

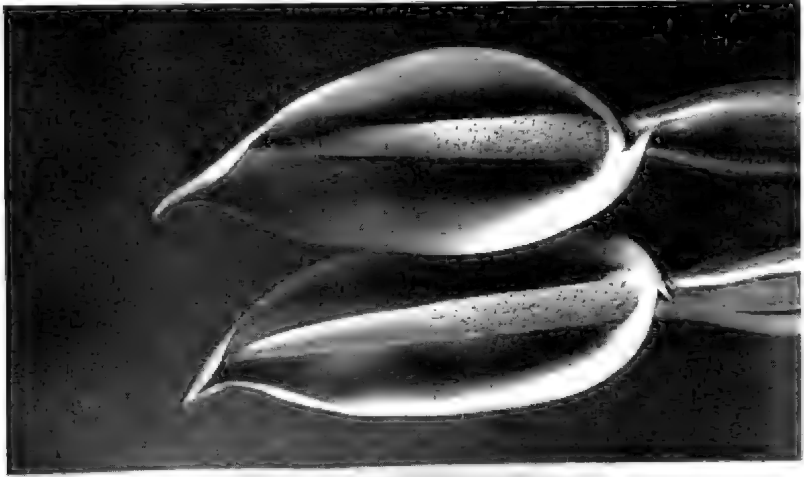
The fact that most of our native shrubs may be grown readily from cuttings makes it possible to propagate from shrubs of especial merit and thereby considerably improve their form, foliage, and flower. The remarkable superiority of the cultivated Brown Boronia (*B. megastigma*) over the same plant growing under natural conditions in Western Australia illustrates just what could be done with other species.

It is not generally known that there is a wide variation in the flowering quality of Grampians *Thryptomene*. Some bushes are so floriferous as to completely hide the foliage, while in other cases the flowers are quite sparse in comparison and of inferior quality. It should be possible, by selecting a good strain and propagating from it, to raise the standard of this outstanding shrub.

There are sparse- and poor-flowering forms of the well-known Pincushion *Hakea* (*H. laurina*) and of *Hakea multilineata* that are hardly worth garden room, and seed or cuttings from such inferior strains should be avoided. *Grevilleas* in particular show wide range of colour and flower massing within the species, and there are many other genera (e.g. *Correa*) wherein careful selective treatment would do much to increase the popularity that our native shrubs so richly deserve.

J. S. SEATON

PLATE III



For Explanation see p. 140.

Photos. Edith Coleman

THE SECTION GENOPLESIMUM IN THE GENUS PRASOPHYLLUM (ORCHIDACEAE)

By the Rev. H. M. R. RUPP, Northbridge, N.S.W.

I. INTRODUCTORY

The difficulties in connection with the study of members of the above group are well known to all students of extra-tropical Australian Orchids. The diminutive size of the plants themselves (small terrestrials), and the literally microscopic dimensions of the somewhat complicated floral details, have taxed the patience of many observers to breaking-point. Yet these very features, when examined under a sufficiently powerful lens, prove extremely fascinating to those who can persevere in studying them carefully. The distinctions between different forms are found to be as clear-cut, and just as important botanically, as they would appear to the naked eye were the flowers fifty times their actual size.

Every Australian State possesses representatives of these pygmy species of *Prasophyllum*. But, for reasons which are as yet not evident, they appear to have developed to a far greater extent in New South Wales than in any of the other States. At the time of writing (September 1948), forty species have been recognized, including five described for the first time in this paper. Only fifteen of these have been recorded outside New South Wales, and of those fifteen only four (*P. despectans* Hook.f., *P. brachystachyum* Lindl., *P. Horburyanum* Rupp, and *P. parvicallum* Rupp) are not known to occur in New South Wales. The number of species for this State, therefore, is at present thirty-six. Eight species are on record for Queensland (excluding *P. densum* and *P. Woollsi* as both very doubtful), eight for Victoria (excluding *P. Dixonii*, which is now regarded as conspecific with *P. nigricans*), five for Tasmania, three for South Australia, and two for Western Australia.

Within New South Wales, the greatest development of distinct species appears to be in the comparatively small area covered by the counties of Cook and Cumberland. These include the greater part of the Blue Mountains and portion of the Central Coast. No fewer than 33 species have been recorded from this limited area. To the north of it, eight species have been found in the vicinity of the Hunter River Valley. Records from other parts of the State are very scanty. No doubt the Blue Mountains and the Central Coast, being within easy reach of the metropolis, have been "combed" for these pygmies more frequently, and by more collectors, than the outlying areas; and in the course of time the numbers for the latter may be substantially increased. The present writer, a resident of New South Wales for many years, has for some time given special attention to these diminutive orchids,

especially since retirement from occupational duties in 1938. Difficulties are experienced in studying them adequately, not only for the reasons alluded to above, but also because one can never be sure when they will make their appearance. With rare exceptions, they are orchids of summer and autumn; and their growth above ground seems to depend upon the time of the heavy summer and autumn rains, which varies considerably. If the rains fail, so do the pygmies; they remain dormant, or appear in such small numbers that even the sharpest eyes may miss them.

In the *Victorian Naturalist* for November and December 1942, and January 1943, I published a somewhat lengthy article on the section *Genoplesium*, with descriptions of seven new species. In *The Orchids of New South Wales*, published about a year later, descriptions were given of all the species then known in this State, and an artificial Key was supplied. With the discovery of new facts (and incidentally, of more species), that Key is now not satisfactory. In the present paper I offer a new Key, which includes all the known Australian species up to the time of writing. It is prefaced by the description of five new species, all discovered recently within 50 miles of Sydney:

One of the species listed in the Key requires a word of explanation. I have ventured to choose the name *P. EXIGUUM* to indicate the plant figured by R. D. Fitzgerald in *Australian Orchids*, II, 3, over the name *P. rufum*. It cannot be accepted as representing the *P. rufum* of Robert Brown. Mr. W. H. Nicholls received from London drawings made with the aid of a camera lucida, of Brown's type specimen in the British Museum. These drawings showed clearly that Brown's species is identical with a New South Wales plant, abundant in some districts, which had for a long time been regarded as a form of *P. nigricans* R.Br. The differences between it and the true *nigricans*, however, are of specific importance. It bears no resemblance to Fitzgerald's *rufum*, and the name cannot be retained for the latter. No definite record of Fitzgerald's plant, so far as I am aware, has been made since he died; but it must exist, or he could not have figured it. As he considered the flowers to be the smallest in the genus, the name *exiguum* seems appropriate.

II. DESCRIPTIONS OF FIVE NEW SPECIES

1. *PRASOPHYLLUM ANOMALUM*, sp. nov. *Planta moderate gracilis, usque ad 30 cm. alta. Foliis lamina 2-3 cm. sub spica. Flores 5-18, virides, non congesti, prominentes, in ovario brevissime pedunculato. Bractea florum mucronata. Sepalum dorsale c. 5 mm. longum, ciliatum, cucullatum, late lanceolatum. Sepala lateralia 7-8 mm. longa, aperta, patentia, fore acuminata, aliquando ad apices hamata. Petala c. 4 mm. longa, ciliata, plerumque in unguibus brevibus articulata, sed raro sessilia et puriora. Labellum c. 6 mm. longum, in ungue articulatum, oblongum, directum sed ad apicem reflexum et acutum, pallidum maculis paucis, ciliis longis purpureis plus*

minusve reversis dense vestitum; callus obscurus, Columna anomala, anthera staminata, sacpissime sed non semper abortiva; stigma pistillosum, ad antherae basem inmixtum; rostellum obscurum vel obsoletum; alae inchoatae vel aliquando lineares, glabrae, integrae vel inaequaliter furcatae.

A rather slender plant up to 30 cm. high. Leaf-lamina 2-3 cm. below the spike. Flowers 5 to about 18, green, not crowded, standing out prominently from the axis on shortly pedunculate ovaries. Floral bract mucronate. Dorsal sepal about 5 mm. long, ciliate, cucullate, broadly lanceolate. Lateral sepals 7-8 mm. long, free, spreading, almost acuminate, sometimes hooked at the apices. Petals about 4 mm. long, ciliate, *most frequently articulate on short claws*, but rarely sessile and smaller. Labellum about 6 mm. long, articulate on a claw, oblong, straight, but at the apex reflexed and acute, pale with a few purplish blotches, densely fringed with long, purple, more or less reversed cilia; callous plate rather obscure but apparently large. Column anomalous; anther stalked, *separate from the stigma*, often but not always abortive; stigma on a flat stalk, usually leaning against the base of the anther; rostellum obscure or obsolete; column wings rudimentary, or sometimes filiform and glabrous, entire or occasionally unequally furcate.

The description of this extraordinary little flower reads like that of a "freak." But the discoverer, Miss Isobel Bowden, to whom we are also indebted for the four species which follow, found it in considerable numbers along a range of several miles, on the eastern slopes of the Blue Mountains, so that it can scarcely be denied the status of a species. In all, some forty individual flowers were dissected and examined under a bifocal microscope. As a check on my own observations, Mr. H. K. C. Mair, B.Sc., of the Sydney Herbarium, kindly examined a number of the flowers, and confirmed my findings except in the case of the few plants with diminutive sessile petals, which he did not see. The species may truly be termed "anomalous," since the anther and stigma are *separate structures* in every flower. Comparison may be made with Fitzgerald's *Corunastylis apostasioides*, which is only known from the author's plate and description (in *Austr. Orch.*, II, 3); but there is little or nothing in common between the two plants beyond the possession of a gynostemium of non-orchidaceous character. Fitzgerald describes the petals of *Corunastylis* as filiform and glabrous. In nearly all the flowers of *Prasophyllum anomalum* they are narrow-lanceolate and ciliate, and only differ from those of allied species like *P. subriatum* R.Br. in their curious articulation on claws like that of the labellum. Miss Bowden reported finding a few plants in which it was difficult to see petals at all. She sent in specimens of these, and I found that the petals were certainly present, but were very diminutive, almost concealed

by the edges of the dorsal sepal, and quite sessile, with no trace of a mobile claw.

In most flowers the anther is abortive, neither pollinia nor caudicle being present. But this is not an invariable rule; in some flowers there was an imperfect anther sac with a few pollen grains; and in a few instances the anther was perfect. In many flowers the wings of the column are rudimentary, one on each side with what appears to be a third rudiment in front; but occasionally the two laterals are developed into glabrous filaments of varying length; in some cases these were unequally furcate. The flowers open very shyly; and I have not seen more than three out on the same plant at one time. This is also the case with the next species described below.

Habitat: Woodford and Hazelbrook, Blue Mountains, N.S.W.; collected by Miss Isobel Bowden, March and early April 1948.

2. *PRASOPHYLLUM BOWDENAE*, sp. nov. *Planta robusta vel gracilis, usque ad 45 cm. alta. Foliae lamina o spica remota. Caulis sub lamina teres, supra angulatus. Flores 6-21, nunquam congesti, virides vel fuscovirides, subsessiles sed prominentes. Labellum et sepala lateralia valde majora quam segmenta altera. Sepalum dorsale minutum, raro 3 mm. longum, ovato-acutum, cucullatum. Sepala lateralia usque ad 1 cm. longa, aperta, late linearia, concava, primo patentia sed cito propinqua vel transversa, ad bases gibbosa. Petala c. 2½ mm. longa, lanceolata, ciliata, venosa. Labellum articulatum, oblongo-acutum, usque ad 1 cm. longum, undulatum, ad medium paululum constrictum, pallidum maculis purpureis, ciliis longis implicatis glaucis vel purpuratis dense vestitum; callus magnus, conspicue canaliculatus. Columna minutissima; alae profunde bilobatae, lobo externo ciliato, acuminato, lobo interiori obtuso, breviori. Rostellum comparate magnum; stigma fuscum; anthera apice filiformi.*

Plant robust or slender, up to 45 cm. high. Leaf-lamina remote from the spike. Stem below the lamina terete, above it strikingly angular. Flowers 6 to about 21, never crowded, green or greenish-brown, sub-sessile but standing well out from the axis. Labellum and lateral sepals developed *out of all proportion* to the rest of the flower. Dorsal sepal minute, rarely 3 mm. long, ovate-acute, cucullate. Lateral sepals up to 1 cm. long, free, broad-linear, concave, at first divergent but soon becoming parallel or even crossed, gibbous at their bases. Petals hardly more than 2½ mm. long, often less, lanceolate, ciliate, veined longitudinally. Labellum articulate on a rather long claw, oblong but acute at the recurved tip, up to 1 cm. long, undulate, slightly constricted about the middle, pale with some purple patches, especially about the apex, densely beset with long tangled grey or purplish cilia; callous plate ill-defined, but large and conspicuously channelled. Column extremely diminutive; wings deeply bi-lobate, the outer lobe ciliate, acuminate, the inner one shorter, obtuse. Rostellum rather large; stigma brown; anther with a filiform point.

Habitat: Woodford and adjoining localities on the eastern fall

of the Blue Mountains, N.S.W.; collected by Miss Isobel Bowden, March 1948.

This plant was found in abundance; and in view of its relatively large dimensions, it is surprising that it remained unknown for so long. In a different way, it is almost as remarkable as *P. anomalum*. The first impression made by the flowers is that they consist entirely of lateral sepals and labellum. It is impossible to ascertain the characters of the dorsal sepal, petals, and column without the aid of a high-power lens; and even then, these parts can only be made out accurately in flowers of the larger and more robust specimens. In the smaller ones it is doubtful whether they ever open, though the lateral sepals and labellum expand widely. It seems likely that the flowers are self-fertilizing; the ovaries are well-formed, and most of the mature ones seem to contain seeds. I have named this interesting species after its discoverer, whose painstaking efforts in searching for new and rare members of the *Genoplesium* *Prasophylls* have been so singularly successful.

3. *PRASOPHYLLUM MUCRONATUM*, sp. nov. *Planta gracillima, usque ad 12 cm. alta. Foliae laminae prope spicam. Flores 6-12, parvissimi, vix congesti, virides et purpurei. Sepalum dorsale c. 2 mm. longum, cucullatissimum, late ovatum, subito in apiculo acuminato contractum. Sepala lateralia c. 3 mm. longa, linearia, patentia, ad apices glande clavata ornata, ad bases unita, gibbosa. Petala vix 2 mm. longa, triquetra, late lanceolata vel fere rhomboidea, sed semper acuminata; margines aliquando serrulati. Labellum oblongum, apice obtuso sed mucronato; margines minute serrulati, ad apicem fere fimbriati; callus magnus, rubropurpureus, ad basem late canaliculatus; lobellum c. 3 mm. longum, in usque brevissimo. Columnae alae aequaliter bilobatae lobis obtusis, lobus externus minute serrulatus. Anthera obtusa cum glande rotunda; stigma ovale.*

A very slender plant up to 12 cm. high. Leaf-lamina close to the spike. Flowers 6-12, very small, hardly crowded, green and reddish-purple. Dorsal sepal about 2 mm. long, deeply cucullate, broadly ovate, suddenly contracted into an acuminate point. Lateral sepals about 3 mm. long, linear, spreading, furnished at the apex with a clavate gland, united and gibbous at their bases. Petals scarcely 2 mm. long, triangular-lanceolate or almost rhomboid, but always acuminate or even with a filiform point; margins sometimes minutely serrulate. Labellum oblong with a rounded but mucronate apex; margins minutely serrulate, or about the apex almost fimbriate; callous plate large, reddish-purple, widely channelled near the base. Labellum about 3 cm. long, articulate on a very short claw. Column wings equally bi-lobate with obtuse lobes; outer lobe minutely serrulate. Anther obtuse with a relatively large rotund gland on top; stigma oval.

Habitat: Woodford, Blue Mountains, N.S.W.; collected by Miss Isobel Bowden, March 1948. Wahroonga, N.S.W., grown in a pot by J. D. McCormish, March 1948, but collected by him in the neighbourhood.

The late Captain McComish's solitary pot-grown specimen agrees precisely with those collected by Miss Bowden at Woodford. Not many plants were found. The species seems nearer to *P. nigricans* R.Br. than to any other; but the mucronate labellum and the equally-lobed column wings sufficiently distinguish it.

4. *PRASOPHYLLUM MOLLISSIMUM*, sp. nov. *Planta gracilis, usque ad 24 cm. alta. Folia lamina a spica remota. Flores 5-15 in spicam brevem, nec congesti. Sepalum dorsale cymbiforme, c. 3 mm. longum, cucullatum, extra fuscum, utrus viride, marginibus minutissime fimbriatis. Sepala lateralia c. 4 mm. longa, falcato-lanceolata, fere plana, patentia, ad bases unita, fuscoviridia. Petala falcata, acuminata, c. 3 mm. longa, fusca, marginibus minutissime fimbriatis. Labellum late oblongum, acutum, recurvum, spatix, dense pubescens, articulatum, marginibus minutissime fimbriatis; callus obscurus, canaliculatus. Columnae alae conspicuae, profunde et inaequaliter bilobatae; lobus externus gracilis, acuminatus, paululum fimbriatus, fuscus; lobus internus brevior, pallidus, obtusus. Anthera obtusa, rostellum conspicuum, stigma fere orbiculatum.*

A slender plant up to 24 cm. high. Leaf-lamina rather broad, remote from the spike. Flowers 5 to about 15 in a short spike, hardly crowded. Dorsal sepal brown outside, green inside, cymbiform, about 3 mm. long, with minutely fimbriate margins (not ciliate). Lateral sepals about 4 mm. long, falcate-lanceolate, nearly flat, divergent, united at their bases, brown and green. Petals falcate, acuminate, about 3 mm. long, brown, with minutely fimbriate margins. Labellum broadly oblong, acute, recurved, rich chestnut brown, densely pubescent all over the upper surface and having the appearance of velvet, articulate on a moderately long claw, margins minutely fimbriate; callous plate rather obscured by the pubescence, channelled. Column wings conspicuous, deeply and unequally bi-lobate: outer lobe slender, acuminate, dark, with minute fimbriae; inner one shorter, pale, obtuse. Anther obtuse, rostellum conspicuous, stigma nearly circular.

Habitat: Heathcote, National Park, N.S.W.; collected by Miss Isobel Bowden, April 1948.

Seen under a magnifier, the flower of this species is perhaps the most beautiful in the section. The rich chestnut-brown pubescence of the labellum has no parallel in other species. Most of the plants had finished flowering; but fortunately a few were found with perfect flowers. The name ("very soft") is in allusion to the velvety appearance of the labellum. The flower is quite unlike that of Fitzgerald's *P. eriochilum*, the labellum of which is densely ciliate all over.

5. *PRASOPHYLLUM OBOVATUM*, sp. nov. *Planta gracilis, usque ad 15 cm. alta. Folia lamina a spica remota. Flores pauci, rubropurpurei et pellucidi. Sepalum dorsale c. 2 mm. longum, latissime obovatum, apiculaum, cucullatum. Sepala lateralia c. 3 mm. longa, lanceolata cum spicula minuto reflexo, concavissima, viridia. Petala latissima, c. 2 mm. longa, oblique falcata, cum spiculis minutis duobus et glande mo. Labellum c. 3 mm. longum, articulatum, obovatum, recurvum, marginibus undulatis; callus*

crassus, purpureus, comparate parvus, Columnae alae profunde et aequaliter bilobatae; lobus externus gracilis, fuscus, lobus internus pallidus. Anthera glande orbiculare coronata; rostellum parvum, stigma ovale.

A slender plant up to about 15 cm. high. Leaf-lamina not close to the spike. Flowers few, reddish-purple with translucent patches. Dorsal sepal about 2 mm. long, very broadly ovate, apiculate, cucullate. Lateral sepals about 3 mm. long, lanceolate with a minute reflexed point, very deeply concave, green. Petals very broad, about 2 mm long, obliquely falcate, with two minute points at the apex and on one of them a small gland. Labellum about 3 mm. long, articulate, perfectly obovate, recurved, with undulate margins. Callous plate thick, dark purple, rather small. Column wings deeply and equally bi-lobate, the outer lobe slender, dark, the inner one pale. Anther crowned by an orbicular gland; rostellum small; stigma oval.

Habitat: Heathcote, National Park, N.S.W.: collected by Miss Isobel Bowden, April 1948.

The curious "double point" of the petals, and the strikingly obovate labellum with undulate margins, sufficiently distinguish this from other species. It is apparently rare.

III. A NEW VARIETY, AND RECENT RECORDS

PRASOPHYLLUM MORRISII Nicholls [*Vict. Nat.*, XLVIII (1931), 108]. Var. *INTERMEDIUM*, var. nov. Planta *P. fimbriato* similissima, floribus magnis; columnae alae saepe glabrae.

Plant closely resembling *P. fimbriatum* R.Br., with large flowers which, however, are dark purple or almost maroon. The tremulous labellum, quivering in the wind, is particularly suggestive of this segment in *P. fimbriatum*, but it is broader than in the latter. The column wings are more often glabrous as in Brown's species, than ciliate.

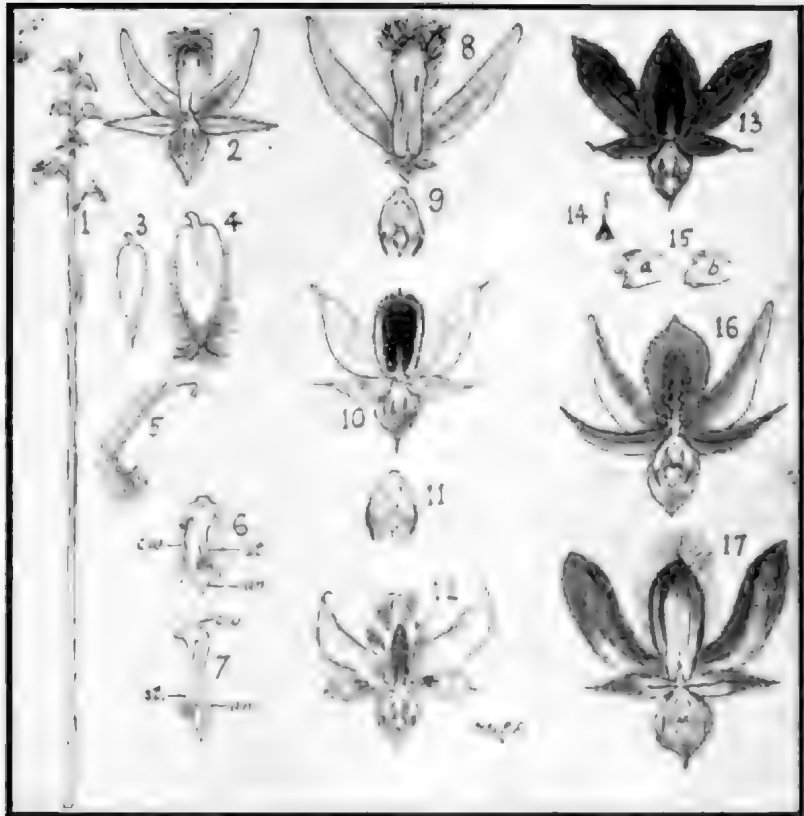
Habitat: Blue Mountains, N.S.W.: Mt. Irvine, Misses J. and G. Scrivener, February 1942; Woodford, Miss I. Bowden, February-March 1948.

Two of the Mount Irvine specimens in the National Herbarium at Sydney are identical with those collected by Miss Bowden at Woodford. The type form of the species also occurs in both localities.

The following records of the species named (some of which have been considered extremely rare) have been made since the publication of *The Orchids of New South Wales* in December 1943.

1. *P. Baueri* (R.Br.) Poir. Pennant Hills, Miss I. Bowden, 2.1948; Wahroonga, Miss I. Bowden, 3.1948; Heathcote, A. W. Dockrill, 3.1948.

- 148 H. M. R. Rupp, Section *Genoplesium* in Genus *Prasophyllum* [Vict. Nat. Vol. 65]
2. *P. Deoneanum* Fitzg. Cowan, Miss I. Bowden, 1.1948; Wahroonga, Miss I. Bowden, 3.1948.
 3. *P. longisepalum* Fitzg. Wentworth Falls, A. R. and H. M. R. Rupp, 1.1948.
 4. *P. Nichollsianum* Rupp. Woodford, Miss I. Bowden, 1.1948.
 5. *P. trifidum* Rupp. Wahroonga, Miss I. Bowden and Mrs. P. R. Messiner, 3.1948; Castlecove, Miss I. Bowden, 4.1948.
 6. *P. aureoviride* Rupp. Recorded by Miss I. Bowden at Woodford, 2.1948, at Lindfield, 2.1948, at Wahroonga, 3.1948. Also by J. D. McComish at Wahroonga, 3.1948. (All plants recorded were var. *Elmae*.)
 7. *P. ansatum* Fitzg. Pennant Hills, Miss I. Bowden, 3.1948; Woodford, same collector, 3.1948.
 8. *P. nigricans* R.Br. Woodford, Pennant Hills, and Wahroonga, Miss I. Bowden, Feb. to April 1948; Wahroonga, J. D. McComish, Mar.-April 1948.
 9. *P. rufum* R.Br. Normanhurst, Miss I. Bowden, 4.1948; Heathcote, A. W. Dockrill, 3.1948.
 10. *P. densum* Fitzg. Wahroonga, J. D. McComish, 3.1946; Woodford, Miss I. Bowden, 1.1948.
 11. *P. viride* Fitzg. Glenbrook, Miss I. Bowden, 2.1948; Heathcote, A. W. Dockrill, 3.1948.
 12. *P. Hopsonii* Rupp. Near Barrington Tops, A. W. Dockrill, 12.1947.
 13. *P. Archeri* Hook.f. Blackheath, G. W. Althofer, 2.1947; Woodford and Hazelbrook, Miss I. Bowden, 2. and 3.1948; Wahroonga, J. D. McComish, 4.1946, 4.1948. (First records of this species in the neighbourhood of Sydney.)
 14. *P. reflexum* Fitzg. Woodford, Miss I. Bowden, 1.1948.
 15. *P. fimbriatum* R.Br. Glenbrook. Miss I. Bowden, 1.1948. (No definite record of this species previously from the Blue Mountains.)
 16. *P. Morrisii* Nicholls. Woodford, Miss I. Bowden, Jan. to late March 1948.
 17. *P. Nublingii* Rogers. Bundeena, A. W. Dockrill, 5.1946; Heathcote, same collector, 3.1948.
 18. *P. Ruppii* Rogers. Wahroonga, J. D. McComish, 3.1947; Pennant Hills, Miss I. Bowden, 2. and 3.1948.

*PRASOPHYLLUM* spp. (Section *Genoplesium*).

Key to Illustration.

(All figures greatly enlarged except No. 1.)

1. *P. anomalum*, n. sp. A plant, slightly enlarged.
2. " " Flower, from the front.
3. " " Petal, showing claw at the base.
4. " " Labellum from the front (flattened out).
5. " " Labellum from the side.
6. " " Column with wings developed, from the front.
ca., column wings; *an*, anther; *st*, stigma.
7. " " Column with rudimentary wings, from the side.
8. *P. Bowdenae*, n. sp. Flower, from the front.
9. " " Column, from the front.
10. *P. mucronatum*, n. sp. Flower, from the front.
11. " " Column, from the front.
12. *P. obovatum*, n. sp. Flower, from the front.
13. *P. trifidum* Rupp. Flower, from the front.
14. " " Tip of petal, showing twisted gland.
15. " " Variations in column wings.
16. *P. mollissimum*, n. sp. Flower, from the front.
17. *P. Morrisii* Nich., var. *intermedium*, n. var. Flower, from the front.

IV. A KEY TO THE SECTION *GENOPLESIMUM*

1. Floral segments not provided with cilia. (Exceptions; short cilia occasionally found on the margins of the labellum in *P. densum* and *P. rufum*.)
 2. Lateral sepals conspicuously long.
 3. Flowers few, never crowded.
 4. Stem pale. Petals notched or bifid *P. Baueri* (R.Br.) Poir.
 - 4.* Stem red. Petals entire *P. Deaneanum* R. D. Fitzg.
 - 3.* Flowers few or many, crowded in a short spike.
 5. Flowers relatively large. Anther conical, gland-tipped.
 - 5.* Flowers small. Anther flat-topped, with a filiform appendage.
 - P. longisepalum* R. D. Fitzg.
 - P. Nichollsianum* Rupp.
 - 2.* Lateral sepals not conspicuously long.
 6. Lateral sepals crossed. Labellum minute, sessile.
 - 6.* Lateral sepals not crossed, at least till after maturity, Labellum articulate on a claw.
 7. Labellum oblong-linear, with an auricle on each side.
 - 7.* Labellum rather broad, without any auricles.
 8. Labellum trapezoid *P. laminatum* R. D. Fitzg.
 - 8.* Labellum not trapezoid.
 9. Dorsal sepal, petals, and labellum with filiform tips. Labellum spatulate *P. unicum* Rupp.
 - 9.* Floral segments without filiform tips.
 10. Labellum oblong or ovate. Flower spike short.
 11. Flowers brown.
 12. Plant consistently dwarf. Flowers light or dark brown, in a very dense spike. Labellum oblong, occasionally sparsely ciliate. *P. densum* R. D. Fitzg.
 - 12.* Plant not usually dwarf. Flowers rich chestnut brown, spike not dense. Labellum oblong, densely pubescent, velvety *P. mollissimum* Rupp.
 - 11.* Flowers not brown.
 13. Flowers golden-green, or green with crimson markings. Labellum ovate. *P. aurcoviride* Rupp.
 - 13.* Flowers purplish-red with translucent patches. Labellum perfectly obovate *P. obovatum* Rupp.
 - 10.* Labellum varying in shape. Flower spike often relatively long [to 14].
 14. Labellum almost or quite triangular. Flowers minute.
 15. Flowers red, hardly opening *P. exiguum* (R. D. Fitzg.) Rupp.
 - 15.* Flowers green, opening widely *P. Horburyanum* Rupp.
 - 14.* Labellum not triangular.
 16. Margins of labellum more or less serrulate.
 17. Lateral sepals or petals gland-tipped.
 18. Lateral sepals gland-tipped. Labellum oblong, mucronate. Lobes of the column wings equal in length *P. mucronatum* Rupp.
 - 18.* Petals tipped with a twisted gland. Labellum ovate-acute. Lobes of the column wings unequal, often trifid *P. trifidum* Rupp.
 - 17.* No floral segments gland-tipped. Labellum acuminate.
 - P. despectans* Hook. f.
 - 16.* Margins of labellum not serrulate. Labellum very dark, usually acute.
 19. Lateral sepals greenish, united at the base, sometimes gland-tipped.
 20. Labellum constricted near the tip, the margins along the constriction irregularly crenulate *P. nigricans* R.Br.

- 20.* Labellum not constricted, its margins smooth.
- 21. Flower spike usually elongating. Labellum irritable, dark brown in contrast with other bright green segments.
P. fuscoviride Reeder.
- 21.* Flower spike always short, subcapitate. Labellum not irritable, recurved, concolorous with other brownish segments.
P. brachystachyum Lindl.
- 19.* Lateral sepals deep red, free, always gland-tipped. Labellum obovate-cuncate, denticulate about the tip, margins rough or shortly and sparsely ciliate *P. rufum* R.Br.
- 1.* Various floral segments provided with cilia.
- 22. Cilia on the column wings only. Flowers very small, never opening.
P. viride R. D. Fitzg.
- 22.* Cilia on various segments; always on the labellum.
- 23. Incidence of cilia twofold; on the labellum and the column wings.
- 24. Cilia conspicuously long and dense *P. phnosum* Rupp.
- 24.* Cilia not conspicuously long and dense.
- 25. Cilia very short. Flowers very diminutive.
- 26. Flowers green on rather small ovaries *P. Hopsonii* Rupp.
- 26.* Flowers dark on substantial ovaries. *P. Beaughtholai* Nicholls.
- 25.* Cilia not very short. Flowers larger than in 25.
- 27. Very dwarf plant. Flowers with purple, red, and yellow tints. Callous plate sagittate *P. sagittiferum* Rupp.
- 27.* Plant dwarf to quite tall. Flowers greyish-green, yellowish-green, or purplish. Callous plate not sagittate.
P. Archeri Hook. f.
- 23.* Incidence of cilia more than twofold.
- 28. Incidence of cilia threefold.
- 29. Cilia on dorsal sepal, petals, and labellum.
- 30. Column anomalous, with separate anther and stigma. Petals often hinged like labellum. Column wings either rudimentary or glabrous-filiform, sometimes forked.
P. anomalum Rupp.
- 30.* Column of normal construction.
- 31. Callous plate unusually small. Anther with a curved filiform point *P. parvicallum* Rupp.
- 31.* Callous plate relatively large. Anther without any filiform point.
- 32. Labellum ovate-oblong, densely ciliate all over the upper surface *P. cricochilum* R. D. Fitzg.
- 32.* Labellum linear-oblong, or occasionally broader, fringed with long crimson or pink cilia *P. fimbriatum* R.Br.
- 29.* Cilia on petals, labellum, and column wings [to 33].
- 33. Lateral sepals and labellum abnormally larger than other segments. Plant often robust and tall; stem angular above the leaf.
P. Bowdenae Rupp.
- 33.* Lateral sepals and labellum not abnormally large.
- 34. Anther with an erect filiform point. Labellum often with only a few coarse cilia, not reflexed *P. filiforme* R. D. Fitzg.
- 34.* Anther rather blunt. Labellum sparsely ciliate, reflexed for half its length *P. reflexum* R. D. Fitzg.
- 28.* Incidence of cilia fourfold or more.
- 35. Cilia often on all floral segments. Flowers deep purplish-red.
P. wilsoniense Rupp.
- 35.* Cilia usually absent from lateral sepals.
- 36. Flowers maroon or deep purple, rarely paler. Cilia long.
- 37. Labellum acuminate, much reflexed *P. acuminatum* Rogers.
- 37.* Labellum oblong, somewhat undulate *P. Morrisii* Nicholls.

- 36.* Flowers brown or dark green. Cilia short. -
 38. Labellum short, ciliate near the tip. Flowers purplish-brown.
P. Woolfsii F. Muell.
 38.* Labellum long, ciliate all along the margins.
 39. Flowers dark brown or dark green. Labellum oblong, nearly
 rectangular *P. Nublingii* Rogers.
 39.* Flowers dark brown with bright green lateral sepals. Labellum
 oblong-apiculate *P. Ruppii* Rogers.

In any attempt to provide a workable artificial Key for this group of orchids, it becomes obvious almost at once that the species may conveniently be separated into two primary divisions: (1) those in which the floral segments are *devoid* of fringing *cilia*, and (2) those in which various floral segments are furnished with such *cilia*. Two species are known, however, in which the labellum sometimes exhibits a few short marginal cilia, and sometimes is quite without them (*P. densum* and *P. rufum*). It would be possible to create a third primary division, including these two and *P. viride*, which is ciliate only on the column-wings; but I prefer to place the first two in the non-ciliate division, noting them as occasional exceptions to the general rule; and to keep *P. viride* in the ciliate division.

It is desirable to explain the omission from the Key of several names previously recognized as valid. They are as follow:

1. *P. nudum* Hook.f. (Tasmanian plant.) [See *Vint. Nat.*, LIX (1942), 9-11.] Mr. Nicholls distinguishes Hooker's Tasmanian plant from the New Zealand form to which that author had previously given the same name. The Tasmanian plant, which is also found in Victoria and New South Wales, is now known as *P. Beaughleholei* Nicholls.

2. *P. Dixonii* F. Muell. Mr. Nicholls informs me that after very careful examination of the holo-type in the Melbourne Herbarium, he and Mr. J. H. Willis concluded that this species must be reduced to a form of *P. nigricans* R.Br. Other material bearing the label "*P. Dixonii*" proved to be pale conditions of *P. Archeri* Hk.f. I have similarly examined specimens in the Sydney Herbarium, and am in complete agreement with this view.

3. *P. Tepperi* F. Muell. ex Rogers. The late Dr. Rogers described this species, previously a *nomen nudum* of Mueller's, in *Trans. Roy. Soc. S. Austr.*, xxxiii (1909), 206. Subsequently, however, he dropped it in his descriptions of South Australian Orchids in Black's *S. Austr. Flora* (1922 ed.), and, so far as I can ascertain, it has not reappeared in orchid literature since.

4. *P. Elnae* Rupp in *Vint. Nat.*, LIX (1942), 122. This has subsequently been found to be only a variety of *P. aureoviride* Rupp. [See Hunt in *Austr. Orch. Review*, Vol. XI, No. 4 (1946), 92.]

V. COMPARISON OF *PRASOPHYLLUM ANOMALUM*
 WITH R. D. FITZGERALD'S *CORUNASTYLIS APOSTASIODES*

(*Australian Orchids*, II, 3)

Such a comparison seems to me to call for special comments, independently of the description of the first-named plant. Here we have two small terrestrial orchids, one rather obviously belonging to the genus *Prasophyllum*, and the other at least very closely allied to it, yet both devoid of a fundamental characteristic of the family *Orchidaceae* (the fusion of anther and stigma into a single structure). Unfortunately our knowledge of *Corunastylis apostasioides* is entirely dependent upon Fitzgerald's plate and description, as it has never been seen since his death in 1892, and so far as I am aware no specimens have been preserved. It was found, he states, by G. H. Sheaffe at Berrima, on the high country about 90 miles S.W. of Sydney. No date is given, beyond the fact that it flowered in June; but the date of Fitzgerald's plate is August 1886. He does not say how many plants were seen; but presumably he would not have established a new genus (especially one of such peculiar character) unless several specimens had been brought in. He considered the Berrima plant to constitute a link between the genus *Apostasia* and other orchids. I think I am right in saying that most orchidologists of today agree in separating *Apostasia* and the allied genus *Nieuwedtia* from the *Orchidaceae*, to constitute the family *Apostasiaceae*.

In both *Corunastylis apostasioides* and *Prasophyllum anomalum*, the abnormal gynostemium does, perhaps, suggest an approach to the *Apostasiaceae*; but it cannot be said that there is much else to connect them. The *Apostasiaceae* are tall, robust, almost woody plants with large and numerous leaves. *Corunastylis* and *Prasophyllum anomalum*, on the contrary, are weak, succulent herbs rarely 30 cm. high, with a solitary stem-sheathing leaf having a very short free linear lamina. Moreover, the *Apostasiaceae* possess two stamens and anthers, with occasionally a third imperfect anther.

The description of *Prasophyllum anomalum*, with its separate anther and stigma, and the frequent absence of column appendages or wings, may suggest to some readers that it is actually only a modified form of the Berrima orchid for which Fitzgerald founded the genus *Corunastylis*. I cannot, however, conceive of the plant depicted by Fitzgerald as representing the orchid found on the Blue Mountains by Miss Bowden. Except in stem and leaf, they do not resemble each other; in *P. anomalum* the flowers are consistently larger in proportion to the spike, and they do not expand readily. Moreover, in *Corunastylis* the petals are represented by glabrous forked filaments. These are extraordinarily like the

column wings of *P. anomalum* when the latter are not abortive; and indeed, looking at Fitzgerald's fig. 4 (enlargement of labellum, petals, anther and stigma), I cannot see why the so-called petals (which the author himself queries) might not just as well be called column wings! But in that case we should be compelled to regard *Corunastylis* as *apetalous*; while in *P. anomalum* (with few exceptions) the petals are not only strongly developed and ciliate, but are articulate on basal claws like that of the labellum. In a few of the specimens collected they were reduced in size and non-articulate, but were still ciliate. There is little resemblance in the labella of the two plants. The *stigmata* are undoubtedly similar; but the anther of *Corunastylis* is much larger and of different shape, and the stalk (stamen?) at its base is much shorter. According to Fitzgerald's plate, *Corunastylis* has six small oblong-ovate tubers. Miss Bowden found the tubers of *P. anomalum* quite normal, similar to those of other species of the section *Genoplesium* growing nearby. I do not think, therefore, that we can possibly regard *Corunastylis* and *P. anomalum* as conspecific. It might, perhaps, be argued that the latter should have been described as a second species of the former genus. But in every respect, except those of the gynostemium and the petal-claws, it is so obviously a *Prasophyllum* that I think it is much better placed within this genus.

AN EARLY BIRD-SONG

(To the Editor)

Sir,—William's *Australian Magazine*, 1869-70, contains "The Native Wren," a descriptive song. Words are by Henry Kendall, music by J. Summers, Mus. Bac. (Oxon). In a footnote the publisher states that while visiting the Dandenongs he was struck by the sweet song of the native wren. He took down the melody and the published song was the result.

Perhaps this is the first recorded instance of a native bird's song being set to music. In any case I feel the circumstance is worth recording.

Does any member know of an earlier recording?

Yours faithfully,

Melbourne,
Aug. 20, 1948.

J. K. MOIR

BIRD LANGUAGE

Large tubs of water in the garden have floats of cork or wood to aid birds which have occasionally fallen in. One cold morning recently I found a spinebill in a tub from which the float had been removed. The bird made no resistance as I held it in my warm, cupped hands. Although its eyes opened and closed it lay perfectly still for a long while. Seeing a rather excited spinebill on a branch overhanging the tub, I moved closer, thinking it might be a mate. It flew over my head, uttering its characteristic call. Immediately the wet bird fluttered, and when I lifted the upper hand, flew to a tree and commenced to preen itself. It certainly recognized a clan call.

R.C.

**ZOOLOGICAL NOTES ON THE NORTHERN TERRITORY
(June 1944 to September 1945)**

By LIONEL GILBERT, Nabiac, N.S.W.

(Continued from *Vict. Nat.*, August, p. 102)**II. REEF AND OTHER MARINE LIFE***At Cape Don, Arnhem Land*

Three distinct land formations were visible here. First, the comparatively high ground supporting savannah vegetation; at the edge of this was a steep drop to sea-level, the sandy stretches and mangrove swamps, and thirdly the reef, which was covered at half and full tide. This reef was a great hunting ground; but, to reach it, one could only wait until the tide was partly out—to wait any longer would not permit sufficient time to be spent there.

Toward the edge of the main physical feature (the high area) the ground was sandy and clothed with *Pandanus*. The steep drop to sea-level took one over a type of ironstone, but once at the foot of the incline, there was sand once more—damp sand this time, pitted with crab-holes and scarred with the tracks of gastropods, e.g. "periwinkles."

A little way along this sand, the backwaters of the mangrove swamp were encountered, and here it was necessary to walk on logs over the stagnant algae-covered water until the first line of mangroves was passed; then the sand became firmer and crisper. Within the swamp, the only clear part was a sandy track through the trees. It was higher than the surrounding areas, and on either side of it stood great mangroves, their buttressed roots rising from the oozing mud. These trees were very thick, and met overhead at a height of at least 30 feet, making the place gloomy. A few sea birds fluttered about the tops of the trees, but otherwise it was perfectly silent. Even the noise of the sea, no more than a few yards ahead, was excluded.

Passing along this mangrove track, one came to a further clearing, where the natives hauled in their dugout canoes and catches of the green edible turtle (*Chelone mydas*). This little clear space was high, and covered with clean white sand. Heaped here and there were the bleached bones and carapaces of many green turtles speared on the reef.

Beyond this last high area, one entered the water or mud, according to the state of tide, and walked down a sort of creek bed, with mangroves high on either side. Apparently this strip was a drain for the swamp, and the water rushing down had swept it clear of the long mangrove pods, making a little haven for dugout canoes which were tied to stakes driven far into the mud. In most canoes was a large Bailer Shell (*Melo diadema*), although occasionally a native would use the more modern tin.

It was interesting to note that natives dig their graves with these same bailer, or melon shells.

Farther down the drainage strip the sand became lighter in colour, although no finer, being composed of sharp coral particles that hurt one's bare feet. Here, the line of mangroves ceased altogether and, on the other side of a back-channel in which water might be three feet deep, the reef was visible. When wading through this channel, care was also necessary to avoid any sting-rays which, although small enough, were capable of inflicting a considerable wound.

On the other side of the channel, one could step on to the reef. Its base was apparently an igneous rock, upon which ancient coral colonies had built up a thick stratum of limestone, living colonies continuing this process. The light brown "Brain Coral," so-called because of a remarkable resemblance to the convolutions of the human brain, was there in huge orb-shaped masses—to three feet wide and two feet high. Others were bigger still, and formed great coral boulders when their polyps died.

When exposed at low tide, the coral polyps withdraw their "tentacles" into the limestone cells of the dwelling, but the whole exterior is covered with thin colourless mucus, rather like white of egg. This prevents the sun and wind from drying up the living inhabitants before tide return.

In clear coral pools the edges might be clustered with branched and "staghorn corals" in delicate tints of blue, white, pink and green. At low tide these colonies were usually level with the water, and had a spread of up to three feet. Lying flat on the sandy bottom of certain pools, the brown unattached "Mushroom Coral" (*Fungia* spp.) could be found; these resembled very closely—in size, shape, and structure—the under part of an agaric or gilled fungus. They could be lifted from the water with ease and, once above water level, the slime began to slide off the coral disc.

No living "Organ-pipe Coral" (*Tulipora* spp.) was seen, although there were great pieces of some dead colonies forming the basis of the present reef. Around some of the coral boulders clustered the soft green Alcyonarian or "soft" coral; although closely related to the "hard" colonies, it lacks the power of secreting limestone absorbed from the sea. The texture of these extensive flat colonies was both spongy and leathery.

Occasionally, after paddling out to sea in their dugout canoes, the natives returned with specimens of a beautiful fragile "fan" coral. One of the gorgonid corals, it had the texture of lace, yet was hard, erect, and vivid red in colour. This thin-branched coral spread only in lateral directions so that colonies of it were flat and roughly triangular, being widest at the top where the branches ceased growing. The foot of such a colony was like that of a large marine alga. It is not known whence these specimens came, probably from the outer islets and reefs surrounding them.

In some coral pools of the reef were young clams (*Tridacna* sp.), looking very attractive, with their green- and blue-mottled mantles waving in the current. Such beautiful displays could hardly fail to lure the reef fish. Other snares for fish were in the form of large sea-anemones, brown and whites mainly, and among the waving tentacles of some of these glided the indifferent Anemone Fish, deceiving and decoying other fish to make a meal for the ever-hungry *coelenterate*.

To roll over some of the larger coral boulders, meant the likely discovery of a wealth of marine organisms. The dominant animal, of course, was encrusting coral of hard, but thin structure, while here and there, crawling slowly over the rough coral surface, might be found trochus shells (*Trochus* spp.), trumpet shells (*Triton* sp.) and various cowries (e.g. the white, brown-spotted *Cypraea tigris*; the tiny pale Money Cowry, *Cypraea moneta*; the greenish-mottled *C. piperita*, with a brown blot on its back; and the beautiful large grey and brown *C. arabica*).

These molluscs were collected by native women, who boiled them, ate the flesh, and then sold the shells, in perfect glossy order, to the white man who was by no means as efficient at finding them. They sought other shells for sale too, and often returned with large bailer shells (*Melo amphora*), some the size of a football, and the unique spider shell (*Lambis* sp.) with fragile arms extended all round. Pearl shells (*Pinctada maxima*, etc.) were plentiful in some restricted areas.

Under boulders with the cowries were cone shells—brown and white (*Conus* spp.) Certain species of this genus are capable of poisoning the unwary, the sting at times even causing death. Another dangerous member of the reef fauna is the Stonefish (*Synanceja horrida*), which half submerges itself in the sand of the pools in such an effective manner as to become almost invisible. Its own colour and irregular form heighten the camouflage, so that without boots one constantly runs the risk of being inflicted with the most excruciating pain, and occasionally death.

Other shells were the pretty grey-mottled Bubble (*Bullaria* sp.), Turbans (*Turbo squamosus* and *Astraea stellaris*) and, on the clearer rocks, small sea snails (*Verita* spp.).

Washed up from reefs, and on the beaches in this area (including Darwin itself), were found scallops (*Pecten* spp.), mitres (*Mitroidea* spp.), fragile razor shells (*Solen* sp.), small spindle shells (*Fusus* sp.), staircase shells (*Solarium* sp.), turret shells (*Turritella* spp.), young pearl shells (*Pinctada* spp.), limpets (*Patella* spp.), ear shells (*Haliotis* sp.), young cowries in their very different stages of maturity, hammerhead oysters (*Mallens* sp.) and numerous other kinds of univalve and bivalve molluscs, including a very pretty fragile pink bivalve. Cockles of many types were present also, and the usual dozens of young and tiny gastropods.

More rarely on the beaches were found the white and almost translucent "shell" of the Paper Argonaut (*Argonauta* sp.)—almost too fragile to be collected with safety—and the harder, many-chambered true shell of the Pearly Nautilus (*Nautilus* sp.). Another cephalopod lived on the reefs too, the small reef octopus.

Among soft-bodied creatures in the reef pools was trepang or hêche-de-mer, so favoured as a table-delicacy in the East. Most specimens were very dark, and might attain 18 inches in length. Some were quite smooth, while others had small fleshy protuberances over the body. A very large type of red and black starfish was plentiful in one restricted area, but apart from some Brittle-stars, not many echinoderms were seen.

Fish included prettily coloured coral fish (around the reefs) and small reef-inhabiting eels. Farther out to sea, flying fish (*Cypselurus* sp.) flashed brilliantly as they took their prolonged leaps out of the water. Natives often speared a very fine table fish which grew to great size and was called locally "Whitefish."

Near the beaches, sharks measuring 8 to 10 feet were often seen. They swam leisurely at the very edge of the sand in search of schools of small fish which habitually frequent the shallows. Although the white man was quick to leave when these came cruising by, the natives remained unmoved and continued their frolicking in the water. In these places, there was no "surf," so that the sharks were in no danger of being thrown upon the sand by powerful breakers.

Other dangers to avoid when swimming were the stingrays, common on and around the reefs, and the Portuguese Man-o-War (*Physalia* sp.). The latter (a co-eleuterate) was rightly feared, as its effect is both instantaneous and paralysing. When struck by the long armed threads, a victim simply collapses, and if any delicate nerve centre be so struck, death may result. According to the natives, sand rubbed on the affected area and continually washed with fresh water was the only treatment; such scarification did seem to have definite results. After a few days, an ugly raised weal indicated the area which had come in contact with *Physalia's* poisoned barbs.

Crustacean life on the reef included several types of multi-coloured reef crabs, and the interesting sponge crab, which takes a piece of living sponge and "plants" it on top of the carapace. There the sponge continues to grow and envelopes the crab's carapace, thus disguising and protecting it—no fish relishes the siliceous spicules of a sponge. Reef shrimps were common in the rock crevices, and some attained considerable size.

In dark mangrove swamps, the giant Mangrove Crab (*Scylla serrata*) kept company with the interesting little mudskippers (*Periophthalmus argentilineatus*). The former is extremely strong, being able to snap quite large sticks, and probably a man's finger,

with its large bulging nippers. These were dug out of their holes in the mud by lubras and were very good eating.

The mudskippers, with big protruding eyes, lived in the swamps in great numbers, and probably provided food for their crustacean associates. None of these little fish was seen to exceed four or five inches. They were very well endowed with protective coloration, basking in what little sunlight penetrated the gloom, and frequently lying on the buttress roots or pneumatophores of the mangroves (*Bruguiera* and *Rhizophora* spp.). If disturbed gently, the skippers simply took a few paces by means of their forefins, but if agitated they literally "ran" through the mud on strong pectoral fins, until well in hiding.

Very often, when a fine collection of shells was brought back from the reef and left outside for the night, one would be accused next morning of taking some of the specimens; sometimes half the shells might be missing, but when you saw various examples of the conchological collection "walking" along the grass towards the sea, it was clear that these shells were inhabited by Red Hermit Crabs (*Dardanus megistos*) or some other species. The number of apparently empty shells which were thus inhabited by the soft-bodied hermit crabs was truly remarkable.

The salt water crocodile (*Crocodilus porosus*) was not very plentiful, although natives often reported them from various distances away, occasionally bringing in young ones as proof. Some claimed to have heard one "old man crocodile" making his barking noise at night as he lumbered about the swamp. No Johnston's crocodiles were seen owing to the lack of fresh water.

Turtles were rather abundant around the reefs and in the open sea, and the natives had many a feast of the green edible turtle (*Chelone mydas*). Hawksbill turtles (*Chelone imbricata*) were also brought in after being speared through the carapace. The latter kind of turtle, if cleaned, cured, stuffed, and polished by an expert taxidermist who removed the thick encrustations of marine organisms, might be made into very fine specimens, especially if lacquered to ensure their preservation. If cat's-eye shells be inserted behind the eyeholes in these reptiles' skins, the appearance is quite lifelike.

(Concluded.)

BIRD ACTIVITIES REPEATING THEMSELVES

On April 26, 1946, there was much commotion high up in one of our oldest gum trees. Magpies and piewits were dashing at a kookaburra perched on a bough. The kookaburra decamped. The same thing happened in the same tree on April 15, 1947, and again the kookaburra was forced to move on.

E.C

WHAT, WHERE AND WHEN**General Excursions:**

- Saturday, October 9—Plenty Gorge. Leaders: Members of Geology and Botany Groups. Invitation to all Club members. Train from Princes Bridge 9.5 a.m. to South Morang (change at Thomastown). Two meals required. Afternoon excursionists by 1.20 p.m. Whittlesea train from Spencer Street, direct to South Morang. Plenty River and Gorge short walk from South Morang railway station. Rail fare, 2/2, 2nd class return.
- Saturday, October 16—Lahertouche (Gippsland). All-day visit by private cars, to obtain special botanical exhibits for Show. Leader: Mr. Colin F. Lewis (Tel. Dandenong 686), who will furnish full particulars to members able to provide own transport. Leader will meet other cars at Dandenong en route.
- October 19 to 21 (Tuesday to Thursday inclusive)—Three-day Australian Nature Exhibition at Hawthorn Town Hall. Open each afternoon and evening, with morning sessions for schools by arrangement. Director: Mr. A. J. Swaby (Tel. XW 2559), 17 Avondale Street, Hampton.
- Saturday, October 23—Toolern Vale. Subject: "Birds." Leader: Mr. A. S. Chalk. Nash's bus from Batman Avenue, 9 a.m. Bookings, 7/6, with Mrs. J. Pinches, 8 Thomas Street, Brunswick, N.10. Bring two meals.
- Tuesday, November 2 (Cup Day)—Club picnic, Arthur's Seat, Dromana. Leader: The President (Mr. J. Ros Garnet). Nash's bus from Batman Avenue 8.30 a.m. Bookings, 9/-, with Mr. R. D. Jemison, 3 Linda Street, Coburg, N.13. Two meals required

Preliminary Announcements:

- Sunday, November 14—Macclesfield. Subject: "Spiders." Leaders: Messrs. A. and R. Dunn. Nash's bus from Batman Avenue, 9.30 a.m. Bookings, 7/6, with Miss M. E. Argo, 25 Spray Street, Elwood, S.3.
- Saturday, November 27—Inverloch, 200-mile parlour coach excursion via Cape Patterson, leaving Batman Avenue 7.45 a.m. Full particulars later. Advance reserved seat bookings, approx. 20/-, with Mr. H. Stewart, 14 Bayview Terrace, Ascot Vale, W.2 (Tel. FU 022, Ext. 457).

Group Fixtures:

- Monday, October 25—Botany Group. Royal Society's Hall, 8 p.m. Subject: "Swamp Ephemerals."
- Monday, November 1—Geology Group. Royal Society's Hall, 8 p.m. Subject: "Build of Victoria, Part 3, The Port Phillip Area."
- Thursday, November 4—Wildflower Garden Group. Royal Society's Hall, 8 p.m. New members cordially invited to join.
- Friday, November 5—Marine Biology Group. Royal Society's Hall, 7.45 p.m.
- Saturday, November 6—Geology Group excursion. Full details at previous Group meeting, or from Hon. Sec. of Group, Mr. A. A. Baker, 53 Carlisle Street, Preston, N.18.

Special Notice:

Excursions Committee would welcome suggestions for 1949 excursion syllabus, also volunteers to lead, especially for extended week-end and holiday period excursions.

H. C. E. STEWART:

Acting Excursions Secretary,

(Tel. FU 022, Ext. 457).

The Victorian Naturalist

Vol. 65.—No. 7 NOVEMBER 4, 1948

No. 779

PROCEEDINGS

The monthly meeting of the Club was held at the National Herbarium on Monday, October 11, 1948. The President, Mr. J. Ros Garnet, and about 170 members attended. Apologies for non-attendance were received from Messrs. P. Crosbie Morrison, T. S. Hart and E. E. Lord.

Members will be interested in the news that Miss Dawn Weston, now travelling abroad, had been spending some time with Miss Nancy Fletcher, who is still in Birmingham, but who frequently has occasion to travel on the Continent.

The President thanked the following members for their co-operation with the exhibit at the Royal Show: Mr. and Mrs. Dave Lewis, Mrs. Pinches, Mrs. Osborne, Miss E. Dixon, Mrs. Grassick, Miss Davies, Miss Balaam, Miss Peterson, Mrs. and Miss Holland, Mrs. Freame, Messrs. Schubert, Ros Garnet, Hammet, Reeves, Dodds and Finlayson. The courtesy of the Museum was also acknowledged in lending specimens of animals, and our thanks were due to Mr. Isaac, M.L.C., for his assistance, and also to Mr. Reeves for his photographs.

The President reported that the Rushworth excursion was a great success, and the party had been accorded a civic welcome. The Club Picnic on Cup Day would be to Arthur's Seat.

The President advised that the Assistant Secretary, Miss Adams, had been granted three months leave as she is going to Rockhampton, and wished her good hunting in birds and flowers. Our good wishes were extended to Mr. R. Kershaw, who is soon to depart for Tasmania, where he is to live in future.

The Secretary reported that new nomination forms were available. He again asked for members to advise him of any Club property they hold.

A welcome was extended to any visitors present, and also in particular to new members who have been admitted as under: Ordinary Members: Mr. Tarlton Rayment, Mr. T. E. George, Mr. A. H. Bradfield. Country Member: Mr. B. B. Given. No nominations for membership had been received.

Miss Wigan brought good wishes to members from Mr. Noel Lothian, Director of the Botanical Gardens in Adelaide, and Miss Watson from the Western Australian Field Naturalists' Club. Mr. S. R. Mitchell brought greetings from our former secretary, Mr. F. S. Colliver.

SOIL CONSERVATION RESEARCH

The speaker for the evening was Prof. J. S. Turner, whose subject was "Soil Conservation Research on the Bogong High Plains." The speaker showed slides of the surrounding country, and also of the alpine flora on the High Plains, followed by films. Experimental work is being carried on by trained botanists to determine the damage done by cattle to the important soil-holding plants of the area. Particularly beautiful were some studies of *Helipterum albicans* growing amongst rocks with *Brachycome rigidula*. Prof. Turner also exhibited some fine drawings of alpine wild-flowers by Miss Margaret Stones.

EXHIBITS

Dr. M. M. Chittaway: Exhibit of "branch stubs" of *Eucalyptus obliqua*; some photographs of the recent trip to Rushworth and Whroo.

Mr. F. S. Seaton: *Leptospermum scoparium* var. "*Lambethii*", and *Pterocordia plumosa*, both garden-grown at Caulfield.

Mr. J. Ros Garnet: A collection of pigmy plants from Rushworth—*Juncus bufonius*, *Helipterum pygmaeum*, *Hydrocotyle colycarpa*, *Rutidosus multiflora*, *Levenhookia dubia*, *Crassula macrantha*, *Myriocephalus rhizocephalus*, *Drosera pygmaea*, *Glossostigma clatinoides*, *Trichinium spathulatum*, *Fimbristylis tenella*, *Centrolepis strigosa*.

Mr. A. A. Baker: Rock specimens from South Morang excursion, 9/10/48—Newer Basalt from the Plenty Gorge; grandodiorite, fresh and weathered forms; felspar phenocrysts in granite, hornfels and banded hornfels, and iron jointing in Silurian shales.

Mr. C. J. Gabriel: "Carrier" shells—*Xenophora conchyliophorus* Born (West Indies), *X. calculifera* Reeve (Hong Kong), *X. pallidula* Reeve (Japan), *X. corrugata* Reeve (Hong Kong), *X. (Turgium) exuta* Reeve (Hong Kong), *X. (Onustus) solaris* Reeve (China).

Mr. Alan Carter: A series of *Notocallista Kingi* (Gray 1827) from Rosebud, Victoria, showing the great variation of colouring exhibited by this species of shell.

Messrs. C. French and R. Bury: Native flowers from Queensland, Western Australia and Victoria, grown at Maranoa Gardens.

Mr. S. R. Mitchell: Opal and calcite pseudomorphs.

Mr. P. Crosbie Morrison: Common Heath (*Epacris impressa*), pink, with "double" (actually quintuple and sextuple) flowers, collected by Dr. Byron L. Stanton at Belgrave Heights, October 9.

SEEN AT YERING

On April 29, 1948, we saw hosts of white cockatoos feeding on beautifully green pasture—a lovely sight. From the road, they looked like white-leghorn fowls. Half the flock flew, delighting us with their graceful flight, as they wheeled and turned. We have seen them in the same locality alighting on a gum tree, looking like great white flowers.

E.C.

CONTRIBUTIONS TO THE FLORA OF SOUTH
AUSTRALIA—II

By DR. ERWIN GAUBA, Research, Vic.

CHENOPODIACEAE

Kochia erioclada (Benth.) Gauba, stat. nov.[syn. *Kochia triptera* Benth. var. *erioclada* Benth.]

Tubus perianthii fructiferi 4.5-6 (7) mm. longus, ambitu in longitudinali sectione infundibuliformi: in medio constrictus, supra medium apicem versus obconico-dilatatus et eandem fructus includens, basin versus solidus et sicut stipes angustatus. Tubi laevi lobis quinque ad marginem \pm sparse ciliatulis, horizontaliter depressis, stylum stigmataque tergentibus dense clausus. Ala circum tubi apicem horizontalis 3-5 mm. lata, membranacea, glabra, margine integra vel leviter undulata. Tubi alae verticales 3-4 (5) superne cum ala horizontali coalescentes eademque qua ala horizontalis latitudinis, basin versus sensim arcuato-angustatae.

Leg. et J. Drummond No. 432, W.A. (TYPE).

This plant, a small shrub up to 2 ft. in height, has been described by Bentham as variety *erioclada* of his *Kochia triptera*. However, in the course of accurate examination, several contradictions arose, necessitating a comparison of Drummond's specimen No. 432 ("var. *erioclada*") with those original specimens upon which Bentham had based his diagnosis of *K. triptera*, i.e., the specimens collected by James Drummond in Western Australia (without number), by Beckler in the Darling Desert (Vict. Expedition, 1861) and by E. Giles near Mt. Murchison—all preserved in the National Herbarium, Melbourne. I found that, with regard to the entirely different structure of its perianth tube, Drummond's *exsicc.* No. 432 cannot be classed as a variety under *Kochia triptera*. Bentham's description of the var. *erioclada* (*Flora Australiensis*, V, 1870, p. 185) reads: "Branches densely tomentose; leaves glabrous as in the typical form, but more obtuse and terete."

I do not attach a high systematical value to the indumentum of *Kochia* species, rather more to the form of the leaves. But there are very important differences in the structure of the perianth tube. For his type *triptera* Bentham quite correctly states, "broadly turbinate tube": but in var. *erioclada* the tube (which Bentham probably has not submitted to examination) is funnel-shaped in longitudinal section—from the constricted middle enlarged upwards and enclosing the fruit cavity, but narrowed downwards into a thin stipe (and not with a "thick solid base" as in the type).

In both plants the tube of the fruiting perianth is, though in a different way, firmly closed by the horizontally depressed lobes; but in the type, the style and the stigmata protrude, whilst in the var. *erioclada* they are bent down under the lobes and therefore invisible.

With regard to the structure of the flower there are further differences: for instance, in the shape of lobes and of the ovary, etc.—as it is shown in Fig. 3, a and b.

All these facts justify my raising of Benthani's var. *eriolada* to the rank of a good species, and the foregoing description of the fruiting perianth enlarges the short diagnosis given by Benthani.

In addition to Drummond's original sample, No. 432 from

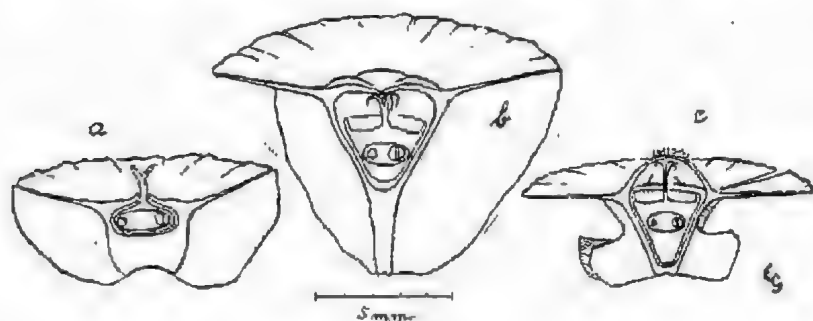


Fig. 2

Vertical section of fruiting perianth of:

- (a) *Kochia triptera* Benth. (leg. E. Giles, near Mt. Murchison).
- (b) *Kochia erioclada* (Benth.) Gauba (leg. J. Drummond, No 432, W.A.).
- (c) *Kochia decipiens* Gauba (leg. E. Gauba, Loveday, S.A.).

W.A., I consider as belonging to *Kochia erioclada* the following specimens in the National Herbarium, Melbourne:

Northern part of Yorke's Peninsula (leg. Miss Salmon, 1869); Eucla Harbour (leg. Forrest, 1870); Between Eucla and Fowler's Bay (leg. Richards, 1875); South of White Wells, Head of Great Austr. Bight (leg. J. H. Willis, 1947); Ceduna, Great Austr. Bight (leg. J. H. Willis, 1947); and Moonta, Spencer Gulf, S.A. (leg. ?).

All these specimens come from the coastal region and their fruiting perianths are very uniform in size and structure, being of dull brown colour in the dried state (cf. *K. triptera*, which is blackish, lacquered and shining); when fresh they are pale green to bright rosy-crimson. It would thus appear that *K. erioclada* is typically a coastal plant; but I found at the Melbourne Herbarium also specimens from inland districts. There are some sheets labelled "Barrier Ranges, 1889, Mrs. Irvine" containing a mixture of *K. erioclada* and *K. decipiens* (*sp. nov.*) and another sheet labelled "Balranald (N.S.W.), 1878, No. 152, Dr. Lucas," containing one fragment of *K. erioclada* and one of a *Kochia* which I have not yet determined.

Quite recently (Sept., 1948) Mr. J. H. Willis has collected genuine *K. erioclada* in the Victorian Mallee—growing with *K.*

sedifolia about five miles south of the 65-mile post on the Sturt Highway. I have examined his material and it constitutes the first reliable record of this species from an inland district. Unfortunately the original specimen of Drummond's (No. 432) is only labelled "W.A."; so, provisionally, I must leave the question of the precise geographical range of *Kochia erioclada* unanswered—it certainly occurs in W.A., S.A., Vic., and N.S.W.

Kochia decipiens Gauba, *sp. nov.*

Frutex ad 70 cm. altus [prope Loveday], regulariter ramosus, ambitu pyramidalis.

Axæ (caulis et ramus) dense albo-tomentosi, ad insertionem foliorum pilis albis 2 mm. longis instructi. Folia succulentia glabra, glauca, in sicco nigrescentia, apice rotundata interdum brevissime mucronulata, basi attenuata, interdum claviformia, 10-15 mm. longa, axillis fasciculiferis.

Flores singuli in axillis foliorum sessiles, perianthiis fructificationis tempore alatis spicas tristichas densas formantibus. Lobi perianthii floriferi quinque e basi lata rotundato-triangularis vel oblongi, ad marginem dense albo-villosi, supra tubum obconicum erecti vel arcuato-commissures. Stamina 5 e perianthio non exserta, filamenta 2 (2½) mm. longa, plana, basi caulescentia, apice angustata. Antherae cordata-oblongae vel oblongae, ca. 3 mm. longae. Stylus 1 mm. longus, stigmatu 3 subulata, 2 mm. longa, e perianthio juvenili exserta.

Tubus perianthii fructiferi 3-3½ mm. longus, e basi angusta ad apicem versus sensim obconico-dilatatus, in medio vix vel leviter constrictus, ad faucem 3-4 mm. diametro; caeca ⅔ longitudinis tubi occupans, sed saepe usque ad basin eius descendens (in *Kochia triptera* et *K. erioclada* caeca dimidio brevior quam tubus). Lobi perianthii fructiferi supra faucem tubi sicut lectum commissures et stylium cum stigmatibus occultantes. Alae horizontales circum faucem tubi expansae, glabra, primum viridis vel roseae, demum brunneae vel griseae, unilaterales fixae, usque ad 5 mm. latae. Alae verticales quoad numerum inconstantes, quoad formam et magnitudinem variabilissimae, saepe 3-5, sed tantum modo in parte tubi inferiore bene evolutae, in qua parte usque ad 2 (3) × 2 mm. latae-altae, rotundatae vel angulatae; pars tubi superior anguste alata vel alae ad costas reductae vel nullae. Duae alae (raro plures) interdum valde rudimentariae, ad lobulos vel gibbos inconspicuas reductae vel nullae.

Very common on sandy and loamy soils around Loveday, flowering and fruiting October-May (TYPE—leg. E. Gauba, 15.11.42).

I cannot place my *Kochia* specimens from Loveday either under *K. triptera* or under *K. erioclada*. Though the leaf shape and the axial indumentum of my plant conform to those of *K. erioclada*, there is an essential difference in the structure of the fruiting perianth. The tube of the Loveday *Kochia* is obconical (sometimes with a slight constriction at the middle) and the fruit cavity occupies at least two-thirds of its length, but often descends down to its base. The perianth lobes, densely villous on the margins, are not depressed but form a prominent dome above the throat. The vertical wings are in contrast to those of the two previous species, being generally well developed only in the lower half of

the tube. These structures and features are sufficient to justify the above description of my Loveday specimens as a distinct species. Mr. Willis's field observations in the far north-west corner of Victoria lend further support to my contention—he describes *K. erioclada* as a bushy undershrub to 2 ft. (ca. 60 cm.) high, whereas *K. decipiens* is much larger and more attenuated, to 6 ft. (ca. 2 m.) high. Both have clustered greenish to bright rosy fruits, when fresh.

As far as I could see from collections on hand at the National Herbarium, Melbourne, this species embraces a wide range of forms, their diversity being chiefly caused by the varying degree of development of the vertical perianth wings. Nevertheless, if we emphasize the structure of the fruiting perianth itself, regardless

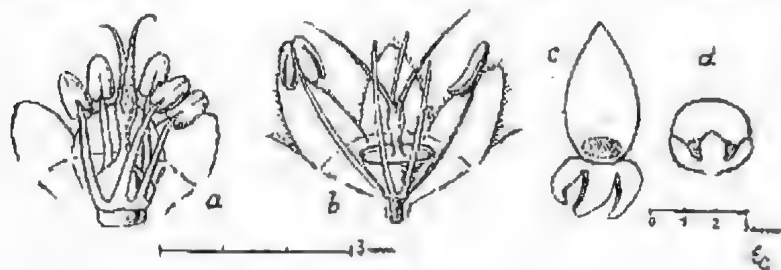


Fig. 3

- (a) Flower of *Kochia triptera* Benth. (leg. F. Giles, Maconnell Ranges, 1875).
 (b) Flower of *Kochia erioclada* (Benth.) Gauba (leg. Miss Salmon, northern part of Yorke's Peninsula, 1869).
 (c) Fruit of *Rhagodia nutans* R.Br. var. *oxycarpa* Gauba (leg. E. Gauba, Loveday, S.A.).
 (d) Fruit of *Rhagodia nutans* R.Br. (leg. Mrs. A. E. Dyason, Research, Vic.)

of these wings (which vary in size, form and number, very often on the same sample), we may group all forms around the Loveday type. I desist here from the creation of any varieties, pending study on a larger scale, and will only mention some extreme forms among the collection at the Herbarium, putting them all under *Kochia decipiens*. The species occurs also in W.A., S.A., Vic., and N.S.W., but, unlike *K. erioclada*, does not evince any preference for coastal localities.

The most perfect development of vertical wings, extending from the base up to the horizontal wing and often connate with it (their upper border being as large as or shorter than the horizontal wing), is exhibited in the specimens from: Barrier Ranges, N.S.W., *pro parte* (leg. Mrs. Irvine, 1889); Lake Torrens, Arcoona Range (leg. R. Tate, 1883, sub "*K. pentatropis*" Tate); and Tarcoola, S.A. (leg. E. H. Ising).

The greatest reduction in size, to narrow longitudinal ridges or basal fin-like appendages, is shown in samples from: Red Cliffs, Vic. (*leg.* Miss Jean Galbraith, 1947), a small fruited form; and Coolgardie, W.A. (*leg.* R. F. Thornton, 1895).

An indumentum of very long soft hairs covers the juvenile leaves of a specimen from Lake Lefroy, W.A. (*leg.* R. Helms, 1891).

The greatest conformity to the Loveday type is shown in a specimen from Mildura, Vic. (per Bot. School, Melb. Univ., 1936).

With regard to the systematic affinity (to one another) of the three *Kochia* species treated above, it may be stated that *K. triptera* occupies an isolated position, while *K. erioclada* and *K. decipiens* are obviously close relatives. A shortening of the stipe, a size reduction of the vertical wings and finally a domeshaped erection of the perianth lobes, the ciliate edges of which become densely villous, may theoretically indicate the course of evolution from *K. erioclada* to *K. decipiens*, or (the reverse changes) from *K. decipiens* to *K. erioclada*—an idea only, of course, but supported by the existence of transition forms with regard to the one or the other characteristic. In any case, *K. erioclada* and *K. decipiens* are close links in the same evolutionary series.

Rhagodia nutans R.Br., var. *oaycarpa* Gauba, var. nov.

Bacca *matura aurantiaca ovoides (nec depresso-globosa), apice acuto, 2-2½ mm. lata, 4-5 mm. longa (i.e., duplo longior quam lata est). Lobi perianthii tempore fructuum maturorum succulenti, 1½ × 1 mm. longi-lati, arcuato-deflexi. Perianthium nuda cum bacca decedens.*

Loveday, in a bush clearing (TYPE—*leg.* E. Gauba, 28.5.43).

Specimens I collected near Berri (27.1.43) were in flower, but without ripe fruits, therefore not exactly determinable.

Atriplex leptocarpa F.v.M.

This species is variable in all parts. Provisionally I relegate my specimens from Berri (*leg.* 27.1.43) to the *forma minor* R. H. Anderson (q.v. *Proc. Lin. Soc. N.S.W.*, LV, 1930, p. 499): "*bracteolis fructiferis 2-4 mm. longis tubo dilatato subglobozo*," but the fruiting perianths of my samples have above the rounded base two lateral hollow humps. J. M. Black (*Fl. S.A.*, Part II, 1924) mentions a var. *acuminatum*—suppressed in the second ed., 1948—with fruiting bracteoles "often furnished at their base with 2 small hard dorsal tubercles."

These humps evidently signify an enlargement of the seed cavity, and exactly the same perianth is observable in a specimen at the Melbourne Herbarium, labelled "H. W. Potts, Murray River, 19.4.1901."

With regard to the multiplicity of variations and their numerous combinations to which *A. leptocarpa* is subject, I cannot at present

evaluate the systematical importance of this particular structure, until a thorough examination has been made of the species' whole and very considerable variability.

Atriplex prostrata R.Br.

Very common on loamy soils at Loveday, together with *Atriplex semibaccata*, *A. campanulata*, *Bassia uniflora*, *B. patentiuspis*, *B. paradoxa*, and other *Chenopodiaceae*.

The species is apparently new for this area. Black (*Fl. S.A.*) admits it only from Yorke Peninsula, Kangaroo Island and Eyre's Peninsula.

(To be continued.)

MONTHLY NOTES FROM THE PORTLAND F.N.C.

By NOEL F. LEARMONTH, Tyrendarra.

A Search for Rare Ferns

Some of our members held a field day early in September, their object being the re-discovery of two local ferns collected by William Allitt eighty years ago, but not seen since, viz., Forked Spleenwort (*Asplenium praemarstonii*) and Common Filmy Fern (*Hymenophyllum cupressiforme*). They were both said to occur "on Darlots Creek" (Tyrendarra), though, in the case of the Spleenwort, which has never been found elsewhere in Victoria, Mueller added rather confusingly "near the Grampians."

We had previously searched a large area near Tyrendarra for these ferns without success, so this time tried the upper reaches of the stream where it rushes wildly through a narrow gorge between a limestone cliff and piles of rugged basalt barriers—a rough, isolated spot near the former Lake Condah Aboriginal Station. Here we found Fishbone Fern (*Blechnum nudum*), Soft Water Fern (*B. copense*), Hard Water Fern (*B. procerum*), Common Azolla (*A. filiculoides*), and Common Maidenhair (*Adiantum athiopicum*), but neither of Allitt's species. However, in a deep limestone crevice was a single plant of some wood-fern (*Dryopteris*) which will probably turn out to be Naked Wood-Fern (*D. pennigera*), reported from Sherbrooke Creek (Port Campbell), and later found growing abundantly on the Mole-side Creek, Lower Glenelg, by Mr. Cliff Beaglehole. Another similar plant was found higher up the creek.

In the record floods of March, 1946, when almost twenty inches of rain fell in three days, this gorge was swept clean of all vegetation, thus destroying what was probably a mass of ferns and leaving only the remnants which we found there. However, the hunt for Allitt's ferns will be continued, as favourable and hopeful terrain runs into many square miles. Other uncommon finds for the day were the Black-shouldered Kite (*Ictanur asillaris*), a bird we have not seen in our district for many years, also an outside pair of Wedge-tail Eagles with their nest surmounting an equally outside tree on a cliff edge—a very wild, out-of-the-way corner.

ERRATUM

In the *Vict. Nat.* for October (page 149) the caption under illustrations of Rev. H. M. R. Rupp's new *Prasophyllum* species should be extended to read, "All figures greatly enlarged except No. 1, which is only about half natural size."

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Mr. Kershaw (1866-1946), whose obituary by R. A. Keble was published in the *Naturalist* for April, 1946, p. 243, also wrote a memorial notice concerning Professor Sir Baldwin Spencer (*Vict. Nat.*, Vol. XLVI, p. 102).

I am indebted to Mr. F. S. Colliver for aid and helpful suggestions in the compilation of this bibliography of my late grandfather.

—R.C.K.

"OLE MAN RIVER"

On Saturday, September 11, a few members of the Geology Group went to the Outer Circle Railway Bridge at Fairfield to study the history of the Yarra. Though the attendance was not good, those who came had a very interesting time under the tutelage of Mr. Bryan.

It was at this point that "Ole Man River"—the original Yarra—was blocked during Pleistocene (?) times by a flow of newer basalt down the old Darebin Creek. "Ole Man River" could no longer keep "rollin' along." "He" couldn't even get over the barrier, and so the waters were dammed back, forming a lake which extended as far as Templestowe, four miles upstream from Heidelberg. Owing to the checking of the flow, silt was deposited over this area, thereby raising the level of the river until it was able to flow over the barrier and carve another course—between the Newer Basalt lower down at Collingwood and the Silurian rock which forms the hills at Kew.

In a road cutting near the Outer Circle it was noticed that two distinct layers of sand and silt were deposited horizontally on top of the tilted Silurian strata during the period of blockage. As the river cut deeper down into the basalt below the bridge, it was also able to cut down deeper into the silt above the bridge. This work is still continuing because the Yarra has not yet reached its original level.

The members proceeded upstream from the bridge and noticed numerous river terraces, indicating the different levels of the stream from time to time. Some good examples of "ox bow" lakes or "cut-off meanders" were also seen.

A.P.J.

OBITUARY

Mrs. Blanche E. Miller, whose death took place on August 1, was connected with all the leading clubs and societies interested in Natural History in this State, and worked in various ways for the welfare of all.

Mrs. Miller made herself familiar with the history of the Field Naturalists' Club by personally tabulating and indexing its doings, and this exceedingly valuable work was always freely available to anyone requiring it for reference. She was never an office-bearer in any of the clubs to which she belonged, but her husband, Mr. V. H. Miller, is a Past President of our Club, and was for very many years on its executive committee.

Mrs. Miller's chief interest was in birds, and she was associated for many years with the work of the late Dr. J. A. Leach. Her great delight was to introduce a new member—especially a junior—to any of the clubs and societies with which she was connected, and it would be very hard indeed to assess the actual worth of the work done by her over the years.

M. L. WIGAN.

WHAT IS CALADENIA GRACILIS R.Br.?

By the Rev. H. M. R. Rupp, Northbridge, N.S.W.

Robert Brown's description of this orchid (as a species from Van Diemen's Land) will be found in his *Prodromus* (1810), p. 324. Bentham [*Fl. Austr.*, VI (1873), 387] suppressed the species, and gave *C. gracilis* as a synonym of *C. testacea* R.Br. Rodway [*Tasm. Flora* (1903), 205] agreed with Bentham, and described *C. testacea* as occurring in Tasmania. Following his description is a note to the effect that Hooker's figure of *C. alata* R.Br. (in the second volume of his *Tasm. Flora*, plate CXXV) really represents *C. testacea*, but is incorrectly coloured. But the figure in question is an excellent representation of *C. angustata* Lindl.; it is certainly not *C. testacea*. Rodway is correct in saying that it is not *C. alata*; but although we cannot be sure whether Bentham was right in reducing the latter to a synonym of *C. carnea* R.Br., we do know precisely what *C. angustata* is like. The names in Hooker's plate were (probably accidentally) transposed. The plant over the name *C. alata* is a typical *C. angustata*, while the plant over the name *C. angustata* is not that species; if it correctly represents Brown's *C. alata*, then the latter is identical with the plant which Rogers named *C. alpina* [*Trans. Roy. Soc. S. Austr.*, LI (1927, 12)], which in its turn has been shown to be conspecific with the New Zealand *C. Lyallii* Hook.f. It would appear, then, that Brown's name *alata* has priority for this species? But it is quite certain that none of the plants concerned in Hooker's Tasmanian plate is *C. testacea*.

Brown described the latter (*Prodr. l.c.*) from Port Jackson specimens. It is a common orchid in many districts of New South Wales, especially on dry hillsides in coastal forests. It is also found in Victoria, where a brightly-coloured form was for a while accorded specific rank under the name *C. Hildae*. This is the only variation from the type which has been recorded. *C. testacea* is so distinctive in appearance that in the living state it could never be confused with any other species; but herbarium specimens, unless very carefully dried, might easily be mistaken for small forms of *C. angustata* or *C. carnea*. With the exception, perhaps, of the West Australian *C. aphylla* Benth., it is the most attenuated species in the genus; and from this extreme slenderness it scarcely ever shows the slightest variation. The small flowers number one to six in a terminal raceme. The perianth is rather dark brown externally, and glandular-pubescent; inside it is more or less golden green. The labellum is seldom definitely lobed; its margins are entire along the erect basal portion, then rather coarsely fimbriate, and then crenulate to the recurved or revolute tip. The discal calli are dark reddish-purple, in four rows which fuse and

become congested towards the tip. The flowers are sweetly honey scented.

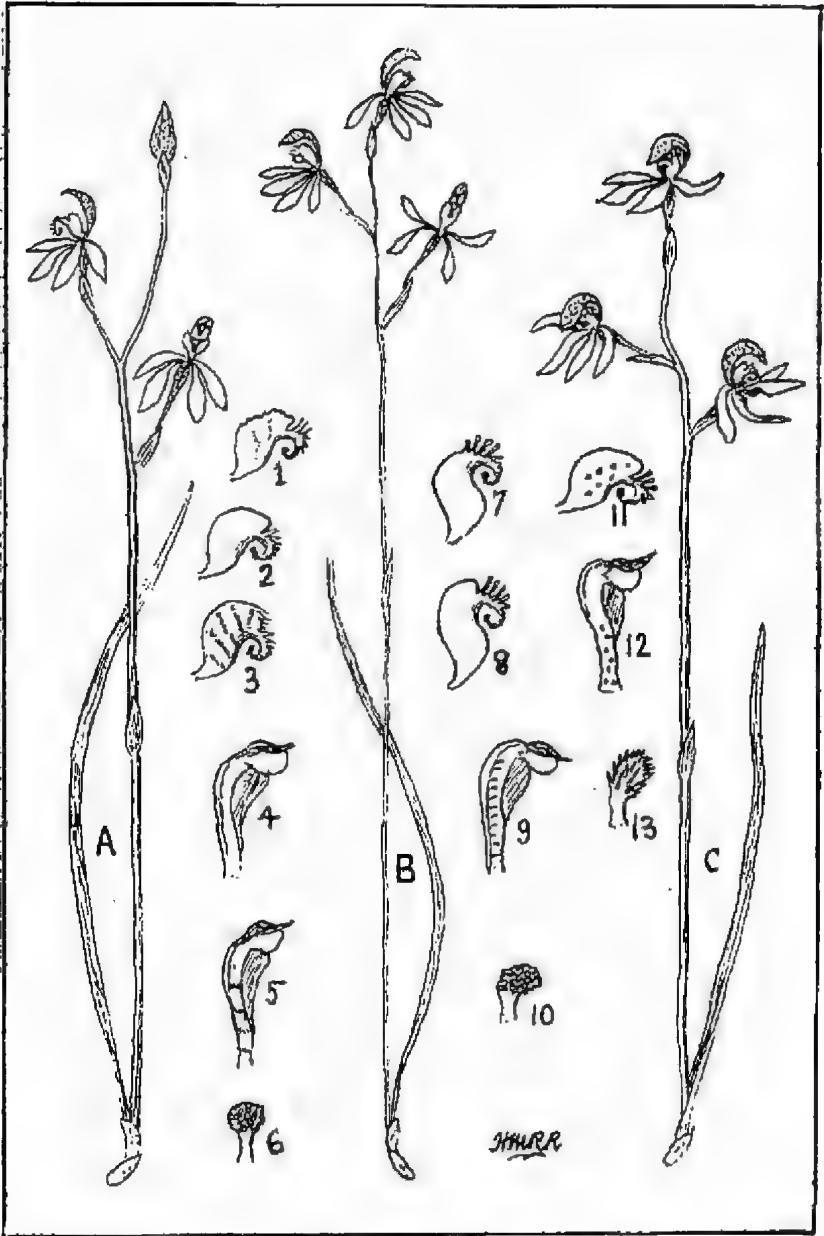
Now what has all this to do with Brown's *C. gracilis*? I believe that this species was wrongly suppressed by Bentham, and that it is the orchid which has passed for many years in Tasmania as *C. testacea*. During a residence in the island State from 1920 to 1923, I frequently collected the so-called *C. testacea*, but could never reconcile it with the New South Wales plant of that name, with which I was very familiar. To me it seemed more like *C. cucullata* Fitzg.; and I still think its affinities are closer with that species than with *C. testacea*; but the discal calli of the labellum are very different. In the National Herbarium at Sydney there are about 65 specimens of this plant collected by Ronald Gunn more than a hundred years ago. They are in an admirable state of preservation. I have made a critical examination of a number of the flowers, comparing them also with the more recent specimens collected by myself.

Brown's description of *C. gracilis*, *l.c.*, is as follows:

C. gracilis, perianthii folialis aculis, labelli glandulis quadriseriatis, lobis lateralibus latioribus quam longis nudiusculis, intermedio breviter fimbriato; disco basi glanduloso. (D.). [The bracketed D denotes Van Diemen's Land.]

Rodway's description, which is very brief, will be found as cited above, under the name *C. testacea*. The following more elaborate description of this plant, which I believe to be *C. gracilis*, is offered with a view to showing the differences between it and its nearest allies.

A slender plant, but never attenuated like *C. testacea* R.Br., 10-24 cm. high, with an acute bract about half-way up the stem. Stem more or less glandular-hairy; ovary densely so; leaf almost or quite glabrous, linear, 9-14 cm. long. Flowers 1 to 6, but most commonly 2-3, in a terminal raceme. Perianth outside dusky grey or sometimes brownish, densely glandular-pubescent; inside greyish-green. Dorsal sepal cucullate, but less so than in *C. cucullata* Fitzg., narrow-lanceolate, 10-12 mm. long. Lateral sepals and petals similar to the dorsal sepal except for the cucullate curve, spreading or somewhat deflexed. Labellum shorter than the perianth, trilobate; basal portion erect, then gradually recurved or even revolute; lateral lobes short and broad, their margins either (1) entire, or (2) irregularly and minutely fimbriate, or (3) sharply dentate in front. Middle lobe either (1) conspicuously fimbriate, or (2) deeply dentate, or (3) crenulate near the purple tip. Calli of the disc shortly stalked or almost sessile, round-headed and glandular-rugose, but devoid of prickles like those of *C. cucullata*, not inclined forward as in *C. testacea*, purplish-brown, in 4 irregular rows or irregularly scattered, but in either case congested towards the tip of the middle lobe. Column



For Key, see page 176

straighter than in *C. testacea* or *C. cucullata*, and the wings extending farther down. Labellum and column both occasionally barred with pink transverse striae, but this feature is very inconstant.

The very variable character of the labellum, as indicated above, is not shared by allied species. Although it would appear from a general survey of the characteristic features of the flower that *C. testacea* and *C. cucullata* are the nearest allies, neither of these species (at least in their typical forms) occurs in Tasmania; and it is suggested that a natural cross between *C. carnea* R.Br. and *C. angustata* Lindl., both of which are abundant there, might be expected to produce a form such as *C. gracilis*.

Most of Gunn's specimens came from "Degraeveses", a locality identified by Mrs. Florence Perrin of Launceston as the Cascades near Hobart. I collected the species there myself, and also at Brown's River. All but one of the records known to me are from southern Tasmania. The exception is that given by Bentham, *l.c.* (under *C. testacea*): "Port Dalrymple, R. Brown." This locality is at the mouth of the Tamar estuary. Much collecting has been done in that area by keen and competent observers, but the record has not been repeated. It is curious that Hooker omits both *C. gracilis* and *C. testacea*, though he must surely have seen Gunn's specimens. The occasional occurrence of transverse bars on the column and labellum may have led him to associate the dried material with *C. carnea*.

In conclusion, I do not hesitate to express the view that *C. gracilis* R.Br. is a valid species, and that it should be restored in place of *C. testacea* in any future publication of the flora of Tasmania.

Caladenia gracilis R.Br. and allied species.

KEY TO ILLUSTRATION

A, *Caladenia gracilis* R.Br. B, *Caladenia testacea* R.Br. C, *Caladenia cucullata* Fitzg. Plants about natural size. Figs. 1-13 all enlarged.

1-6, *C. gracilis*. 1, 2, 3, labella from the side, showing variations. 4, 5, columns. 6, a discal callus.

7-10, *C. testacea*. 7, 8, labella: No. 8 showing obscure lobation. 9, column. 10, a discal callus.

11-13, *C. cucullata*. 11, labellum. 12, column. 13, a discal callus

WANTED TO BUY—Mathew's *Birds of Australia*. Three parts only: Vol. 8, Part 2; Vol. 10, Part 1; Vol. 12, Part 1. Good prices would be given. Apply Robertson & Mullens Ltd., Box 82A, G.P.O., Melbourne.

"CUP-FLOWERS"

By R. D. LEE, Brighton.

While wandering around the salt marshes at Seaholme during spring, 1947, our attention was attracted to an area of a few square yards, slightly higher than the actual marshy ground. We say "slightly higher" advisedly, as the altitude of the highest part would only be some four or five feet above water level. However, this particular patch was carpeted with light grey. We investigated and found innumerable little plants no more than three inches high. Upon later enquiries they proved to be the "Common Cup-flower," *Angianthus Precisianus*, a species we had never seen before.

We also learned that of the five Victorian species, this Cup-flower is the only one to be found throughout most of the State (all except the north-

Common Cup-flower (*Angianthus Precisianus*).

east)—wherever salt-marshy conditions abound. The other four species inhabit sandy Mallee country in the north-west, with two of them (*A. tomentosus* and *A. strictus*) extending also to similar sandy portions of the south-west.

This genus of *Compositae* embraces dwarf or pygmy plants with a brief life span, flowering and fruiting quickly during the short favourable period in such dry areas. They all, to quote Baron von Mueller, are more or less "beset with somewhat cottony vestiture," giving them that silvery greyish appearance. The flowering heads, surrounded by floral leaves, themselves consist of numerous headlets, each with two or three (according to species) tiny florets—a somewhat unusual "ultra-compound" arrangement in the family *Compositae*.

Mr. J. H. Willis tells me that Western Australia is the headquarters of

the Cup-flowers, with 27 species, including all seven* Victorian ones. In a recent letter that he received from the Government Botanist at Perth, Mr. Gardner expressed dissatisfaction with the unnaturalness of the genus *Angianthus*, which it is proposed to split up again into four genera, viz., *Angianthus* (with the one type species, *A. tomentosus*), *Skirrophorus*, *Chrysocoryne* and *Eriocladium*, several other species being united with the present genus *Gnephosis*. If this plan meets with acceptance, our few Victorian Cup-flowers will be divided among three genera, and *A. Precissianus*—the subject of this paper—will become a *Skirrophorus*.

*[Up to the present year, only five species of *Angianthus* were known to occur in Victoria, but during September I collected two others along the South Australian border: *A. Burkittii* from near Boundary Point in the extreme N.W. corner, and *A. tenellus* from the Great Desert about 18 miles N. of Serviceton.—Ed.]

COCKATOOS AND EUCALYPT GALLS

At Warragul, late in August, I noticed two or three gang-gang cockatoos and remarked that they were rather late visitors this season; I was told that they had probably come to get seeds from some silver-top gums. Later, I went to the trees and saw several gang-gangs energetically nipping the ends off branchlets and dropping them—apparently just for fun. The ground was covered with leafy litter which rained down continuously. Then I noticed that the twigs were heavily infested with galls, many of which were nipped open; obviously the birds were eating the gall larvae (cecidiomyid gnats), so I watched more carefully and saw one young bird nip off a twig, hold the galls in one claw and bite off pieces of the galls which it discarded. The number of unopened galls that were dropped shows the birds to be not over-thrifty; but the evidence is surely enough to convince me that the gang-gang is a friend of our forests.

ARTHUR F. SHELDON, Lilydale.

MUDLARK VICTIM OF EUCALYPT FRUIT

On my suburban back lawn, a pretty mudlark (*Grallina cyanoleuca*) recently flew up to me in apparent distress. It kept close to my feet, as much as to say, "Do you not see I want help?" I talked quietly to the bird, which did not fear my presence, and then noticed that it had something brown attached to one of its feet—a toe was firmly held by the valves on a dry fruit of the "Bangalay" eucalypt (*E. botryoides*). I tried to dislodge the grip, and at times the bird encouraged me by flying a few feet away and struggling itself with its "captor".

At last, I gave up my efforts, while the bird flew off—perhaps disgusted that I was of such little use in this emergency. One admires the pluck of our companionable little mudlark; I once witnessed an interesting fight between magpies and mudlarks when, to my surprise, "Mag" was worsted and flew off leaving spoils to the victors.

Was it not strange that a bird seldom seen in captivity should have become the chance victim of Bangalay "gum-nuts"? There are many specimens of *Eucalyptus botryoides* growing in our streets, but it was certainly bad luck to have been caught, apparently when roosting in one of these trees. Have any similar mishaps come to the notice of ornithologists?

A. J. TADGELL.

BOTANY GROUP EXCURSION TO FERNTREE GULLY

By T. S. HART, Croydon.

A small party in the afternoon, who failed to get in touch with the morning excursion party of June 19th, made observations on the characteristic Gully vegetation of the area in relation to its environment.

The chief causes acting to produce this assemblage of plants may be noted as adequate rainfall and water supply at all seasons, heavy shelter with reduction of the range of temperature—both at the hot and cold ends—and also better conservation of moisture, a suitable soil basis, and the surface forms of the country. The general rainfall establishes a better shelter by abundant vegetation outside the gully itself: the gully vegetation further improves and adds to the soil, an effect helped by wash and slow settling from the slopes, both surface and soil waters receiving additions also from the higher land.

Quite a different type of moist forest vegetation develops in the east of Gippsland with more summer rain and that luxuriance of vegetation which is an ordinary feature farther north on an east coast of the trade wind area (cf. also Natal). Luxuriance is favoured by equable conditions not necessarily the hottest and wettest.

The actual components of gully vegetation then may include: (1) Plants of warmer origins, which are able to extend into cooler climates by lessening of the winter cold. (2) Plants of colder origin, which may extend owing to the mitigation of summer heat and dryness. (3) Plants quite typical of the latitude, if able to grow with sufficient vigour to compete against the others and not be affected by overshadowing or overwetness.

The Blackwood (*Acacia melanoxylon*) is a typical tree of the gullies. It makes height with a straight trunk to reach ample sunlight, and maintains its bipinnate juvenile foliage longer than in more adverse conditions. But Blackwood is by no means limited to the gullies; it continues down the valleys and still makes useful timber, while small forms may be found even in light sandy soils and on the volcanic plains.

The Silver Wattle (*Acacia dealbata*), abundant and tall—to 120 ft.—in the gullies, extends along rivers and creeks freely. It reaches nearly to the tree line on Mt. Baw Baw, where it is still very tall, fitting to the shorter active season of the mountains (flowering early and ripening its seed in five months). The nearly-related Black Wattle flowers late and takes about fourteen months to mature seed. Black Wattle is also a smaller tree.

The Hazel Pomaderris (*P. apicala*) can make dense scrub not only in gullies, if soil and rainfall suit. The Blanket-leaf (*Bedfordia salicina*) of fern gullies grows also on the cliff slopes near Lakes Entrance, facing south and shaded by the cliff and forest above, but open to the moist sea winds; it has adequate shelter and moisture from the summer rains.

The *Tecoma*, like lianes in general, runs to the tree-tops and flowers up there, but it occurs also outside the gullies near Kilsyth, and even sprawling over low granite rocks. The percolation of water gives adequate supplies for roots, at least in some cracks (e.g., Granite Rock, Bairnsdale, with southerly aspect at about 600 ft. elevation). The Forest Wire-grass (*Tetrarrhena juncea*) is not confined to the gullies either.

Nevertheless, all these are characteristic gully plants. The soft herbaceous little *Australim* (of the Nettle family but without stings) is one of the most typical gully plants and can tolerate a remarkable degree of shade. Beech, of course, is a plant of southern origin and in Victoria it occurs only in some of the more favourable gullies, with heavy rainfall. The Giant Mountain Grass (*Glyceria dives*) also seems to belong to the inner, more sheltered valleys, occurring with tall *Leptospermum scoparium*. It is very abundant in the upper Bunyip River and Toorongó country.

WHAT, WHERE AND WHEN

General Excursions:

Sunday, November 14—Macclesfield Subject: "Spiders." Leaders: Messrs. A. and R. Dunn. Nash's bus from Batman Avenue, 9.30 a.m. Bookings, 7/6, with Miss M. E. Argo, 25 Spray Street, Elwood, S.3. Bring one meal.

Saturday, November 27—Inverloch. 200-mile excursion, via Tooradin, Wonthaggi, and Cape Patterson. Subjects: Conchology, Geology and Coastal Botany. Leader: Miss J. Hope MacPherson. Calderwood's parlour coach leaves Batman Avenue, 7.45 a.m. sharp, return to city at 8 p.m. Bring two meals. Reserved seat bookings, 18/6, with Mr H. Stewart, 14 Bayview Terrace, Ascot Vale, W.2 (Tel. FU 022, ext. 457). Advance reservations must be confirmed on or before Monday, Nov. 8, otherwise cancelled.

Saturday, December 4—Willsmere Park Lagoon, North Kew. Subject: "Aquatic Insects." Leader: Miss J. W. Raff, B.Sc. Meet at Park gates, 2.30 p.m. Take Tramways bus in Flinders St. to North Kew: also reached by Tooronga-Kew bus (off at Willsmere and Bedford Roads), and Alphington-Kew Station bus (alight corner Willsmere Road and Grandview Terrace).

Sunday, December 12—Henley Gorge, via Lilydale. Subject: "Geology and Associated Botany." Leader: Mr. A. F. Sheldon. Nash's bus from Batman Avenue, 9.30 a.m. Bring one meal. Bookings, 5/6, with Mr. H. E. Finlayson, 353 Geelong Road, Kingsville, W.12.

Group Fixtures:

Saturday, November 6—Geology Group excursion. Particulars from Hon. Sec. of Group, Mr. A. A. Baker, 53 Carlisle St., Preston, N.18.

Saturday, November 20 (afternoon) Botany Group excursion. Subject: "Swamp Ephemerals." Locality and details at Group monthly meeting.

Monday, November 22—Botany Group. Royal Society's Hall, 8 p.m. Subject: "Myrtaceae."

Thursday, December 2—Wildflower Garden Group. Royal Society's Hall, 8 p.m. New members welcome.

Friday, December 3—Marine Biology Group. Royal Society's Hall, 7.45 p.m.

Tuesday, December 7—Geology Group. Royal Society's Hall, 8 p.m. Subject to be arranged.

H. C. E. STEWART,
for Excursion Committee.

HAWTHORN NATURE SHOW

The Australian Nature Show was held at the Hawthorn Town Hall on October 19-21. The exhibits were well displayed, and, under the able planning of Mr. A. J. Swaby, the work of setting up on the Monday evening went forward quickly and smoothly. The exhibit by the Junior Branch at Hawthorn, in particular, was excellent, and attracted much attention.

Although the financial return may not be as great as last year, there is no doubt of the value of the Show as a medium of introducing to the public the work and aims of our Club. The crowd of school children packing the entrance waiting for the doors to open on the Wednesday morning indicates their interest, and stresses its educational value.

Further details and reports will be given in the next issue of the *Naturalist*.

The Victorian Naturalist

Vol. 65.—No. 8 DECEMBER 9, 1948

No. 780

PROCEEDINGS

The monthly meeting of the Club was held at the National Herbarium on Monday, November 3, 1948. The President, Mr. J. Ros Garnet, and about 180 members were present. An apology was received from Mr. Alan Carter.

The President read a letter from the Inspector of Fisheries and Game in which it was stated that permits held by the company leasing portion of the Fern Tree Gully National Park as a private zoo were to be cancelled and all protected animals and birds removed.

In reply to several enquiries from general members who wished to attend group excursions, the President advised that *all* excursions of the Club were available to any member; but that, where a bus was engaged, the members of the group concerned must rightly have preference. Where the excursion was by public conveyance or there was room on a bus trip, other members would be very welcome to attend.

Mr. Garnet intimated that he and a few members were planning to spend a week at Lake Mountain during January, and asked others interested to let him know so that he could make transport arrangements.

Mr. Swaby reported on the Annual Show, from which the revenue had been £119 and the expenses £84, leaving a profit of £35. He sincerely thanked all members who had helped with the work, either beforehand in planning and gathering the exhibits, or by supervision duties during the Show itself—in some cases this had entailed many hours of unselfish service. He felt, however, that helpers at these functions have a lot to learn in the way of showmanship and that the exhibits should be so displayed as immediately to attract attention. He also considered that plans should be in operation much earlier in the year than is usual.

The President announced that the Australian Natural History Medallion for 1948 had been awarded to Mr. L. Glauert, Director of the Perth Museum. This announcement was received with applause.

A welcome was extended to visitors for the evening, and to the following who were elected as Ordinary Members: Messrs. E. A. Bartleman, N. Carter, R. W. Deutscher, E. Howard, and Misses B. Jeffery and M. Johnson.

The following nominations for Ordinary Membership were received: Mrs K. Pullar, Miss F. L. Paull, Mr. W. L. Davies, Mr. A. W. C. Burston, and Mr. A. N. Usher.

Notice was given that Mr. Coles, of Withers Transport Industries, was planning an evening trip to Phillip Island to see the Mutton-birds; interested members were advised to contact the firm direct.

"THREE THOUSAND MILES THROUGH NEW ZEALAND"

With remarkably clear colour films and facile description, Mr. F. Lewis took members with him through his five months' tour of both Islands of New Zealand. The pictures were taken for a scenic record and embraced such highlights as the bubbling mud pools and hot springs of the thermal area at Rotorua in the North, the Franz Joseph and Tasman Glaciers in the centre of the South Island, and the beautiful lakes and sounds in the extreme south. The Pohutukawa tree, N.Z. Clematis and Scarlet Manuka, the Kiwi and Royal Albatross were among the native floral and bird life so finely portrayed. The films possessed a delicacy and perfection of colour which really captured the beauty of the Islands, and Mr. Lewis attributed his success to the use of a "haze filter" throughout the entire trip. Those who were privileged to see these pictures will long remember the interest and pleasure they aroused.

EXHIBITS

Mr. C. French: Pink Tea-tree (*Leptospermum rotundifolium*), garden grown.

Miss J. W. Raff: White form of Pink-eye (*Tetratheca ciliata*) and branch of "Prickly Moses" (*Acacia verticillata*), much fasciated in crozier fashion—both collected at Katorama.

Mr. C. J. Gabriel: Marine shells—*Cordium tenuicostatum* Lam. (Vic.), *C. esynorum* Desh. (Vic.), *C. pulchellum* Gray (Vic.), *C. edule* Linn. (England), *C. lyratum* Sby. (W. Aust.), *C. unedo* Linn. (Lord Howe Is.), and *Hemicordium cardissa* Linn. (China)

Mr. J. Ros Garnet: Clubbed Spider Orchid (*Calodenia clavigera*) from Arthur's Seat, 2/11/48; "Sikh" Orchid, also known as Mitchell's Greenhood, (*Pterostylis Mitchellii*) from the mallee scrub at Rushworth; Tangle Orchid (*Sarcanthus tridentatus*), formerly known under *Cleisostoma*—one of the five epiphytic orchids to be found in Victoria.

TAIL OF A "BUSHY-TAILED" POSSUM

Having regarded the naked underpart of the possum's tail as a non-slipping adaptation which enables it to grip the twigs to which it clings, and as useful, too, in holding securely bundles of nesting material when climbing to nests in not very accessible places, I was interested to observe at Healesville recently a (to me) new use. While emerging from under the eaves of a sleep-out, an almost fully grown possum was literally scraped off its mother's back, and slithered down the wall for about three feet. As it climbed back, scratching vigorously to get claw-hold on the vertical wall, its tail was pressed perfectly flat against the wall, the naked part acting as a step, or prop. Were it entirely furred the tail would not have been so helpful. Recalling the clammy feeling of that naked part, and the very small joints that would give the flexible, clinging power of fingers, it seemed a remarkable adaptation.

—E.C.

CONTRIBUTIONS TO THE FLORA OF SOUTH AUSTRALIA—III

By DR. ERWIN GAUBA, Research, Victoria.

PAPAVERACEÆ

Roemeria hybrida (L.) DC. var. *velutino-eriocarpa* Fedde.

Loveday, 20.9.1943—not common.

This variety is an alien weed new for South Australia (and probably for the whole continent). The first recorded member of the genus was a plant collected near Riverton (S.A.) by Worsley

C. Johnston and published by J. M. Black (Additions to the Fl. of S.A., No. 29, in *Trans. Royal Society S.A.*, lv, 1931, p. 139) as *Roemeria hybrida* (L.) D.C.

My specimen from Loveday is doubtless the variety *velutino-eriocarpa*, the geographical area of which extends from the Mediterranean region to Turkestan and Afghanistan; I collected it also in Egypt and Persia.

I have some doubt whether Mr. Black's Riverton plant really represents the type. The description given by him (in *Fl. S.A.*, II, second ed., 1948, p. 367), "Erect hairy annual . . . capsule

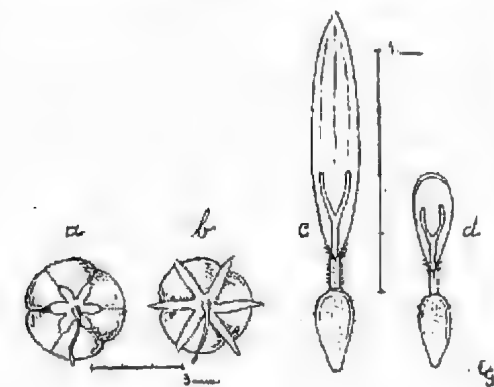


Fig. 4

- a: Fruit with calyx of *Phyllanthus laciniatus* F.v.M. (leg. Mueller, junction of the Murray and Darling Rivers, 1853).
 b: The same of *Ph. laciniatus* var. *deuterocalyx* Gauba (leg. R. Helms, Mt. Squires, W.A., 1891).
 c: Ray flower of *Brachycome ciliaris* Less. (leg. auctor, Loveday).
 d: The same of *B. ciliaris* var. *brachyglossa* Gauba (leg. auctor, Loveday).

more or less bristly," points more toward the above-mentioned variety.

LEGUMINOSAE

Psoralea eriantha Benth.

The original diagnosis of this species was given by Bentham in Mitchell's *Tropical Australia*, 1848, p. 131, after specimens from the Balonne River (Queensland). The species is described as

"*canescenti-pubescentis . . . pedunculis elongatis . . . floribus inferioribus remotis superioribus approximatis . . .*"

Later, in *Fl. Australiensis*, II, 1864, p. 192, Bentham widens the description to embrace material from nearly all States, including under this species forms covered all over with a dense white tomentum. As to the leaf shape and spike structure, he accords a much wider amplitude.

Of the specimens cited by Bentham, there are in the Melbourne Herbarium, unfortunately, only those belonging to the tomentose form, corresponding well with specimens I collected in Loveday (17.12.1944).

An entirely different aspect is offered by a *Psoralea* that I found in another locality of the same district (10.3.1944). It has nearly sessile subglobular spikes and its leaves resemble those of *Psoralea patens* in shape, pubescence and glands; but the calyx points in all details, especially with its dentation, toward *Psoralea eriantha*. My specimen could perhaps be related to the pubescent forms of *P. eriantha*, though Bentham does not mention the immersed glands with which both leaf surfaces are strikingly dotted. Moreover, this Loveday sample bears on branches and leaf stalks, in addition to the verrucous glands, also stipitate ones, a feature I did not observe on any of the 19 Australian species (Black quotes 15 only) that I checked in the Melbourne Herbarium.

Without further basic material for comparison, I cannot yet correctly place my second specimen from Loveday, although Mr. C. A. Gardner, Government Botanist at Perth, has determined (*in lit.*, 14.7.1948) very similar W.A. material as *Psoralea eriantha*. Nevertheless, it seems quite sure that the tomentose forms merit at least varietal rank beside the pubescent form from the Balonne River.

EUPHORBACEÆ

Phyllanthus lacunarius F.v.M., var. *deuterocalyx* Gauba, var. nov.

Calycis lacinae maturitate fructuum 1½-2 mm. longae, latitudinem coccorum aequantes vel paullo longiores (in typo dimidio breviores).

Leg. R. Helms—Mt. Squires, Barrow Range, W.A., 23.9.1891 (TYPE, in Melb. Nat. Herb.). Fig. 4b.

To this variety I relegate all specimens with sepals reaching or slightly exceeding the border of the mature capsule, their tops being pointed (as in the samples of R. Helms) or more or less rounded as in my samples from Loveday, 30.11.44.

In Mueller's diagnosis of *Phyllanthus lacunarius* (*Trans. Phil. Soc. Vict.*, I, 1855, p. 14, also Hooker's *Jour. Bot.*, VIII, 1856, p. 332) there is a correct description of the sepals ("minute, subovate, obtuse . . .") based on his 1853 collecting from the junction of the Murray and Darling Rivers. These samples must be considered as the type (see Fig. 4a), to which I refer also a specimen in the

Melbourne National Herbarium labelled "Goodwin & Dallachy, Darling River." The sepals of both samples do not exceed the middle of the *cocci* and, as far as I saw, they are bent down and shrivelled after the fruitlets have fallen off; in the variety *deuterocalyx* they remain unchanged and spread out star-like.

According to the descriptions in *Fl. of Vict.* and *Fl. of S.A.*, where the sepals are quoted as lanceolate and up to $1\frac{1}{2}$ mm. long, thus approaching var. *deuterocalyx*, it would seem that the latter has a wider distribution and is more common than the type.

MALVACEÆ

Abutilon otocarpum F.v.M.

New for this district, being quoted from the Far North only, but near Loveday it is abundant in sandy localities (7.1.44).

Bentham (*Flora Australiensis*) keyed our plant in the section with carpels "persistent, or rarely at length deciduous," and Black (*Fl. S.A.*) placed it in the group with carpels "not seceding from the axis." These are gradual exaggerations of Mueller's more correct statement (*Key to the System of Vict. Plants*, 1887-88, p. 154): "fruitlets . . . slightly coherent."

My samples from Loveday show, besides flowers, also bare fruiting axes from which the fruitlets have obviously dropped. The same is observable on a number of specimens in the Melbourne Herbarium.

It may be that in this species the fruitlets "secede" a little later or not so readily as in other species; but, in any case, they at last separate completely from the axis. Therefore, such a characteristic should be avoided in the compilation of any key, because it can lead to wrong conclusions.

GOODENIACEÆ

Goodenia heteromera F.v.M.

In Loveday district, common on the banks of the Murray River, opposite Moorook (10.12.44).

I mention this species because, according to Mr. J. M. Black, it seems to be rare in South Australia, from where it is reported only from the River Murray, above Morgan.

COMPOSITÆ

Brachycome ciliaris (Labill.) Less., var. *brachyglossa* Gauba, nov. nov.

Ligulæ 2 mm. longæ, involucri tertia parte circiter breviores (in typo 5-6 mm. longæ, duplo quam involucrium longiores).

Specimina mea annua, ramosissima, inferne glabra, superne imprimis ad pedunculos et involucri bracteas glandulis ± dense obrita. Capitula minora.

Loveday, in locis arenosis (TYPI—leg. Gauba, 6.12.44). Fig. 4d.

In the same district the entirely glabrous *B. ciliaris* and its variety *lanuginosa* (Steetz) Benth. are to be found.

With regard to ramification, glandular indumentum and small heads, the new variety bears a certain resemblance to Drummond's exsic. No. 210, described by Bentham as var. *glandulosa*, but considered by Mrs. G. L. Davis (*in sched.*) as belonging to var. *lanuginosa*. But the ligules of Drummond's plant are, in spite of the small heads, $4\frac{1}{2}$ -5 mm. long, the longest bracts being about $2\frac{1}{2}$ mm. only.

The ligulate ray florets of the new variety are a little hooded and nearly spoon-shaped. In many of the female ray flowers I observed the development of a single stamen with rudimentary anther.

(Concluded.)

MONTHLY NOTES FROM THE PORTLAND F.N.C.

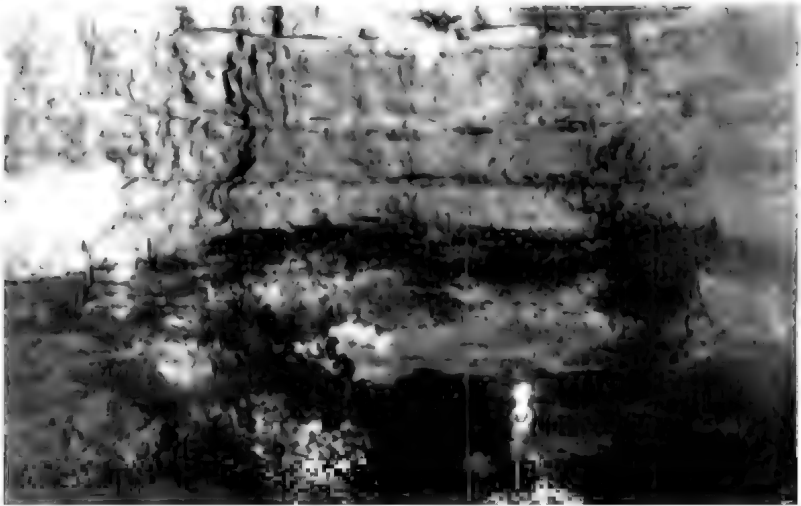
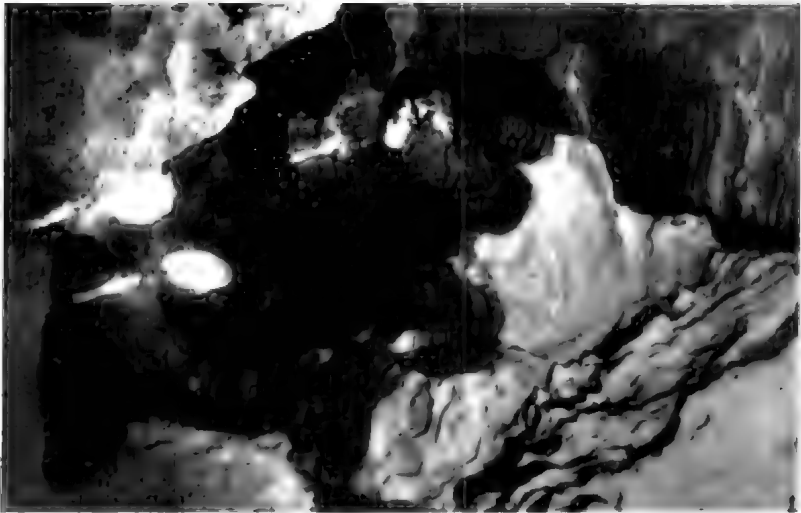
By NOEL F. LEARMONTH, Tyrendarra.

Our regular meetings are held at 8 p.m. on the second Wednesday of every month and all kindred spirits are very welcome. Mr. B. E. Carthew is Honorary Secretary.

In September, Mr. J. B. Ponder of Geelong Grammar School attended our meeting. He spent a few days around Portland and Tyrendarra endeavouring to obtain bird photographs and hunting up some of our local birds. Of these he listed about one hundred, but various mishaps ruined promising photographs of Orange-winged Sittellas on the nest and White Ibis. His best bird find was two Corellas, feeding with a flock of White Cockatoos on bulbs of onion grass. They are very rare in our district and only appear at long intervals. A few Brolgas inhabit the swampy country twenty miles N.E. of Portland and, at the end of an afternoon's search, we were able to show our visitor two of these stately birds. In low scrub and heath near Portland he was fortunate in seeing a number of Beautiful Firetails. The birds are very localized, and we know of several families along the coast. Rufous Bristle-birds and Emu Wrens were also seen here, while other "good finds" were Brown-headed Honeyeater, Black-winged Currawong and Crescent Honeyeater. Along Darlot's Creek, where there is usually a White Ibis rookery containing about 200 nests [on account of the dry winter, few birds came this year; the water around the site was not deep enough to ward off foxes] Mr. Ponder noted: White Egrets, Yellow-bill Spoonbills, White-necked and White-faced Herons, five species of ducks, swans, swamp-hens, and, in the rushes and reed beds, Little Grass-birds, Reed and Fantail Warblers and Striated Field Wrens. He missed Bittern and Speckled Warblers by two days.

Members of the F.N.C.V. will be pleased to know that an inspection of the proposed Lower Glenelg National Forest will shortly be undertaken by representatives of the Forests and Lands Departments with a view to establishing suitable and definite boundaries. The President of the Portland F.N.C. will accompany them.

PLATE IV

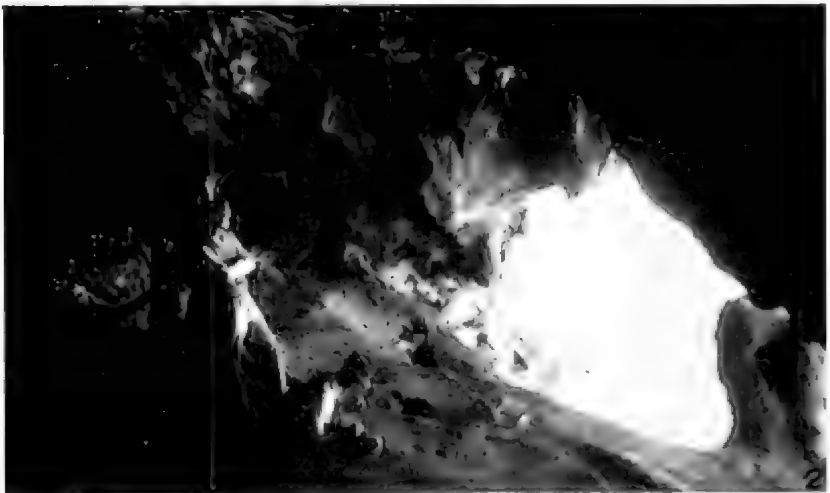
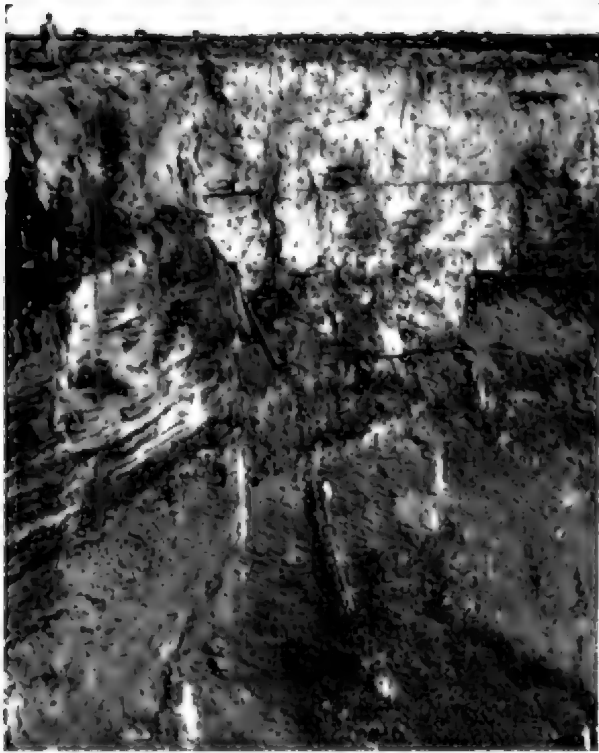


EXPLANATION OF PLATE IV

Fig. 1—Flashlight photograph vertically in Cenote 2. Note openings at ground level, flutings (interpreted as parts of former solution pipes), "ceiling" left by falling away of masses of rock, and bedding in aeolianite.

Fig. 2—Flashlight photograph horizontally in Cenote 2. The darker lower part is where the guano has been. The bedrock behind the figures is Miocene marine limestone. Resting on the marine limestone platform is aeolianite of Pleistocene age. Note here and in Pl. V, Fig. 1, the planation of each dune series before erection of next.

PLATE V



For explanation see page 191.

STRUCTURE AND ORIGIN OF GUANO CAVE, NEAR WARRNAMBOOL, VICTORIA

By EDMUND D. GILL, B.A., B.D.

By descending the 100 feet high æolianite cliffs at the boundary between sections 15 and 17 of the Parish of Mepunga, and climbing eastwards round the rugged base of the cliffs for a few hundred yards, the entrance to Guano Cave can be seen. The opening is some 60 feet above the shore platform, but can be reached by clambering over the huge blocks of rock which have fallen from the cliff.

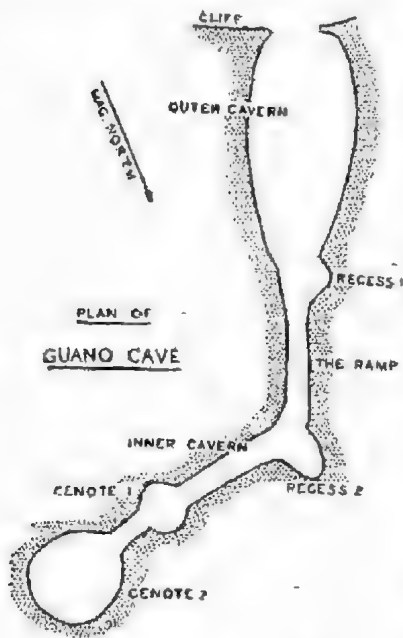


Fig. 1. Scale 1" = 150'.

Previous papers (Gill, 1943, 1946) have given a general account of this part of Victoria. At the bottom of the cliffs 10 feet of fossiliferous Miocene marine limestone outcrop, surmounted by a fossiliferous soil layer, above which is some 90 feet of calcareous æolianite—lithified Pleistocene dunes. Three soil layers can be readily recognized in the æolianite, indicating various stages of dune building.

The surface of the ground is not related to that of the dune which once stood there; the æolian bedding shows that the top of the dune has been planated by subsequent erosion. The present surface is relatively flat and slopes towards the sea. The bedding likewise shows that the dune formation once extended out

into what is now the sea. The coastline is rapidly retrograding.

Outer Cavern

Guano Cave is a dry cave, there being no running water. The dripstones prove that it was once a wet cave. At present there is but a little dampness in the Outer Cavern, and occasional dripping in Recess 2. A strong current of air circulates through the cave, entering by the Outer Cavern and leaving by the tops of the cenotes.

The cliff overhangs the entrance to the Outer Cavern, due to falls of rock from the cliff face. Massive talus is piled against the cliff, one monolith measuring some 30 ft. by 15 ft. The Outer Cavern is 162 ft. long, 57 ft. wide near the entrance, and a little wider inside. The roof is arched but irregular, due to the falling away of masses of rock. The roof is 12 ft. above the floor of the mouth, but much higher inside, reaching a maximum of probably 30 ft. The floor is very irregular, as it is composed of masses of fallen rock, but some of the irregularities are smoothed away by dripstones and cave earth formations. The floor slopes up about 10 ft. to the inner end of the Outer Cavern. Between the fallen blocks of æolianite in the floor are crevices that penetrate deeply, showing that most of the cliff up to this level was involved in the collapse or collapses that formed the Outer Cavern.

Stalactites and stalagmites up to six inches in diameter were observed, but such structures have been considerably disturbed by guano workers who set up a winch in the Outer Cavern and collected large quantities of guano from the floors of the two cenotes and the inner cavern. The guano is from numerous small insectivorous bats. Such still inhabit the cave, especially the cenotes and Recess 2.

The Ramp

The Ramp is a mass of fallen blocks of stone and rubble inclined at an angle of 33° or a little more. The angle of inclination is related to the leeward slope of the ancient dune which the rock material once formed. The steep æolian bedding (leeward side of dune) can be seen in the roof of the Ramp. The top of the Ramp is 40 ft. wide and about 25 ft. high. About a third of the way down, it narrows to about 15 ft. and about 12 ft. high; at the bottom it is about 35 ft. wide. Near the bottom the Ramp changes direction from S. 35° W. to S. 45° W. At this change of direction the steep talus slope ends and in the remaining part to Recess 2 the drop is only about 8 ft.

The rock in the Ramp presents very fresh surfaces, while the surfaces in the Outer Cavern are old and thickly encrusted with secondary calcareous depositions. This suggests that the collapse or collapses forming the Outer Cavern took place some time ago, while the present form of the Ramp may well be due to the recent activities of the guano workers.

Near the top of the Ramp is Recess 1, due to more collapse there. At the foot of the Ramp is Recess 2, which is of quite different character. In horizontal section it is roughly circular, while vertically the roof runs up into a high narrow rounded recess or "chimney", which is clearly an incipient cenote. The "chimney" can be seen to be derived from the coalescence of two such hollows, one larger and one smaller. This is a micromorph

of the big cenotes, and helps in the interpretation of their mode of formation. There is a smaller incipient cenote in the roof at the end of the Ramp.

Inner Cavern

This is in the form of a tunnel about 92 ft. long and 36 ft. wide. The roof is arched but again irregular because of fallen rock, which in turn makes the floor irregular. This cavern is a solutional feature, which was probably first formed as a horizontal drainage component in a subterranean drainage system related to the surface drainage system and the major joint planes in the bedrock limestone. The Outer Cavern is clearly a collapse feature, and it must have fallen into a tunnel underneath at about the same level as the

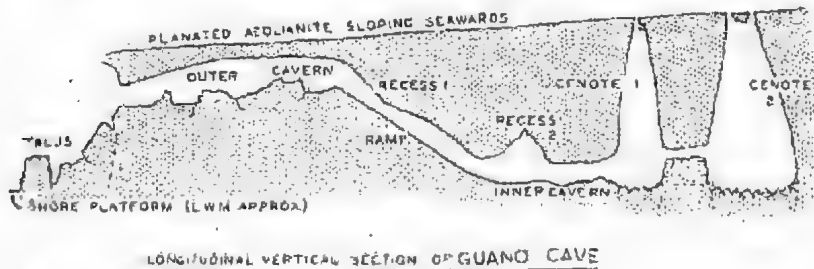


Fig. 2. Horizontal and vertical scales are the same, viz., 1" = 450'.

Inner Cavern, but more or less at right angles to it, i.e., following the other set of major joint planes. Other caves in the district, and also surface features, indicate that the Outer Cavern and Inner Cavern follow the directions of the two main sets of joint planes in the district.

The Cenotes

The two cenotes are vertical solutional features. Cenote 1 is 38 ft. in diameter and Cenote 2 a chain in diameter. As they are essentially the same in structure and origin, only the larger more easterly one will be described. It is circular in horizontal section, is 145 ft. high (measured with a line), and tapers upwards.

The sides of the cenote are fluted (Pl. IV, Fig. 1) as though formed by the coalescence of a number of solution pipes. And indeed this seems to be the correct explanation, because:

1. Such solution pipes are common solutional features in these and other similar limestones (æolianites).
2. Coalescence of small solutional pipes has been noted.
3. There are five openings at ground level above Cenote 1, and these are related to some of the flutings.

4. Some cenote flutings have been explained as due to solution effects by waters running down their sides. The flutings shown in Pl. IV, Fig. 1, are so deeply incised as not to admit of this explanation. However, some of the more superficial flutings in the sides of the cenotes could be accounted for in this way.

The sudden ending of the flutings shown in Pl. IV, Fig. 1, is due to the "solutional and mechanical stoping." Masses of rock so plucked from the roof cram the floor of the cenote. Also on the floor is guano and the bones of the insectivorous bats. The bones of a young kangaroo, rabbits, and cows found there are probably of animals which have fallen through the holes at the top of the cenote. At the surface the openings are masked by grass and bushes.

As far as can be determined by an aneroid, the floor of the Inner Cavern is at about low water mark, while the bottom of Cenote 2 is some feet below that. The walls of the cenote are vertical where they are obscured by the debris forming its floor. It is clear that the cenote continued on well down below sea level. Solution pipes so descending are a common feature of coastal *aeolianites*; the writer has observed them in Victoria and Western Australia. The cenotes and solution pipes descending below sea level must have been formed during a time or times of lower sea level such as are known to have occurred in the Pleistocene period.

Relation to Coastal Physiography

Baker (1943, p. 375) has described a feature east of Port Campbell called "The Blowhole". The sea runs into a tunnel which connects with a high vertical shaft, round which the water swirls strongly. Before the collapsing of the *aeolianite* to form the Outer Cavern, the sea probably ran into Guano Cave in a similar way. The very rounded cenotes, and the absence of secondary calcitic encrustations in their lower parts, invite the suggestion that they were made so by the sea. If the top of Cenote 2 fell in when the sea had access to the cave, then a structure similar to that of the Blowhole would be presented. The platform shown in the section between Cenotes 1 and 2 is formed of pieces of rock stacked there by the guano workers.

Baker also rightly points out that complete collapse over such tunnels would soon result in the formation of one of those rectangular little bays which are so characteristic of this coast.

Acknowledgements

The writer is indebted to Mr. Alex. Wilkins of Warrnambool, who accompanied him on a number of visits to Guano Cave and took the photographs herein reproduced; also to Mr. C. W.

Brazenor of the National Museum, who kindly identified a number of bones.

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PLATE V

Fig. 1—Aeolianite cliffs where they were descended to reach Guano Cave. Note how each dune series has been planated, including the present ground level. The talus slope (seen in lower right hand corner of photograph) leads down to a narrow shore platform.

Fig. 2—Entrance to Outer Cavern. Note the large blocks of fallen rock both inside and outside the entrance, the secondary calcification on the walls, the cave earth on the floor, and the remains of the guano workers' winch (behind figures).

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WINTER BOTANIZING ON THE MUGGA MUGGA, CANBERRA

By J. H. WILLIS

Like Black Mountain to the west and Mt. Majura at the north, the Mugga Mugga is a Trig. station near the southern extremity of Greater Canberra city boundary. These three thickly wooded hills, and the more centrally placed Mt. Ainslie (with flashing beacon as a guide to nocturnal aircraft), lend Canberra much of its charm. Rising some 700-800 feet above grassy plains that surround the city proper, they stand sentinel-like and in striking contrast at a distance of a mile or so; each affords quite a stiff climb up rocky slopes, but one is repaid by magnificent panoramas

—from the sinuous course of the Molonglo River below ("meandering intermittently across the harmonizing landscape like a torn khaki ribbon," as Donald Macdonald² beheld it) to those high and serrated alpine ranges behind Stronilo, guarding the heads of the Murrumbidgee

Black Mountain (of sandstone) and Ainslie Peak (volcanic tuff) had been visited often, yet no one seemed to know much about the Mugga Mugga Peak; few were even aware of its curious name. So my friend Mr. G. H. Featherston invited me, while in Canberra, to explore it and we set out on the afternoon of June 19th—not the best season for botanizing; but shrubs



and trees would be determinable in the absence of blossom, and cryptogams ought to be in evidence then.

Beyond the city grassland, we entered an open forest of almost pure Yellow Box (*Eucalyptus melliodora*), showing a remarkable diversity in its bark—from black and rugged to yellowish and of the smooth "gum" type. Blakely's Red Gum (*Euc. Blakelyi*) became conspicuous, in mixture with the Yellow Box, toward the foot of the mount and occasional trees of Apple Box or But But (*Euc. Bridgesiana*) were also present. It is hard to see wherein *Eucalyptus Blakelyi* differs essentially from the variable Forest

Red Gum (*Enc. tereticornis*—widespread from Gippsland up the whole east Australian coast into New Guinea). I would prefer to regard it as a variety of the latter. There is a marked absence of shrub growth in this *meliiodora*-*Blakelyi* savannah woodland, the ground cover consisting of grasses and several herbaceous composites, e.g., *Vittadinia triloba* and *Helichrysum apiculatum* in great abundance, with some *Colotis lupulacea*.

Another zone of open grass lay before us as we left the forested roadway at a convenient point and commenced to climb. *Stipa falcata* (doubtfully distinct from *S. variabilis*) and the taller *S. aristiglumis* were dominant Spear-grasses, in mixture with Wallaby-grass (*Donthonia pilosa* and *D. semiannularis*), Purple Wire grass (*Aristida ramosa*), Windmill Grass (*Chloris truncata*) and a true panic (probably *Panicum Mitchellii*). A few plants of Cottony Panic (*Digitaria Brozoni*) were seen, but no Niggerheads (*Enneapogon nigricans*), which is common enough about Canberra, especially in the Yarralumla section.

On the steeper rocky slopes we found a dense growth of small twisted eucalypts—*Enc. Bridgesiana* and the silver-blue *Enc. cinerea*, which bears its cruciform buds and obconic fruits in the axils of "juvenile" foliage; some White Box (*Enc. hemiphloia*, var. *albans*) was also noted. Several other trees came in here: Drooping Sheoak (*Casuarina stricta*), a few Lightwoods (*Acacia implexa*), still bearing some late blossom, and an occasional Cherry Ballart (*Exocarpos cupressiformis*). Low shrubby growth was more noticeable too, viz., *Hibbertia linearis* var. *obtusifolia*, *Haecia heterophylla*, *Indigofera australis* var. *signata* (a form with very small round leaflets, treated as a distinct species, *I. signata*, by some botanists) and, more rarely, *Cryptandra spinescens* (a form of *C. amara*?—attractive in a mass of tiny white flower-buds) and *Cassinia quinquefaria*; of the last, we saw only a solitary specimen—a shapely, decorative six-foot bush—though it is plentiful near the Prime Minister's Lodge and in other portions of the A.C.T. Small climbers were represented by *Glycine clandestina* and *Convolvulus crubescens*.

Among the numerous outcrops and boulders of quartz-porphry (some with brilliant red jasper-like bands) emerged an interesting ground flora. Three small ferns grew plentifully in the rock crevices, viz., *Cherlanthes tenuifolia*, *Notholaena distans*, and *Pleurosorus rutifolius*, with *Asplenium flabellifolium* less frequently. Barbwire Grass (*Cymbopogon refractus*) also favoured crannies among the rocks, as it does in the dryish Suggan Buggan and Deddick country of far eastern Victoria, and was accompanied by a *Lomania*—indeterminable without flowers or fruits. Herbaceous plants like *Geranium pilosum*, *Hydrocotyle laxiflora*, *Cymbonotus Lawsonianus*, *Plantago varie* and *Wahlenbergia*

bicolor were added to our list, the last-named exhibiting flowers of a deeper blue than usual—is there ever a season when some blue-bell cannot be found in bloom? Several weeds were firmly established here, e.g., *Salvia Verbenaca* and *Verbascum virgatum*.

Copious lichens on the rocks, ground mosses and a few fungi completed the flora of the steeper slopes. We collected the following toadstools: *Amanitopsis pulchella*, *Luccaria luccata*, *Myrcena subgalericulata*, *M. unacca*, and an *Inocybe* species. *Tulostoma album* and what seemed to be a diminutive state of *Geaster triplex* were the only gasteromycetes observed. *Stereum illudens* grew upon sticks littering the ground, but the dead trunks of old uprooted sheoaks (*Casuarina stricta*) provided the most interesting community of fungi: *Trametes ochroleuca*, *T. cinnabarina*, *T.* sp. (perhaps *lactinea*) and *Hexagona decipiens*—all of the "bracket" type. The *Hexagona* has a velvety brown zoned upper surface and large glaucous-lilac pores beneath; I have never collected it on any other timber than Drooping Sheoak, to which species it seems restricted in south-eastern Australia.

At the summit, we found white-barked *Enc. Rossii* and *Enc. hemiphloia* var. *albens* to be the principal eucalypts, the latter appearing to have replaced *Enc. Bridgesiana* of lower elevations; but Mr. L. D. Pryor (Superintendent of Parks and Gardens, Canberra, and an authority on the local flora) assures me that *albens* has been extensively planted on this hill and is not a native of the district—the nearest indigenous occurrence is near Yass, beyond the Territory boundary. Mr. Cambage (1918)¹ lists White Box as one of those plants which are absent from the A.C.T. on account of insufficient winter warmth; he also includes the large genus *Melaleuca* in this category—none is present there. Subsequent consultation of a large plan showed that most of the Mugga hill is designated "Plantation". It can only be concluded either that White Box has been planted in a most erratic and promiscuous manner, or that it has regenerated naturally from some very old plantings—there is no evidence of any order among trees on the crest of Mugga Mugga, where they are mostly slender, poorly developed specimens growing amongst rock. Are the *cinerea* trees also a result of former plantings? The White Box was heavy with glaucous flower buds, but we had some difficulty in finding fruits. A notable feature of these buds was the exceedingly long angular, and rather curved, claw-like operculum—longer than any examples I had ever seen (q.v. text block).

One speculates as to whether two old karrajong trees (*Sterculia diversifolia*) against the Trig. station might not also be planted specimens. They have been repeatedly lopped, so as to leave an unobstructed view of the surrounding country in all directions. Cambage² records one large tree as being truly indigenous on the

summit of Quartz Hill, about two miles south-east of Mt. Mugga Mugga, and remarks that the small scattered kurrajongs in the Capital Territory are probably at the cold limit of their endurance; they occupy rather similar terrain in mountainous country around Buchan and Wulgulmerang, Victoria, with a predilection for limy ground. A stock- and rabbit-proof fence runs across Mugga Mugga, almost touching the highest point, and there is an astonishing contrast between the herbaceous growth on each side: to the west, almost bare rocky ground; to the east, lush grass with an abundance of the yellow-green and very grass-like sedge *Carex inversa*. Pausing awhile to admire the western hills and the city from an unusual angle, we retraced our steps well satisfied, having noted 50 higher native plants (of which no more than half a dozen showed any flowers) but anxious to re-visit this interesting corner in the warmth of some future springtime.

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CLARKE AND AUSTRALIAN NATURAL HISTORY MEDALLISTS
FOR 1948

The Royal Society of New South Wales has just announced its award of the W. B. Clarke Memorial Medal, "for researches in natural science," to the Rev. Herman M. Rupp, Northbridge, N.S.W. Mr. Rupp, who was present at the September meeting of the Club, had not visited this State for some twenty years, but he needs no introduction to readers of the *Victorian Naturalist* and his name is held in high esteem among botanists throughout Australasia for critical researches on our *Orchidaceae*. F.N.C. members will be delighted at this well-merited award and join with other naturalists in congratulating their valued fellow-member.

On December 14th, the Royal Society of Western Australia will present to Mr. L. Glauret, Curator of Perth Museum, the Australian Natural History Medallion. Mr. Glauret is a Past President of the Perth Legacy Club, W. A. Naturalists' Club, and Royal Society of W.A., which awarded him the Kelvin Gold Medal in 1945. Our Club, with other kindred societies, extends hearty congratulations to the recipient and expresses pleasure that the honour has gone this year, for the first time, to a West Australian.

THE GREEN TREE ANT IN SCIENCE AND HISTORY

By LIONEL GILBERT, NABIAC, N.S.W.

The Green Tree Ant (*Oecophylla smaragdina*, var. *virescens*), so common in some parts of Queensland and Northern Australia, is certainly a noteworthy member of the ant fraternity, and much has been written of its astonishing habits and notorious effects.

Entomologically, this beautiful pale green ant belongs to the Sub-family *Formicinae* (or *Casapponotinae*) of the Family *Formicidae*. It is a tree dweller about half an inch long, with a light green, almost translucent, abdomen. The same stingless ant is found in New Guinea, Southern Asia, Africa and India.

The nest of the Green Tree Ant is roughly spherical, and may range in diameter from about four to ten inches. For years it remained a mystery how this insect constructed such leaf nests. Moreover, the leaves were found to be secured very effectively by silken threads. No adult ant was known to have the power of spinning silk, although the larvae of some species did so, weaving silken cocoons in which to pupate.

Various careful observers—notably the late F. P. Dodd, "Butterfly Man" of Kuranda, Queensland—gradually pieced together the life story and habits of this ant. It was found that, in order to make a new nest, some adult ants—often whole chains of them—spanned a convenient gap and drew a pair of leaves together. Other adults went into the "nursery" and picked up several young larvae in their mandibles. Thus firmly held, these were used as living shuttles to spin silken thread which was to join the leaves and secure them. Once exhausted of their supply of thread, they were returned and another "shift of shuttles" employed to carry on the work until the whole task was finished. Unfortunately for many of the larvae, they were so depleted in the nest construction that they were unable to spin a cocoon for themselves and were thus obliged to pupate naked.

Further observations revealed that in these nests the parasitic larvae of the Green Tree Ant Butterfly (*Liphya brassolis*) live unheeded and prey upon hapless ant larvae. The *Liphya* larva, having waxed fat on the baby Green Ant "shuttles," pupates and escapes quickly from the nest as an adult butterfly.

For all its diminutive size, the Green Tree Ant has earned a reputation as one of the most pugnacious of the world's half million or so insects. When the nest is disturbed, or the tree innocently bumped or shaken, out swarm the inhabitants with mandibles ready to ward off the intruder and make him sorry for his act, however unintentional. Having fallen on to the intruder's head, arms or neck (very often all three), the ants bury both mandibles in very deeply. The abdomen is then curved around over the head

PLATE VI



Green Tree Ants (*Cecropia surinamensis*) on their nest
in a mango, North Queensland

Photo.: By courtesy P. Crossie Morrison, Editor, *Wild Life*

and formic acid is sprayed into the punctures made by the mandibles. Added to the pain and dismay of his situation, the victim has to pluck off in turn each offending individual so as to release its mandibles. It is certainly little wonder that such a formidable creature has created a stir on many occasions both during Australia's early and recent history.

Sir Joseph Banks was apparently first to mention the Green Tree Ant. Under the heading, "Bustard Bay, May 23rd, 1770," he reports:

Upon the sides of lagoons grew mangrove trees, in the branches of which were many nests of ants, of which one sort were quite green. These, when the branches were disturbed, came out in large numbers, and revenged themselves very sufficiently upon their disturbers, biting more sharply than any I have ever felt in Europe.

Like other observers, Sir Joseph made some flattering remarks about the ingenuity of these insects, and his observations were very accurate with regard to the bending of the leaves while they were glued "with a white paperish substance which held them together." But again, like other observers, he found that the skill of these ants was offset by their ill-effects: "Industrious as they are, their courage, if possible, excels their industry; if we accidentally shook the branches on which such a nest was hung, thousands would immediately throw themselves down, many of which falling upon us made us sensible of their stings and revengeful dispositions, especially if, as was often the case, they got possession of our necks and hair."

Not all naturalists were as frank as Sir Joseph about this unpleasant experience. Drawing upon Banks' notes, Dr. John Hawkesworth mentioned the green ants in his *Voyages*, but the journals of others are strangely silent on this "touchy" question.

Rear-Admiral Philip Parker King, who explored the tropical coasts of Australia accompanied by Allan Cunningham, made no mention of the tree ants, although it is fairly certain that Cunningham, at least, must have been attacked whilst botanizing. Perhaps the good captain and his famous botanist companion were too modest to record their experiences with the little suries of the trees! However, King was certainly plagued with "insects (sic) and sandflies," and much mention is made of these.

J. Beete Jukes, geologist-naturalist to Captain Blackwood's survey expedition, is curiously taciturn for a naturalist who landed at numerous places throughout the Barrier Reef and Torres Strait.

The overland explorer John McDouall Stuart, during his expeditions of 1860-62, does not appear to have recorded attacks by *Oecophylla*, although he, too, complained bitterly of the mosquitoes and sandflies. No doubt Ludwig Leichhardt also

encountered these ants on his trip from the Darling Downs to Port Essington (1844-45).

Two sea-explorers, however, within a short time of each other, very openly expressed their thoughts on the Green Tree Ant. On December 4th, 1837, Captain George Grey was surveying the north-west coast around Prince Regent's River. Apparently it was a memorable day for this naturalist-explorer, who wrote:

The thickness of the vegetation made it difficult to force a way through, and whenever, in attempting so to do, a tree was shaken, numbers of a large green sort of ant fell from the boughs on the unhappy trespasser, and, making the best of their way to the back of his neck, gave warning by a series of most painful bites, that he was encroaching on their domain. Yet it was sometimes ludicrous to see one of the party momentarily stamping and roaring with pain, as he cried out to a companion to hasten and assist him in getting rid of an enemy at once so diminutive and so troublesome.

Like Captain Grey, another early coastal surveyor, Captain J. Lort Stokes, saw the humorous side of a painful encounter with these enterprising insects of the trees. On August 6th, 1839, Stokes landed on Melville Island, and he says: ". . . our visit, however, was not to be forgotten in an instant, although no very pleasing recollections were connected with it. Whilst taking a few angles near the cliffs, we suddenly experienced a series of severe bites or nippings in several parts of our body, and looking round to discover whence arose this unexpected attack, found ourselves under a tree covered with large green ants. Their bites were exceedingly painful, and it was only by beating and tearing off our clothes that we could rid ourselves of these unwelcome visitors. From a distance our appearance must have been sufficiently amusing—one moment soberly intent upon our duties, and the next jumping like madmen, and hastily stripping off our garments. The name of Ant Cliff records our visit to the south shores of Melville Island."

No doubt there are many ex-servicemen who were in northern areas and who can appreciate to the full the feelings of these old explorers—I know I can!

Nevertheless, in Australia we are rather fortunate. Dr. G. Hartwig, in his *Tropical World*, quotes Livingstone as follows: "Having, while in Angola, accidentally stepped upon a nest of red ants, not an instant seemed to elapse before a simultaneous attack was made on various unprotected parts. . . . The bites of these furies were like sparks of fire, and there was no retreat. I jumped about for a second or two, then in desperation tore off all my clothing and rubbed and picked them off *seriatim* as quickly as possible! Fortunately, no one observed this *rencontre*, or word might have been taken back to the village that I had become mad. It is really astonishing how such small bodies can contain so large an amount of ill-nature. . . ."

This was bad enough, but poor Richard Schomburgk (later Director of Adelaide Botanic Gardens) recorded from Guiana:

I have no words to describe the pain inflicted upon me by the mandibles of the *Ponera clavata*, a large but, fortunately, not very common ant, whose long black body is beset with single hairs. Like an electric shock, the pain instantly shot through my body, and soon after acquired the greatest intensity in the breast and over and under the armpits. After a few minutes I felt almost completely paralysed, so that I could only with the greatest difficulty, and under the most excruciating tortures, totter towards the plantation, which, however, it was impossible for me to reach. I was found senseless on the ground, and the following day a violent wound fever ensued.

Undoubtedly, this puts our Green Tree Ant into second place at least!

F.N.C.V. EXHIBIT AT THE R.A.S. CENTENARY SHOW

For the Royal Agricultural Society's Centenary Show of 1948 our Club was invited to stage an exhibit in conjunction with the "Save the Forests" Campaign. As the Club, for some time past, has been endeavouring to stimulate public interest in the State's National Parks, this opportunity was taken to further the campaign by setting up an attractive husband scene, representing the idea of wild life conservation and the importance of National Parks in that connection.

From a forest of trees and shrubs emerged a mountain streamlet whose waters trickled down among ferns and moss-covered rocks to feed a crystal-clear pool. Near the pool, amongst the blossoms of the forest wildflowers, could be seen many little brightly-coloured birds, while the lyre-bird danced unafraid and unperturbed on a nearby clearing.

With a number of native animals peeping from little nooks, the wombat nosing about and a small wallaby resting in a sunny spot, the scene was especially appealing and attracted the attention of thousands of visitors to the Show. The trees and shrubs in the full beauty of their springtime mantle of flowers—all from the nurseries of our own Club members (Mrs. C. E. Isaac and Mr. Ben. Schubert)—were made even brighter in being flanked by a mass of cut-flowers, mainly from the garden of Mr. Ivo Hammet.

The impression of distance was gained by using large mirrors as a background, and to add to the decorative effect a number of Mr. H. T. Reeves' beautiful hand-coloured and half-tone photographs was arranged on the walls which formed the tree-sheltered background.

By way of contrast there was set up by the Country Fire Authority a well-planned farm on the margin of the National Park scene. Almost unconsciously one noted the mutual benefit deriving from the co-operation of the two interests—that concerned with land utilization and that with wildlife conservation. The same Authority, by showing in an adjacent "set" the hazards created by the careless and thoughtless landholder, drew a sharply contrasting picture which was emphasized by a blackened, burnt-out tree stump on which perched a dejected Kookaburra. This was the contribution of the Victorian Forests Commission, "In memory of a forest giant."

For the hard work of preparation and dismantling and for the continuous supervision of the exhibit the thanks of the President and Council of the Club are extended to the Honorary Director of the "Save the Forests" Campaign (the Hon. C. E. Isaac, M.L.C.) and his associates, to the National Museum and its officers, and to more than sixteen members who cheerfully and devotedly worked to make the exhibit a worthy one.

—J.R.G.

FURTHER NOTES ON THE ORCHIDS OF THE WESTERN WIMMERA

By E. V. BARTON, Surrey Hills:

Having spent several years in the Kaniva district, I was able to record a number of orchid species from this most interesting botanical region. Several species not recorded by Mr. Eric Muir ("Orchids of the Western Wimmera," *Vict. Nat.*, May 1948, p. 18) were collected, viz.:

1. *Prasophyllum nigricans*—common at both Lawloit and Diapur.
2. *Prasophyllum patens*—Little Desert at Miram South.
3. *Calochilus Robertsonii*—Little Desert at Miram South.
4. *Thelymitra rubra*—Diapur.
5. *Leptoceras fimbriatum*—Diapur.
6. *Caladenia filamentosa* (typical red form)—Diapur.
7. *Caladenia Fitzgeraldii* (probably identical with Mr. Muir's "*C. reticulata*")—Little Desert south of Kaniva.
8. *Orthoceras strictum*—Lawloit (very rare) and Little Desert (one specimen only), both records in the one season.

I found *Caladenia cardiochila* to be not uncommon in the Little Desert and recorded *Eriochilus cucullatus* at both Serviceton and Diapur, though rare enough. *Pterostylis vittata* was not uncommon at Diapur, and I located another *Caladenia* at both Diapur and Miram South—it was probably referable to *C. cucullata*.

As far as I am aware, the following species on Mr. Muir's list have never been collected at Kaniva:

<i>Prasophyllum</i> <i>elatum</i> <i>odoratum</i> <i>fusco-viride</i> <i>Gastrodia</i> <i>sesamoides</i> <i>Thelymitra</i> <i>acurea</i> <i>ixioides</i> .	<i>Caladenia</i> <i>filamentosa</i> , var. <i>tentaculata</i> <i>Diuris</i> <i>palustris</i> <i>Pterostylis</i> <i>cyanocephala</i> <i>mutica</i> <i>longifolia</i> <i>squamata</i> <i>pedoglossa</i> *
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I wish sincerely to thank the staff of the Herbarium, South Yarra, for very kind assistance in checking my specimens and making necessary corrections in nomenclature.

*[Mr. Muir's record of *Pterostylis pedoglossa* would be better deleted from Wimmera lists; it was based on a very tentative suggestion by Mr. A. J. Swaby for a specimen that he found in the early bud stage and might well have been some other greenhood. During a September collecting trip in Mallee scrub along the South Australian border, about 16 miles north of Serviceton, I found solitary specimens of *Prasophyllum fusco-viride* (flowers withered), *Thelymitra rubra*, *Caladenia dilatata* and *Pterostylis longifolia*; also abundant plants of the following species: *Thelymitra aristata*, *T. antennifera*, *Caladenia filamentosa* (var. *tentaculata*), *C. cardiochila*, *C. carnea*, *Lyperanthus nigricans*, *Pterostylis nana*, and *P. mutica*, all in flower except the *Lyperanthus*, which rarely blooms in this part of Victoria.—Ed.]

SOME BEES FROM THE VICTORIAN ALPS

By TARBTON RAYMENT, F.R.Z.S., Melbourne

Family COLLETIDAE

Paracolletes chalybeatus Er.

I have referred to this unsatisfactory species several females from Mount Buffalo, which differ from *P. stewarti* Raym.* by the following characters:

The area of the metathorax is duller, with a median depression, and the scale-like sculpture is coarse (more shining in *P. stewarti*) the pterostigma is very long and pale amber, and the nervures are lighter and paler (blackish and heavier in *stewarti*); pygidial plate smooth over a large area (covered with a close scale-like sculpture in *stewarti*). Serrations of hind calcar seven, coarse (finer in *stewarti* and five in number); hair of hind basitarsi pale straw (black in *stewarti*). The area of the metathorax has a sharply defined angle of truncation in *stewarti*, but *Chalybeatus* lacks this feature.

A series of females taken on flowers of "Burgan," *Kunzea peduncularis*.

Locality—Mackey's Lookout, Mount Buffalo, Vic. (alt. 3,500 feet), Jan. 8, 1948, H. C. E. Stewart.

Paracolletes stewarti Raym.

A series of females, not exactly typical, and appearing to approach *P. chalybeatus* Er. as defined above. It would seem that these intergrade.

On flowers of "Burgan."

Locality—Mackey's Lookout, Mount Buffalo, Vic., Jan. 9, 1948, H. C. E. Stewart.

Family ANDRENIDAE

Subfamily HALICTINAE

Halictus asperithorax Ckll.

Two typical females and a male; indistinguishable from specimens from Sandringham.

Locality—Reed's Lookout, Mount Buffalo, Vic., Jan. 7, 1948, H. C. E. Stewart.

Observed to spring the triggers of the Grass Trigger-plant, *Styloidium graninifolium*.

Halictus gilesi Ckll.

One female.

Locality—View Point track, Mount Buffalo, Vic., Dec. 26, 1947, H. C. E. Stewart.

On flowers of Alpine Daisy, *Brachycome scapiformis*.

Parasphcodes wellingtoni Ckll.

A series of females.

Locality—Shore of Lake Catani, Mount Buffalo, Vic., Dec. 28, 1947, H. C. E. Stewart.

On flowers of *Brachycome scapiformis*.

Family CERATINIDAE

Exoneura montana Raym.

One typical female.

Locality—Mackey's Lookout, Mount Buffalo, Vic., Jan. 9, 1948 (alt. 3,500 feet), H. C. E. Stewart.

On flowers of "Burgan," *Kunzea peduncularis*.

**Pick. Nat.*, Vol. 64, No. 3, Sept. 1947, p. 102.

Family APIDAE
Subfamily APINAE

A worker bee of the hive, *Apis ligustrina* X *A. mellifera* Linn., is exceedingly hairy, probably a development suitable for the cold of the higher altitudes. Another feature was two large pieces of dry soil attached to the apex of the anterior wings, and which would seem to indicate a hive in the ground. The clods resembled large pterostigmata.

Locality—Mount Buffalo, Vic., Jan. 8, 1948, H. C. E. Stewart.

The collector observed the bee in the act of springing the style of the Grass Trigger-plant.

"STROKE A NETTLE"

Anyone who is sufficiently provoked by the stinging nettle to wish to find out the cause of his discomfort will be able, thanks to N. Emmelin and W. Feldberg [*J. Physiol.*, 1947, 106, 440], to obtain nearly a complete answer. The statement that the active principle of the nettle was formic acid has repeatedly appeared in print and become part of the lore belonging to the plant. It now appears that the juice of the nettle does not contain this substance in any measurable quantity. The facts are both more interesting than the fiction and more in keeping with contemporary biochemical research. It has been ascertained that the fluid in the hair of a nettle contains one part in a hundred of acetylcholine and between one part in five hundred and one part in a thousand of histamine. In the case of the former, the content of individual hairs could be pharmacologically estimated. Ten hairs from a stalk gave values ranging between 0.02 and 0.4 millionths of a gramme, with an average of 0.108. Hairs from the upper surface of leaves contained only about one-third as much. In so far as histamine is concerned it had been assumed in advance, not unreasonably, that the sting of a nettle hair would prove to be merely one more stimulus for the release of this substance from human tissues. Instead, the histamine came from the nettle, although it was necessary to pool the contents of some 15-30 hairs to obtain a measurable effect. Further, it was established by tests on human subjects that both the acetylcholine and the histamine are needed to provoke the typical reaction. Neither separately can produce the equivalent of a natural "sting." On the other hand indications were also obtained that nettle-hair juice produces a more marked effect than would be expected from its content of these two substances alone. It is suggested, therefore, that there is probably a third active principle, still unidentified but not formic acid.

WILD FLOWER PROTECTION IN SOUTH AFRICA

The following extract from the Transvaal newspaper *Spotlight* of May 7 is an illuminating commentary upon the type of work being undertaken to safeguard the floral wealth in a sister Dominion:

The Wild-Flower Protection Committee, long handicapped by lack of effective machinery for the enforcement of the various wild flower protection ordinances, took the law into its own hands last August. With the blessing of the Commissioner of Police, a former police sergeant was commissioned as a special constable and let loose among the pillagers and vandals who have despoiled the Cape of so much of its natural beauty. He has so far recorded more than 200 convictions and the scale of fines has been raised. Not that this alone will act as a deterrent—hawkers do sufficiently well out of flowers to take the rap occasionally without having to scrape their pockets clear—but the mere knowledge that a full-time agent is roaming the countryside has inevitably tended to discourage indiscriminate picking of wild flowers.

ARARAT WILDFLOWER SHOW

Through the help of sister clubs and friends in distant parts of Australia, the Ararat Field Naturalists' Club staged a comprehensive collection of Australian flora at its annual wildflower show on October 12 and 13. From Cairns the North Queensland F.N.C. sent an interesting collection of fruit, flowers and foliage of North Queensland forest trees and tropical plants, and the far south was represented by orchids, heaths and mosses from Tasmania, including a cushion plant from the summit of Mount Wellington. The South Australian section, which included over fifty specimens from Miss Ashby's garden aroused considerable interest. Amongst them were the pink *Bauera rubioides*, three thryptomeneas including the dainty pink *T. micrantha*, *Dryandra formosa*, several *Thomasia* and *Lasio-petalum* species, and numerous melaleucas including the mauve *M. radida*. *Leschenaultia*, smoke bush, kangaroo paws, *verticordia* and *hakeas* were outstanding in a big collection of West Australian flowers. A special feature was made of wildflowers grown under cultivation from the gardens of Mr. Ivo Hammet (Ivanhoe), Mrs. Gossip (Ararat) and Mr. Althofer (Dripstone, N.S.W.). Among the display of flowering gums and other plants from Mr. G. Hatley's plantation, *Euc. Kruscania*, *E. caesia*, *E. tetraptera* and *E. Preissiana* and the King *Hakea* were particularly admired. A novelty was the pink lemon-scented *Zieria* which came from the Little Desert.

The Rev. C. L. Lang (of Hampton), founder of the club, gave lantern lectures at the evening sessions on the Tarra Valley and Western Grampians, and he was welcomed by the President, Mr. R. M. Butler, who also took an opportunity to make a presentation from the members to Miss L. Guyot. Miss Guyot has been Hon. Secretary of the Ararat F.N.C. for over ten years and is leaving Ararat.

The show was well attended, and it was interesting to observe the number of people who took down notes.

L. L. BANFIELD.

POSTING OF CHRISTMAS GIFTS AND GREETINGS

Public Co-operation Sought by the Post Office

Christmas is fast approaching and once more the Post Office will be called upon to handle and distribute the huge Christmastide postings. The Deputy Director, Posts and Telegraphs (Mr. C. G. Brown) accordingly appeals to readers to post as early as possible, and not later than Friday, 17th December, as there is every indication that the exchange of Christmas gifts and greetings this year will exceed previous records.

Mr. Brown offers the following suggestions:

- (1) Make sure that each address is very clear and complete.
- (2) Pack all gifts securely, and show the name and address of the sender, preceded by the word "from". If tie-on labels are used, the address should be featured also on the wrapping of the article.
- (3) Christmas cards may be posted at 1½d. rate of postage if the envelope is left unsealed, and not more than five words of greeting are written on the card.

WHAT, WHERE AND WHEN

General Excursions:

Sunday, December 12—Henley Gorge, via Lilydale. Subject: "Geology and Associated Botany." Leader: Mr. A. F. Seldon (who will meet bus party at Lilydale). Nash's bus leaves Batman Avenue, 9.30 a.m. Bring one meal. Bookings, 5/6, with Mr. H. R. Finlayson, 353 Geelong Road, Kingsville, W.12.

Saturday, January 8, 1949—Botanic Gardens, Melbourne. Subject: "Australian Trees in Summer" (fourth of series for beginners and visitors). Leader: Mr. A. Burke. Meet main gates at Herbarium, near Shrine, 2.30 p.m. New members and interested visitors cordially welcome.

Group Fixtures:

Saturday, December 11—Marine Biology Discussion Group excursion to Quiet Corner, Beaumaris. Afternoon trains from Flinders Street to Sandringham, thence Beaumaris bus; alight at Surf Avenue, and proceed to beach. Low tide at 3.30 p.m. Bring afternoon tea. All general Club members invited. This area is of special marine interest.

Saturday, December 18—Botany Discussion Group excursion to Wonga Park (break-up for year). Parlour coach leaves Batman Avenue 9.30 a.m. Reserved seat bookings (6/-) with Hon. Sec. of Group, Mr. H. Stewart, 14 Bayview Terrace, Ascot Vale, W.2 (Tel. FL 022, ext. 457). Bring one meal. Locality good for native birds and flora, and all Club members invited.

Special Announcements:

Christmas-New Year vacation. It is proposed to hold a semi-official camp-out at Lake Mountain, Marysville. Interested members who can provide own camping gear and transport, please contact the President, Mr. J. Ros Garnet, 270 Albion St., West Brunswick, N.12. Further details at December general meeting.

The Geology Discussion Group has undertaken a week-end excursion to Werribee Gorge, Bacchus Marsh, for March 11-13 next (Labour Day). Preliminary inquiries to Mr. A. A. Baker, 53 Carlisle St., Preston, N.18.

H. G. E. STEWART,
for Excursion Committee, F.N.C.V.

LONGEVITY OF SCENTED SUN-ORCHID FLOWERS

On November 22 a fresh example of Scented Sun-orchid (*Thelymitra aristata* Lindl.) reached the Melbourne Herbarium for determination and, having the lowest two of the eight flower buds open, it was placed in a vase of water for observation; the specimen had previously been sent to the National Museum, and could not have been collected any later than November 18. On December 2—at least a fortnight after picking—the lowest five flowers were withered, but the upper three were still fully expanded. Flowers had successively opened and withered, and the characteristic sweet violet-like perfume had persisted for the whole fortnight. Would this be a record for longevity in cut *Thelymitra* blooms?

—J.H.W.

The Victorian Naturalist

Vol. 65.—No. 9

JANUARY 5, 1949

No. 781

PROCEEDINGS

The monthly meeting of the Club was held at the National Herbarium on Monday evening, December 13, 1948. The President, Mr. J. Ros Garnet, and about 170 members were present. Apologies were received from Dr. Chattaway, Miss Neighbour, Miss McPhee, Mr. A. Carter and Mr. J. Preston. A welcome was extended to visitors and the hope expressed that they would be interested enough to come again and eventually join the Club.

The President summarized a letter from a country member who expressed concern for the well-being of a Flying Phalanger; the animal had been observed at Port Fairy on a piece of land about to be cleared. This occurrence was of particular interest in that these creatures have been unknown in the district for fifty years. Mr. Garnet had already referred the matter to the Fisheries and Game Department.

Mr. Stewart advised that plans made to spend A.N.A. week-end at Wallaby Creek could not be carried through because of camping difficulties in connection with the Board of Works reserve. Preliminary notice was given of a parlor coach trip on Saturday, February 5, to the Geelong Botanic Gardens, where there is a good collection of Australian flora.

The President reported on a conference of the National Parks and Monuments Committee, held on December 6. Unfortunately arrangements were completed after the last general Club meeting, and it had not been possible to notify members that the conference was resuming. Delegates from some thirty organizations and semi-Government Departments had attended, and had passed nine important resolutions. All delegates agreed that Victoria's National Parks and Monuments should be under the control of one relevant authority, and a standing committee was appointed to expedite the work. Mr. Garnet would summarize the work of the full committee as soon as possible and publish it in the *Naturalist*.

It was reported that some members were not receiving their *Naturalist* regularly, and the Secretary asked that those so affected let him know, when appropriate steps could be taken to check the addressed wrappers.

The following new members were elected and welcomed into the Club: as Ordinary Members—Messrs. H. Haase, W. L. Davies, A. N. Usher, A. W. C. Burston, Misses K. Pullar and

F. I. Paull; as Interstate Members—Mr. and Mrs. C. G. Singleton (Sylvania, N.S.W.).

Nominations for membership were received from Miss R. McCormack, Mr. G. Jeffrey, Mr. W. Nielsen and Mr. A. J. Hicks.

The President advised that Mr. A. S. Chalk, acting on behalf of the Club, had planted a tree at Toolern Vale in memory of our much-esteemed late member, Mrs. Blanche E. Miller.

Two small dissecting microscopes (of magnification 10) were placed on the table for members' inspection. The manufacturers, Fred. Wiegmann Pty. Ltd. (299 Whitehorse Road, Balwyn, E.8.), can supply them to naturalists for 2/10 each.

Mr. Garnet extended seasonal greetings from the Council to all members and wished them "happy hunting" during the holidays. Mr. French reciprocated on behalf of members and extended the same good wishes to the President and his Council.

NATURE NOTES

Items of interest on several natural history topics in England were read from a letter by Miss Dorothy Sides: (a) Grey squirrels are gradually ousting the small red variety; (b) pigeons which come across from Norway are dying by hundreds, as they consume beechnuts—the husks are swallowed whole and penetrate the birds' throats, setting up an infection known locally as "diphtheria"; (c) elms are apparently dying out through some epidemic disease.

Mr. Miller reported finding the body of a Wandering Albatross at Inverloch.

Interested members were advised by Mr. Dickins to examine a very fine eucalypt on the corner of Malvern and Albany Roads, Toorak; this tree had been planted by Mr. Kidd, a former Club member. Mr. Dickins also reported that many magpies were being killed by motorists on the road between Healesville and Marysville—one hundred dead birds were counted along a one-mile section of the highway.

MELBOURNE—WITH A PAST

Five members of the Geology Discussion Group gave a brief account of Melbourne's geological history:—the past, for the purpose of their review, commencing about 340,000,000 years ago at the Silurian period, then coming through the later Tertiary to Pleistocene and Recent times.

Miss L. Neil opened the subject with a general introduction to geology, especially the stratigraphical aspects. Mr. T. C. Bryan, speaking on the Silurian period, related this age of deposition to rocks actually found near Melbourne. Mr. R. Davidson dealt with the Tertiary sediments, Mr. A. P. Jenkins with the Tertiary volcanic rocks, and Mr. A. A. Baker with Pleistocene and Recent times.

The symposium was supported by slides and members were shown, among many other pictures, two photographs taken at Studley Park, one showing faults in vertical Silurian strata, and the other decomposed dykes cutting across sedimentary rocks, also of Silurian age. Heyington, Ivanhoe and Royal Park railway cuttings were shown to be of great geological interest, and one photograph taken at Royal Park showed sedimentary strata of Tertiary age which had been deposited beneath the sea on an irregular weathered surface of older rocks, the whole being later uplifted above sea level. A fossil jellyfish and a brittle-star imprint from Melbourne's Silurian strata were excellently portrayed on the screen.

EXHIBITS

Mr. R. A. Dunn: Insects collected at the Macclesfield excursion on November 14

Mr. A. J. Swaby: Fairy Shrimp (bright scarlet) found at Sandringham.
Messrs. C. French and R. Bury: Native flowers, including two specimens of Kangaroo Paw, grown at Maranoa Gardens.

Miss L. Neil: Calcite crystals in sandstone; petrified wood (fibre replaced by silicon dioxide); small coal seams in sandstone (Jurassic age)—all collected at Inverloch.

Mr. K. Atkins: Collection of flowering plants from Botanic Gardens, including W.A. Blue-bell Creeper (*Sollya heterophylla*), *Amigosanthos flavido*—green- and red-flowered varieties, *Rauksia serratifolia*, *Callistachys ovata*, and *Milletia megasperma*—the large-flowered Australian Wisteria.

Miss J. Blackburn: Collection of alpine flora from the Mount Buffalo Plateau.

Misses Ursula and Anne Fisch: Fresh flowers from Echo Flat, Lake Mountain (4,700 ft), including *Astelia alpina*, *Harzra longifolia*, *Bossiaea*, *Eriostemon myoporoides*, *Phebalium phyllisifolium*, *Pleurodopsis trymaltoides*, *Epacris baxi-hawkinsii* and *Wittsteinia vacciniacea*

Mrs. M. E. Creame: Tun Shell—a thin rounded shell, the body of which has dark brown spots on a white ground; it is provided with a large proboscis. A curious fact is that this animal's salivary glands secrete a fluid which contains over 3% sulphuric acid and about $\frac{1}{2}$ % hydrochloric acid. The animal squirts out considerable amounts of this fluid, and it is a puzzle how these strongly corrosive acids are produced and stored up.

BIRD "PELLETS"

On March 28th my daughter called me to watch a male blackbird perched in a tree outside her bedroom window. He was singing beautifully. At intervals he gaped widely, dropped something, and resumed his singing with a scarcely perceptible pause. He had been doing this for some time and we watched him repeat the process with effortless ease.

Search under the tree revealed the large nutlets of *Crataegus laevis*, wholly divested of their fruity covering. It was interesting to learn that these do not pass through the bird's body but are ejected in much the same way as the large pellets of undigested matter ejected by owls. We have seen fruits of the "peppercorn" tree (*Schinus molle*) ejected by currawongs in pellets as large as those of owls.

At Murchison we examined large pellets of cormorants and found that they consisted chiefly of the chitinous parts of yabbies. As the yabbies are said to cause damage to aqueducts, the cormorants are certainly useful, even if they take a fish or two!

—E.C.

NEW BEES AND WASPS—PART VIII

A New Species of *Exoneura*, with Notes on Other Reed-bees from the Granupians

By TARTLTON RAYMENT, F.R.Z.S.

Introductory

During December, 1946, Mr. Owen Dawson, of Clyde, Gippsland, a keen collector of the indigenous *APOIDEA*, visited the Granupians (Victoria), Bellfield Peak, at an altitude of 2,250 feet, proved to be a rich field. Many specimens were taken on flowers of *Goodenia ovata*, *Calytrix Sullivanii*, *Melaleuca decussata*, *Dillwynia glaberrima*, *Platylohim obtusangulum*, *Boronia pilosa*, *Leptospermum myrsinoides*, *Melaleuca squarrosa*, and *Olearia ramulosa*. On top of the range, and down the western slope, reeds and sword grass flourish, the flower stems of the latter averaging five to six feet in height.

In fine weather (80° F. at mid-day), Mr. Dawson collected some 30 pithy stems which were occupied by several species of *Exoneurae*. Since the puddings, eggs, larvae, and pupae are the first to be discovered, and shed much additional light on the relationships and habits of these remarkable wild-bees, it is thought advisable to include *all* the new material in another paper to form Part VIII of the series. One new record by Norman Rodd is included.

With one exception, entrance to the stem was made at the broken end, where the pithy centre is exposed and the woody walls extremely thin. In one case, the entrance was effected through the side, but I suggest that some other insect was responsible for the original bore that exposed the pith of the interior.

Exoneura simillima, sp. nov.

I can find no character in the adult female to separate it from the female of *E. holmesi* Raym., except that the abdomen and legs are of a darker and richer red; but the male is very different, and easily distinguished.

The male of the new species has a similar ivory-coloured "T" on the clypeus, the stem of which narrows at the base to a point in both bees, but the clypeus is covered with long lank white hair in *holmesi*, and copious stiff black hair in the new species (as in *E. hamulata* Cld.).

There is a large circular black patch dorsally on the segments at the base of the abdomen, but it is covered with short appressed white hair in the new species [with black hair in *holmesi* and *hamulata*].

The mesothorax in *simillima* has much black hair, but it is long and lank, being dull-white in *holmesi*. The hind legs have much coppery-red hair in the females.

By the larvae, these species are close to *E. hamulata* Ckll., for they have the first appendage with three "fingers", the second with a short basal one, while the third is simple; the other segments of the abdomen have short inconspicuous nodes.

The series were in pithy stems of a sword-grass, and the galleries averaged about 6 cm. in length, with a diameter of 3.4 mm.; the entrance was contracted with a beautifully-formed ring of smooth fibrous material (actually, this is vegetable pith incorporated with a secretion from the salivary glands). Several larvae were lying along the gallery, touching head and tail. Some were fully-fed, and a number of small cylindrical pellets of excremental debris were attached to the lumen of the tube. The galleries never extend beyond the nodes naturally present in the stem.

Sometimes the females taken from a tube differ considerably. From the large number of plant-stem "nests" I have studied, I am led to believe it is possible that other species may crowd into a tube for mutual warmth and protection. This assembling of species at night is a common trait in *Paracolletes*, *Malictus*, *Nomia* and *Anthophora*—a habit that creates difficulties in associating the sexes, but is nevertheless to be regarded as the element of that clustering in swarms so characteristic of the honey-bees.

General Notes on Various Species of Exoneura

Study of the appendages of larvae in this genus has demonstrated that it is often inadvisable to describe new species in the absence of the larval forms. The characters separating many of the bees are insufficient for satisfactory taxonomic description, and nowhere is this more evident than in the *angophorae* group.

There are several forms described as subspecies and varieties, but it is fairly safe to say that when all the larval forms are known, they will ultimately be found to be valid species. The several bees may be separated as follows:

- E. occidentalis* Ckll.—Face black, no-clypeal mark; hind legs black.
- E. angophorae* Ckll.—Face with lateral small yellow marks; hind legs red, with much black hair.
- var. *obliterata* Ckll.—Clypeal narrow stripe suffused or even sub-obsolete; no lateral marks on "face"; hind legs with black hair.
- var. *incerta* Ckll.—Pale lateral marks reduced to mere dots.
- var. *hackeri* Ckll.—Later treated as a species; white clypeal band very broad, with large lateral pallid marks.

If we accept the form having only rudimentary larval appendages as *angophorae*, then *obliterata* is quite distinct, since the larvae possess two long simple "arms" without "fingers", after the manner of *E. angophorella* Raym.

The several females have been grouped together, but the males are very different. Here again caution is necessary, for unless the two be taken together in a plant-stem, it will be impossible to

associate the sexes correctly. I propose to elevate to specific rank the form for which I append a specific description.

Exoneura obliterated (Ckll.) Rayment, stat. nov.

TYPE: Male—length, 7 mm. Black with red abdomen.

Head black, shining; the "face" excavated, leaving the area between the scapes very high; the clypeus is suffused with red until it is of the same colour as the legs; labrum red; yellow of mandibles suffused with red, but black apically; scapes and flagella light red beneath. A few long golden hairs about the margin of the clypeus, labrum and mandibulae.

Mesothoracic disc polished black, as are the scutella and metathorax, which has a delicate tessellate area; tegulae piceous; axillae light reddish. Scattered long golden hairs on pleura.

Abdomen clear chestnut-red, dusky apically, with a microscopic cancellation and puncturation and a few golden hairs.

Legs red; some black basally on the femora; a few black and many coppery hairs on hind tibia and basitarsus.

Wings yellowish, nervures and pterostigma reddish-amber.

ALLOTYPE: Female—length, 7.5 mm. Black with red abdomen.

Head with orbital margins converging below; clypeal stripe, with irregular edges, suffused with reddish, closely and finely punctured; labrum reddish; mandibles with median red patch; scapes reddish in front, flagellum obscurely reddish beneath.

Mesothorax and scutella shining, but with an excessively delicate tessellation; some long white plumose hair on the pleurae and metathorax laterally; on the anterior "corners" of the mesothorax a few long black hairs; tubercles black with a white fringe.

Abdomen light chestnut red, a black circular patch apically with some pale golden hairs (on a few, the two apical segments are almost black; some have a blackish spot on the basal segment).

Legs red, with black on coxae, trochanters and anterior femora basally; hind tibiae and tarsi with stiff black hair.

Wings yellowish; pterostigma and nervures dark-amber.

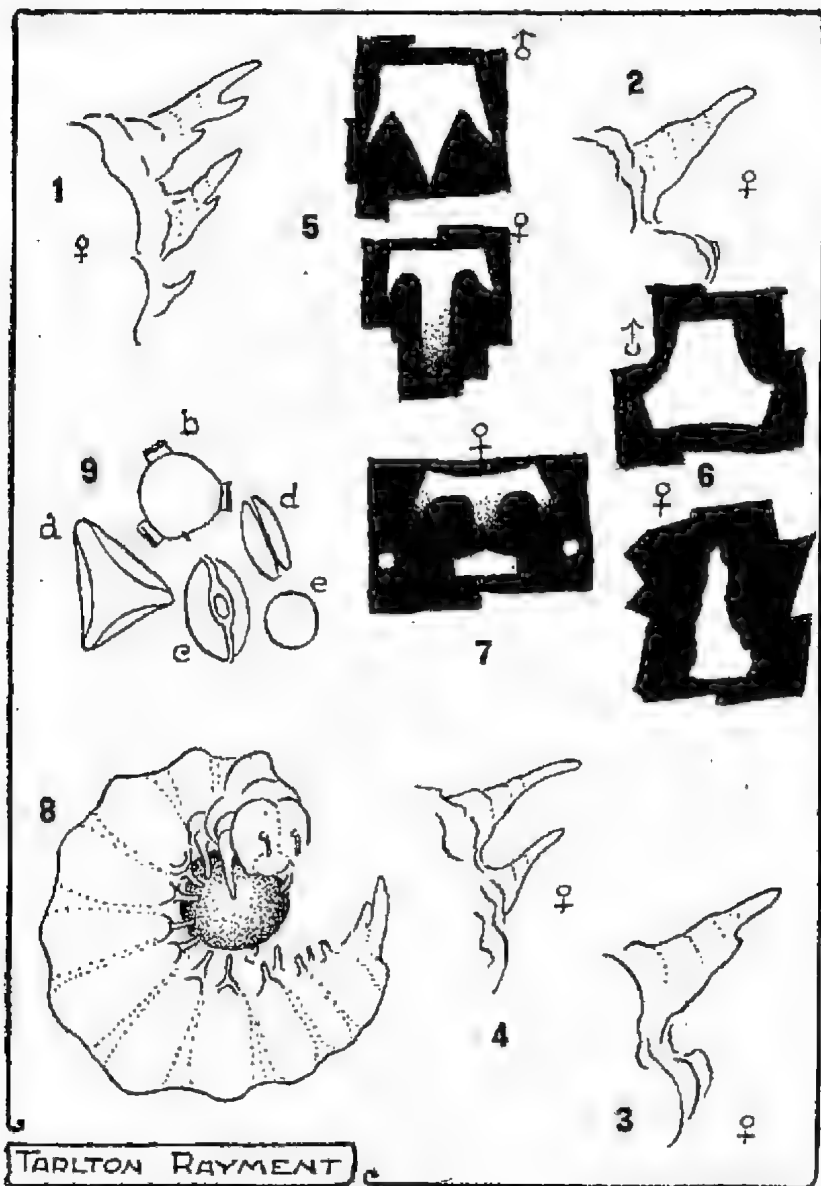
Locality: Grampians, Vic. Dec. 4, 1946. Owen Dawson.

TYPE and ALLOTYPE in the collection of the author.

The nest series was taken from the pithy flower-stalk of a reed, and contained three adults and seven larvae. By their larval appendages, the bees are related to *E. froggatti* Ckll., *E. angophorella* Raym., and the black species *E. roddiana* Raym.

The "arms" are simple, and lack the finger-like appendages of *E. hamulata*; the segmental nodes are long, and the head processes short.

Each larva was supplied with an individual pudding of pollen, some 2 mm. in diameter, which was held in the ventral curve of



TARLTON RAYMENT

KEY TO ILLUSTRATION

1. Larval appendages of *Exoneura similina*, sp. nov.
2. Ditto of *E. froggattii* Ckll.
3. Ditto of *E. fultoni* Ckll.
4. Ditto of *E. obliterata* Ckll.
5. Clypeal marks of male and female *E. similina*.
6. Clypeal marks of male and female *E. obliterata* Ckll.
7. Clypeal and lateral marks of female *E. angophorella* Raym.
8. Larva of *E. obliterata* and its pudding of yellow pollen from a species of *Melaleuca*.
9. Pollen from the puddings: (a) *Leptospermum*; (b) and (c) *Goodenia ovata*; (d) *Dillwynia*; (e) species unknown.

the body. Some of the puddings were orange-coloured, and these were composed of triangular granules from some myrtaceous plant (other females were taken on *Melaleuca decussata*, and *M. squarrosa*, also *Leptospermum myrsinoides*). The cream-coloured puddings contained pale spherical granules from some undetermined plant.

Exoneura froggatti Ckll.

A series of females, typical in all characters, from the pithy stems of sword-grass.

Grampians, Vic. Dec. 7, 1946. Owen Dawson.

By its larvae, this species is related to *E. obliterated* Ckll., and the black species *E. roddiana* Raym., for the "arm" is simple, being without "fingers". Other segmental nodes are absent. Each larva was supplied with an individual pudding of triangular cream-coloured myrtaceous granules.

Exoneura fultoni Ckll.

Several series of females, typical in all characters, from pithy stems of sword-grass.

Grampians, Vic. Dec. 4, 1946. Owen Dawson.

From one tube two females were taken, with seven larvae in all stages of development from egg to pupa. The gallery measured 6 cm. in length, with a diameter of 3.5 mm., and terminated at a node. Other stems contained mature adults, but no larvae; all were engaged in boring into the pith.

The larvae have one prominent appendage with two "fingers". The several eggs were massed together on one pollen pudding at the base of the tube.

Exoneura montana Raym.

New record for the State; described from Macpherson Range, N.S.W.

A series of four males and five females, typical in all characters except for the wholly black abdomen of the males. This species is often mistaken for *E. hamulata* Ckll., but it is quite distinct.

Unfortunately, no larvae were present in the "nest", only one pupa.

Patonga Beach, N.S.W., in a stem of lantana. Nov. 30, 1946. Norman W. Rodd.

Exoneura roddiana Raym.

New record for State; described from Sydney, N.S.W.

A series of one male and three females, typical in all characters, but no eggs or larvae were present; found in stems of reed.

Grampians Range, Vic. (alt. 2,250 feet). Dec. 4, 1946. Owen Dawson, in stems of reed.

CLUB PICNIC TO ARTHUR'S SEAT AND ROSEBUD

By J. ROS GARNET

Under leadership of the President, the Club's Annual Picnic was held on Cup Day, November 2nd, and it is doubtful whether the thirty-five members and friends who attended could have had a more enjoyable day.

Except for low cloud on the mount as we ascended Arthur's Seat, the day was one of brilliant and warm sunshine. Wildflowers were at their best, the Manuka clothing flats and hillsides with its snowy-white mantle, while the Guinea-flowers, Butter-cups and Curling Everlastings blended their gold with the blue and mauve of Sun Orchids, Waxlips, Blue Squills and Purple Eyebright, with here and there the party-coloured Eutaxia, Parrot Peas, Flat Peas and Bush Peas.

While the cloud was still low we climbed to the tower on the summit of Arthur's Seat and admired the magnificent panoramas that lay before us. From this vantage point one could trace the ancient course of the Dandenong Creek—even beneath the waters of Port Phillip Bay.* Away beneath us lay the McCrae Lighthouse beside a long stretch of clean beach, and beyond, out on the waters of the Bay, moved a disabled tanker guided by its two attendant tugs along the channel towards Melbourne; towards the Heads a white-painted steamer could be seen, bound for the open sea

As it was the intention to enjoy our picnic lunch at King's Falls—a few miles away—we deserted the van and rambled along the Rosebud road toward the *rendezvous*. The heathlands along the roadside and in the nearby paddocks provided us with a tempting variety of wildflowers, of which the orchids attracted special attention. Seventeen species were noted during this short walk and among them, worthy of mention, were the Great Sun Orchid (*Thelymitra grandiflora*), the Tall Sun Orchid (*Th. media*), the Green Leek Orchid (*Prasophyllum Brainei*), and the Clubbed Spider Orchid (*Calodenia clavigeru*).

The falls where we lunched must be one of the most delightful spots on the range—a place near the source of two small mountain streams which splash over the basalt rocks to drop a hundred feet down into a steep gorge.

Perched on the face of the gorge were several eucalypts, including Manna Gum and White Sallee, while Drooping She-oaks added grace to the scene. The creeks, densely fringed with ferns and moisture-loving plants, were scenes of beauty in themselves, the more spectacular subjects being an occasional King-fern, Rough Tree-fern, or Snowy Daisy-bush in full bloom.

*A most interesting and authoritative account of the geology of the district is given by R. A. Keble in *Vic. Nat.*, Feb. 1932, Vol. 48, pp. 195-193.

Much interest attached to the finding of a young koala, and members voiced the hope that it bespoke the re-establishment of these animals on Arthur's Seat.

Later in the afternoon we journeyed four or five miles down the mountain road to Rosebud, where at their kind invitation we enjoyed the hospitality of Mr. and Mrs. Colin Lewis. On the road the van passed over a Black-tailed Wallaby which had evidently been killed by some passing motor. The incident called to mind that Arthur's Seat, with its lower slopes and the nearby coastal scrub, was once the home of an abundant marsupial fauna, much of which has now passed away as the range has become settled. Wallabies and possums are, however, still plentiful and may be heard often and seen less frequently in and around Dromana and Rosebud.

After enjoying afternoon tea on the lawns of the Vice-President's seaside home, botanists and marine biologists alike explored the garden to admire his collection of native plants, gathered together from many districts and growing successfully within a stone's throw of the beach. Plants from both the coastal strip and the drier inland, from the mountains and the valleys, appear to be thriving equally well with the protection afforded by clumps of Coast Tea-tree.

Having lazed awhile, we wandered out on to the beach, where the party either paddled, bathed, browsed or continued to laze as the spirit willed, until it seemed that the time had come to leave for home. So pleasant had been the warmth of the afternoon and so quiet the waters of the Bay that the time passed all too rapidly—especially for the seven children who were among the party. The sun was setting as we cheered our farewell to Mr. and Mrs. Lewis and journeyed home along the Beach Road.

WEST WIMMERA ORCHIDS

By E. T. MUIR, Dimboola.

Since my original contribution on this subject (*Vict. Nat.*, May, 1948, p. 18) and Mr. E. V. Barton's recent supplementary notes, I have had opportunity still further to extend our knowledge of the Western Wimmera *Orchidaceae*.

During October, Mr. Cliff Beaglehole (of Gorae West) accompanied me to several parts of the Little Desert, and at Diapur, in the Lawloit Ranges, we found *Thelymitra epipactoides*, *T. luteo-ciliata*, *T. pauciflora*, and indeterminate specimens of a *Micranis* and of a *Corybas* species—all new records for this region—besides confirming Mr. Barton's additional records of *Prosopphyllum nigricans*, *Calochilus Robertsonii* and *Leptaceras fimbriatum* and Mr. T. E. George's collection of *Prosopphyllum alatum* (originally from Yanac).

The list of certified Western Wimmera orchids now stands at 47 species in 16 genera—*Thelymitra*, *Caladenia* and *Pterostylis* being the largest groups, with 8, 9 and 10 species respectively.

VICTORIAN FERN AND CLUBMOSS RECORDS—I.

By N. A. WAKEFIELD and J. H. WILLIS

Within the last two years, the regional distributions of several rare or noteworthy Victorian pteridophytes have been extended (or confirmed where previously in doubt) and, since the *Victorian Naturalist* has already published so much valuable data concerning our fern flora, it is appropriate that any additional information should be placed on record here.

1. *Cyathea Cunninghamii* Hk.f.—Sassafras Creek below Beagley's Bridge, Dandenong Ranges (13 specimens noted, 25/4/1948—S. Storie and J. H. Willis).

The Slender Tree-fern, which has a limited distribution in Victoria (Otways, South Gippsland Hills, Wilson's Promontory, Orbest and Mt. Drummer region), has been presumed extinct in the Dandenongs for the last 30 or 40 years. Baron von Mueller received fronds from several correspondents near there in the 'seventies, and a few living examples were noted by Mr. P. R. H. St. John about the turn of the century; thereafter, this lovely *Cyathea* faded out of the picture, and years of searching have failed to disclose a single plant of it in this region. It was therefore a delight to learn recently from Mr. S. Storie of Kallista that Slender Tree-ferns yet survive in one small area between Kallista and Monbulk. For this interesting re-discovery, all credit goes to Mr. Storie, who guided one of us to the spot shortly afterwards. All of the thirteen specimens were old, but healthy, plants growing in the wettest part of tributary gullies opening south into Sassafras Creek—eight were counted along the permanent creek reserve and five in neighbouring private property. *Cyathea Cunninghamii* once grew also in Main Creek, S.E. of Arthur's Seat, but has long since been exterminated from there by reason of clearings for farm land.

2. *Cystopteris fragilis* (L.) Bernh.—Wotan Creek, Mt. Bogong (J. H. Willis, 16/1/1947); Little River Falls, near Wulgulmerang (J. H. Willis and N. A. Wakefield, 16/1/1948).

Although common enough in many parts of Europe, the Bladder Fern—like the boreal Moonwort, Avens and Lady's-mantle—is confined to mountain fastnesses in south-eastern Australia and is looked upon as one of our rarest ferns. Apparently Mr. A. J. Tadgell was the first to locate *Cystopteris* in Victoria, where he found it growing at a waterfall high up on the southern declivities of Mt. Bogong [see *Vict. Nat.*, XXXIX, April, 1923, p. 175; also XL1, August, 1924, p. 64]. This remained the only record for 24 years, until one of the writers collected further specimens along Wotan Creek (also on the southern slopes of Bogong and not far below the Cleve Cole memorial hut). Last January, we were both able to explore the beautiful falls on Little River, about five miles north-east of Wulgulmerang; there, in addition to such rarities as *Agropyron pectinatum*, *Cyatnodes divaricata* and an undescribed species of *Brachycome*, we also found *Cystopteris*—some 60 miles S.E. of its haunts on Mt. Bogong, and the only other locality to be recorded for the State. The specific name of *fragilis* is most apt, for Bladder Fern is exceedingly tender and delicate, lurking away under rock ledges that are continually wet from dripping water or the cold spray of the falls.

3. *Davallia pyxidata* Cav. — Mt. Bepcha near Glenisla (R. W. Bond, 6/1/1948); also Mt. Talbot and Picnic Rocks, Black Range, S. of Horsham (A. J. Swaby, Sept., 1933).

Ewart (*Flora Vict.*, 1930, p. 39) attributes a wide distribution to the Hare's-foot Fern, viz., "S.W., S. and E.": but, in the Melbourne Herbarium,

the only collections to substantiate its occurrence are an old specimen labelled "Grampians"—with no information as to collector, date, or precise locality—and a sheet of material from West Kinglake under the handwriting of P. R. H. St John. The latter gives rise to serious doubt and may have been taken from cultivated material. While this *Davallia* is grown frequently in hanging baskets, its existence under natural conditions within Victoria was for years a matter for uncertainty, until Mr. A. J. Swaby (Sept., 1933) located genuine spontaneous examples on the Black Range (west of the Grampians)—possibly the very source of the old "Grampians" collection in our National Herbarium. During a preliminary natural history survey of the Black Range by the McCoy Society last March, opportunity was taken to visit the isolated sandstone mass of Mt. Bepha, near Glenelg. In horizontal fissures high up on the northern escarpment of the mount (a wonderful hunting ground for lichens), Mr. Bond found living specimens of Hart's-foot Fern which, though leathery and strongly rhizomic, were nevertheless a surprise in such an exposed and unfavourable habitat—one would expect to find only the toughest rock plants there.

4. *Dryopteris pennigera* (Forst.) C. Chr.—Glenelg River gorge and Moleside Creek, far S.W. Victoria (Cliff Beaglehole, 1946 and 6/4/1947).

Since its comparatively recent discovery by Mr. Owen Singleton at Sierbrooke River, western Otways, in 1943 [see *Viet. Nat.*, LX, March, 1944, p. 173], the Naked Wood-fern has been found more abundantly in the far south-west of the State by Mr. Cliff Beaglehole. Members of the 1947 Easter Excursion to the Lower Glenelg saw this lime-loving fern on cliffs of the Glenelg River gorge and also on Moleside Creek, a tributary stream [see *Viet. Nat.*, LXIV, August, 1947, pp. 69 and 70].

5. *Hymenophyllum peltatum* (Poir.) Desv.—Cumberland Falls, south of Lake Mountain, at 3000 ft. (Owen Singleton, 24/4/1943).

Since the Alpine filmy-fern was added to our Census as a result of Mr. A. J. Talgell's discovery of specimens on Mt. Bogong (February, 1923), the species has turned up in several alpine portions of the State (e.g., Mt. Cope, Niggerheads, Mt. Speculation, Lake Mountain)—hitherto it has doubtless been confused with the very similar but more widespread *Hymenophyllum cupressiforme* (not *H. tunbridgeuse*, as cited in most Australian works). The latest, and apparently lowest altitude record is Cumberland Falls, where the little fern descends from its haunts on Lake Mountain plateau to grow among wet granite boulders and the mossy butts of Myrtle Beech trees, no more than 3000 feet above sea level. Lower down in the Cumberland gorge, *H. peltatum* gives place to *H. cupressiforme*, but in Tasmania—as with several of our alpine plants—it occurs more commonly at much lower elevations.

6. *Meconium varum* (R.Br.) Copeland—Head of Taggerty River, Lake Mountain, at 4000 ft. (Owen Singleton, 24/4/1943); Acheron Way at Cement Creek, on *Nothofagus* trunks (A. J. Swaby, 27/1/1948); McCrae Creek, Beanak, on old gnarled *Nothofagus* buttresses (R. W. Bond and J. H. Willis, 16/7/1948).

The specific name has deceived more than one botanist (even the compilers of our Census) into believing that the "Rare Filmy-fern" was indeed a rarity. Actually, Brown's epithet *varum* implies very thin texture and has nothing to do with quantities or occurrences; but it is redundant, since all filmy ferns are texturally "rare". Mr. Singleton's collection from the Lake Mountain area (April, 1943) represents the highest altitude—4000 feet—so far recorded in this State, while Mr. Swaby's Cement Creek and Mr. Bond's McCrae Creek collections still farther extend our knowledge of the distribution of a fern which, if not very widespread, is certainly not rare in the several localities concerned.

7. *Marsilia angustifolia* R.Br.—Upper Glenelg River, near the Cherry Pool (J. H. Willis, 6/3/1948).

The typical Narrow-leaf Nardoo apparently extends from Port Jackson (type area) to far north Australia; but a matted form with very small fronds has been located on drying mud near Mildura and at Dimboola. This species is now recorded for a third locality considerably further south: the McCoy party found it during March on wet mud around the edges of a permanent water-hole in the bed of the Glenelg, about three miles south of Cherry Pool; *Elatine gratioloides* occurred in association with it.

8. *Ophioglossum rosaceum* A. Cunn.—Mt. Morton, South-Belgrave (Mrs. Paul Fisch, 22/6/1947; J. H. Willis, 10/8/1948).

The Adder's-tongue, affecting most parts of the Commonwealth and all but the very mountainous portions of Victoria, can hardly be called an uncommon species. It is a seasonal feature of grassland areas, like the Keilor basalt plains or Goulburn Valley, and of Mallee sand-hills. Why, then, hither to mention it from Mt. Morton? The location is not so remarkable here as the mode of occurrence, for specimens were found growing amongst loose moss on the wet surfaces of granite rock, about half a mile south of Mt. Morton. This "lithophytic" form of *Ophioglossum* had exceedingly long fertile fronds—up to six inches or more.

9. *Lycopodium varium* R.Br.—No. 1 Peak, near Mt. Kaye, Cann River Valley, E. Vic. (N. A. Wakefield, 6/10/1946, 16/10/1948—Mt. Kaye.)

One very large plant and a few smaller ones were located in crevices and on ledges of granitic rocks in the Mt. Kaye area, East Gippsland. Previously the species had been known only from Genoa Peak in this State. There are records in the Melbourne Herbarium from near Braidwood (N.S.W.), Furneaux Group (Bass Strait) and Surrey Hills (Tas.)—all on granite, for which the species seems to have a predilection.

10. *Psilotum nudum* (L.) Griseb.—Ballantyne's Hills, Suggan Buggan, far E. Vic. (N. A. Wakefield, 31/1/1947, 16/1/1948).

This recent discovery of Skeleton Clubmoss in northern rock crevices of the dryish Ballantyne's Hills, far eastern Victoria, constitutes a very interesting link between the only other known location (Mt. Zero, Mt. Arapiles and Mitre Rock—all in the north-west Grampians district) and the nearest occurrence in New South Wales (apparently Port Jackson area). Though not uncommon through Queensland rain-forests, where it becomes an epiphyte, *Psilotum* remains one of our rarest Victorian pteridophytes.

11. *Tmesipteris parva* N. A. Wakefield.—Head of Stony Creek, M.M.B.W. Reserve, near Olinda (J. H. Willis, A. B. Court and F. Child, 28/12/1947).

Long Fern-clubmoss, *T. Billardieri*, is the species most frequently encountered as a tree-fern epiphyte in our gullies, and any occurrence of the smaller *T. ovata* or *T. parva* is worth registering. The last-named is very rare in the Dandenongs, but last December one *Dicksonia* trunk (and only one) in the Silvan Dam M.M.B.W. Reserve, was found to be smothered with this dainty plant. *T. ovata* is represented in the Melbourne Herbarium by an old (1853) specimen from the Dandenongs, but the record does not seem to have been confirmed by any subsequent collection. All three Victorian *Tmesipteris* species, and several others, had long been confused under the name *T. tannensis* [see *Vic. Nat.*, LX, Jan. 1944, p. 142].

(It may be remarked here that the solitary plant of *Asplenium adnigratoides*, constituting the only Victorian record of the species—see *Vic. Nat.*, LVII, Oct. 1940, p. 114—has since died. As its situation, on the wall of a huge crevice about two miles S.E. of Genoa, was unique, it will probably not be found elsewhere in this State, although plentiful on Mt. Drumedary, N.S.W., 80 miles to the north.)

(To be continued)

SOME INLAND PARROTS

By M. ELDER

By "Inland" I mean 350 miles from Sydney and about the same distance north of Melbourne. My headquarters was a wheat and sheep farm at Kamarak. The bush paddock, where pine and box country merged with mallee scrub, was always popular with the birds. Cockatoo-parrots could be seen most evenings, twenty or thirty flying about just for the joy of showing their speed. I was never very sure of their nests, but I think some shared an old kurrajong tree with a big colony of bees. The Cockatoo-parrot is 12 inches long, soft grey, with a white splash on the wings, and the characteristic small yellow pointed crest. The red spots on each side of a white head are not so easily seen at a distance. Its call is rather like "Quarrion", one of its names.

The Blue-Bonnets were there too: I watched one fly up from the grass to its nest in a hollow branch of an old box tree. Its mate came out, so I watched them both for some minutes; she is "duller", as the bird books say. His olive-green back is a camouflage when feeding in grass. Underneath the green shades to yellow, with a red triangle forward up the legs. The blue bonnet, face, head and neck, and the blue feathers on the wings, make him a really fine parrot. One morning a pair of them came into the white cedar tree at the house, only a few feet from me. They did not eat the ripe berries, but very young flower buds that we had noticed only the day before. White cedar berries are poison to some things, poultry included, and I have never seen anything eat them.

Budgerigars need no description; they are lovely, flying in hundreds at sunset. At this time they came to the dam to drink—a fringe of bright green birds on the red-brown mud at the water's edge. Sometimes in summer we have been swimming and they have come to drink at the other end of the dam, provided we made less noise than they did. They also nest in colonies in the old box trees. The Mallee and the Many-coloured Parrot are in the district, but I was not privileged to watch them on this visit. Of course, the noisy Galahs are always about. Some years they are very troublesome, eating wheat at seeding time.

EAST GIPPSLAND ORCHIDS

By N. A. WAREFIELD, Cann River.

Reference to this journal for August, 1940 (Vol. LVII, p. 70) will indicate the orchid species recorded for East Gippsland up to that time. Following are some additional records and notes:

Prasophyllum nigricans, on moist flats amongst *Xanthorrhoea hastata*, at McKenzie River and Genoa Creek—the pale green and reddish form.

Thelymitra rubra, in clayey soil at Cann River.

Thelymitra acnosa, in peaty bogs at Maramingo Creek, Genoa; and also in moss-beds near the Upper Delegate River, Bendoc.

Thelymitra cyanea, reported as new for Victoria when discovered by Mr. W. Hunter near the Upper Delegate River (*Vic. Nat.*, Vol. LIX, p. 201, April 1943); but found also at Maramingo Creek (Dec. 1940, N.A.W.).

Burnethia cuneata, a few plants bordering a peaty bog at Reedy Creek, near Cann River.

Caladenia Fitzgeraldii, widespread in lowland forest areas, and listed previously as *C. clavigera* (N.A.W.) and *C. reticulata* (W. Hunter). Despite Mr. W. H. Nicholls' remarks (*Vic. Nat.*, Vol. LVIII, p. 127, Dec. 1941), I am in complete agreement with Rev. H. M. R. Rupp's action in keeping this form as a distinct species.

Caladenia reticulata, coastal, near Betka River, Mallecoota. Though not the typical form of South Australia and western Victoria, this is the common Victorian form to which this name is applied, and is best distinguished from *C. Fitzgeraldii* by the white-headed "golf-stick" type of marginal teeth on the labellum.

Caladenia aurantiaca, in heathlands at Masto, Reedy Creek and Genoa. This was recently raised to specific rank by Rev. H. M. R. Rupp (*Proc. Linn. Soc. N.S.W.*, Vol. LXXI, p. 278); and it is amply distinguished from *C. carnea*, of which it had been regarded as a variety, by the labellum shape and a complete lack of red markings.

Caladenia pallida, in mountainous situations—Goongerah, Mt. Ellery and slopes of the Cobbaras Mountains.

Chiloglottis trapeziformis, plentiful at Cann River, Brodribb and Bruthen.

Pterostylis Baptista, abundant about Genoa and Cann River, on wet scrubby flats, generally with *P. falcata* and *P. acuminata*. First recorded for Victoria in *Vic. Nat.*, Vol. LVII, p. 147, Dec. 1940.

Prasophyllum odoratum, on coastal heaths at Mallecoota and Cape Conran. Also its var. *albidiflora* (W.H.).

Prasophyllum Beaughleholeri, Bidwell near Upper Delegate River. A new species first found in Victoria at Portland (*Vic. Nat.*, Vol. LIX, p. 9, May 1942).

There are now 107 species on the list for East Gippsland, and 82 of these are known to occur within twenty miles of Orbost.

EXCURSION FROM MONTROSE TO MT. EVELYN

About seven members met at Montrose on October 2nd, the weather being fine, in spite of some forebodings, and conditions underfoot good. It was decided at once to make the through trip to Mt. Evelyn Station and board the evening train. The route is in easy country (up to 450 ft.), not entering the higher hills.

Several species of *Acacia* were observed, though mostly past their best flowering. A form with very narrow phyllodes, varying somewhat but commonly appearing one-nerved in the narrower forms, was supposed to be *A. longissima*. On consulting the Herbarium, however, these and another varying collection from north of Croydon were all referred to the "dissitiflora" form of the *A. longifolia* group. This is *Acacia dissitiflora* of Bentham early, but reduced by him to a variety of *A. longifolia* in *Flora Australiensis*, and by later writers to a variety of *A. mucronata*—now separated from *A. longifolia*. The name *dissitiflora* is very apt, meaning "flower spaced apart."

The true *A. longissima* appears to be only far eastern in Victoria, if indeed Victorian at all. Bentham regarded it as sufficiently distinct from the various forms of the *A. longifolia* group, and later writers have followed his view, though the features which lead to this decision are not very clear. There is some incompleteness even now as to seed details, but *A. longissima* has very flaccid leaves and pale, almost whitish flower spikes (cf. *A. mucronata*).

Of other plants, *Exocarpos stricta*, Pale-fruit Ballart, was plentiful and flowering freely; *Coprosma quadrifida*, the Puckly Currant-bush, showed the styles quite conspicuous and much exceeding the spread of the very small perianth; a few flowers of Coral Heath (*Epacris microphylla*) were seen, but it may have been past its best season.

Few orchids were in evidence, and the season did not appear on the whole to be far advanced.

T. S. ILART

WHAT, WHERE AND WHEN

General Excursions:

Saturday, January 8—Botanic Gardens, Melbourne. Subject: "Australian Trees in Summer" (fourth of series for beginners and visitors). Leader: Mr. A. Burke. Meet main gates at Herbarium, near Shrine, 2.30 p.m. New members and interested visitors cordially welcome.

Saturday, January 22—Shorcham. Subject: "Marine Life and Singing Sands." (Foreshore also good for coastal botany and birds.) Leader: Mrs. J. J. Freame. Trains from Flinders Street to Frankston (fare, 3/5 return) at 9 a.m. and 9.7 a.m., thence service bus to Shorcham. Bring two meals, wading shoes and glass collecting jar.

Australia Day week-end (January 29-31).—Contemplated camp-out has been cancelled, due to lack of camping facilities and to transport difficulties.

Saturday, February 5—Geelong Botanic Gardens. Subject: "Australian Flowering Trees." Leaders: Messrs. Walley (Curator of Gardens) and A. J. Swaby. Parlour coach from Batman Avenue 9 a.m., return to city 6.30 p.m. Bookings, 9/6, with Mr. H. Stewart, 14 Bayview Terrace, Ascot Vale, W.2 (Tel. FU 022, ext. 457). Bring picnic lunch and afternoon tea. N.B.: Some notable examples of native trees, including kurrajong hybrids, are expected to be in full flower and will be of particular interest to Photographic and Wildflower Garden Group members. Early booking essential.

Preliminary Announcements:

Saturday, February 19—Launch excursion on River Yarra (downstream and estuary). Leader: Mr. H. P. Dickins. Dredging to be undertaken by Marine Biology Group. Leave Princes Bridge 2 p.m. Bookings, 2/6, with Mr. R. B. Jemison, 3 Linda St., Moreland.

Saturday, February 26—Murrindindi and Wilhelmina Falls. Locality never previously visited by Club. Full details of subject and leader later. Parlour coach from Batman Avenue, 8.30 a.m. Advance reserved seats, 12/6, with Mr. H. Stewart, 14 Bayview Terrace, Ascot Vale, W.2.

Group Fixtures:

Botany Discussion Group in recess for January. First meeting for year on February 28.

—H. C. E. STEWART,

for Excursion Committee, F.N.C.V.

The Victorian Naturalist

Vol. 65.—No. 10 FEBRUARY 9, 1949

No. 782

PROCEEDINGS

The monthly meeting of the Club was held at the National Herbarium on Monday, January 10, 1949. The Vice-President, Mr. Colin Lewis, occupied the chair and about 150 members were present. Apologies were received from Messrs. Garnet, Lord and Willis and Dr. Chattaway.

The chairman extended a welcome to several notable visitors from other States, including Dr. F. W. Whitehouse, Associate Professor of Geology at Brisbane University, and Mr. C. T. White, Government Botanist of Queensland; also to the following Club members who had been out of the State for some time: Mrs. Stan Colliver, Miss Nance Fletcher, Miss Maud Perry, and Mr. L. Woolcock. The chairman also extended greetings for 1949 to all members.

Mr. Stewart advised that the list for the trip to Geelong Botanic Gardens on February 5th was full, and asked members who had made tentative bookings for the Murrindindi trip on February 26th to confirm them, as he expected the trip to be popular. A launch is to be engaged for the River Yarra trip on February 19th, and early bookings were requested. Mr. Stewart made an appeal to members to send in suggestions for excursions for the winter programme.

The following new members were elected and welcomed into the Club: as Ordinary Members, Miss R. McCormack, Messrs. G. Jeffrey and W. A. E. Nielsen; and as Country Member, Mr. A. J. Hicks.

NATURE NOTES

Mr. H. P. Dickins produced some pieces of strong string which had been cut neatly through by a case-moth after he had tied the case to a bush by the string.

Mr. Miller reported that he had sliced up about 1½ lbs. of strong cheese and put it out for the birds; no cheese remained after an hour and a half. Mrs. Freame commented on the alacrity with which birds will eat any icecream which has been spilt on pathways.

Mrs. Salau described a migration of millipedes which she had observed. At first this migration was from north to south, and a week later it went to the north-east. The millipedes moved over and not around all possible obstructions.

HIDDEN TREASURE

An impromptu evening afforded members an opportunity to talk about their holiday experiences, and this experiment proved both interesting and enjoyable. The evening was further enhanced by two of our visitors who gave short discourses on topical subjects.

Mr. Lewis commented on the absence of the little green beetle which is usually prevalent at this time of the year and does great damage by depleting foliage. It was later reported that the beetle is in the Brighton district, but not as badly as in some years.

Mr. Hammet's treasures were largely hidden, as he spoke about stones in the garden, the little plants which thrive about them, and how well trees and shrubs thrive in ground which has a liberal proportion of stone. It was also reported that the Forests Commission is now working on the theory that trees do better in land with plenty of stone, and Mr. Alan Carter observed how well the pines were doing in that section of the Ovens Valley which was strewn with stones from the dredging operations.

Five treasures and one doubtful record were reported from the Buffalo Plateau. The former were five land shells, the first recorded for the Plateau, found by Mr. Gabriel, and the other was the Large-billed Scrub Wren reported by Mr. Stewart. If the latter record is correct, we have the highest altitude attained by this bird.

The unseasonal activities of a pair of Lyrebirds in Sherbrooke Forest, and "try-out" efforts of a young male with only half-grown tail feathers, were described by Miss Watson; but she was a little sceptical of a "local's" report that a Lyrebird had definitely been heard singing "Three Blind Mice."

Mrs. Freame spoke about a limpet-like sea slug, *Onchidium*, which, in place of a shell, has a very tough and roughened skin; it is found on the coasts at Mornington, San Remo and Shoreham.

Mr. Chisholm, after making further comments on the Large-billed Scrub Wren, the distribution of which has not been fully investigated, focused his remarks on the habits of the Mistletoe Bird and made a strong plea for its preservation.

Miss Young had observed that the nectar on her flowering gums this year was not attracting bees, and, on tasting it herself, she had discovered that it lacked sweetness. This appeared to be a seasonal peculiarity, and it was reported that apiarists expect the supply of honey to be seriously affected.

Dr. F. W. Whitehouse, Associate Professor of Geology at Brisbane University, and Mr. C. T. White, Government Botanist of Queensland, spoke on their respective subjects. Dr. Whitehouse outlined the history of the search for oil in his State and described the geological structure and conditions necessary before oil could be present. He also commented on the fact that basalt

had been found in north Queensland, exactly the same as the basalt in and around Melbourne.

Mr. White felt that he could not make many comments in his official capacity, as he was much more at home with the flora of the northern parts of Australia than with that of Victoria. He gave a resumé of some of the Natural History Clubs in Queensland and spoke in the efficient manner in which the Forestry Department of his State controlled national parks.

Miss Nance Fletcher brought the evening to a close with a few general impressions of England and the Continent, and expressed her great pleasure at being home in Australia.

EXHIBITS

Miss L. Davies: Large Tongue-orchid (*Cryptostylis subulata*) and Hyacinth Orchid (*Dipodium punctatum*)—both collected from Rosebud.

Messrs. C. French and R. Bury: Fifteen species of native flowers, including *Eucalyptus Oldfieldii*, *Callistemon teretifolius*, *Grevillea Banksii*, var. *Fosteri*, *Lambertia formosa* and *Melaleuca macronychia*.

Mr. C. J. Gabriel: Marine shell, *Strombus laciniatus* Chem.

Mr. A. N. Carter: A series of flowers and fruits of the Saw Banksia (*Banksia serrata*), showing a complete series of growth stages from youngest buds to mature cone. Collected at Robertson's Beach, Gippsland.

Mr. H. Miller: Orchid (*Thunia Marshalliana*) from Moulmein; a plant brought ten years ago and flowering for the first time.

Mrs. M. E. Freame: Wing Shell, *Pteris papilionacea*, collected at Point Cook, 9/1/49; *Onchidium*, a limpet-like slug which bears a close relationship to the garden slug (see further reference under "Hidden Treasure").

Mr. K. Atkins: Collection of flowering plants from Botanic Gardens, including: *Alyxia buxifolia*, *Baccha fascicularis* and *B. virgata*; *Banksia serratifolia*; *Calothamnus chrysantherus*; *Leptospermum pubescens*; *Lomatia fraxinifolia*, *Melaleuca macronychia*, *Veronica perfoliata*, *Viola hederacea* and *Hibbertia scandens*.

"BEETLES AHOY!"

(A Book Review)

This is the title of an excellent little volume of nature studies for children of all ages (six to sixty).

John and Molly are the two children who collect anything from insects to sea-shells, and who ask questions about everything they see. Mr. Jones, the "Professor", is just the person to answer them and explain in simple language what happens and why, and tell of the plant and animal wonders that can be found in this ancient land of ours. (He has a long white beard, so has probably been a member of some Field Naturalists' Club for a considerable time.)

Originally giving them as broadcast talks to schools in Western Australia, the author, Ada Jackson, who is well known for her natural history writings, has wisely decided to incorporate these interesting dialogues in more permanent form. And that is a lucky thing for all children over the years who will enjoy the stories, explore with John and Molly, and find answers from the Professor.

A book of 160 pages which can be recommended with confidence, it is attractively produced by Patersons Press Ltd., of Perth, at the reasonable price of 8/6,

—JNA M. WATSON.

EXCURSION TO RUSHWORTH

(September 30-October 3, 1948)

I. General Report

By J. ROS GARNETT

Although Rushworth has been visited from time to time by individual members, the Club had never previously made an official excursion to the district—a remarkable fact when it is considered that the region has yielded such botanical rarities as the Long-tailed Greenhood orchid (*Pterostylis Woollsi*), the "Beardless" *Calochilus* or "Mother Christmas" (*Calochilus imberbis*), and the Short-beard Orchid (*C. Richæ*). To our knowledge the hamlet of Whroo is the only reported habitat of the last-named plant, which is named after the discoverer, Mrs. Rich, a former resident of Rushworth. The same lady was responsible also for the other two records, and one of the two specimens of *Pterostylis Woollsi* known to have been collected in this State was sent by her to Mr. W. H. Nicholls in 1928—it is now in the National Herbarium.

Calochilus imberbis has been reported from only three localities—Rushworth, Ringwood and Gisborne; hence, for the botanists of the party, had there been nothing else of especial interest to see, the possibility of locating one or other of these rarities would have been sufficient incentive to attend this excursion. There was a further attraction, however. A glance at the map accompanying our Club's Census of Victorian Plants will show that the Goulburn River constitutes a substantial part of the boundary between the north-western and the north-eastern geographical divisions of the State; the proximity of Rushworth to the Goulburn thus places it as a marginal district which might be expected to exhibit vegetational features common to both divisions or, at least, to show some interesting transitions—a fact that is apparent upon study of the accompanying botanical check-list.

Because there had been no previous systematic investigation of the general Rushworth flora, the Government Botanist (Mr. A. W. Jessop) appointed Mr. P. Bibby to represent the Herbarium during the excursion. The records given in this check-list may therefore be taken as authoritative and the writer wishes to thank the Director and staff of the National Herbarium for the interest taken in this excursion and for their generous assistance in checking determinations.

The parlour coach, with its party of twenty-two adults and two children, left Melbourne at 9.30 a.m. in brilliant sunshine on Show Day, and throughout the whole period of the excursion the party enjoyed perfect weather; south of the Divide, it was discouragingly wet and cold. After a short stop for lunch at Seymour, we moved on along the Goulburn Valley Highway and made a brief stop near

Nagambie, where the lovely Broughton Pea, *Swainsona procumbens*, invited close inspection. Here we met Mr. and Mrs. Paul Fisch and their family, who also took part in the excursion.

Tempting as were the meadows of wild flowers with their riot of colour in the railway reserve near Hammond, we passed with a promise to examine them on the return trip. As we travelled through the outskirts of the Waranga Basin the nature of the vegetation began to change, sparse remnants of Grey Box (*Eucalyptus hemiphloia*) merging into Red Ironbark forest where the "Chinese Scrub" or Drooping Cassinia (*C. arcuata*) became dominant understrub.

Head winds, and a producer-gas unit on the 'bus, delayed our arrival at Rushworth until after 2 p.m.; but, late as we were, the Shire President (Councillor Speers), with the councillor for Rushworth Riding (Mr. Heily) and other civic officials, extended to us a very cordial welcome.

In his address Cr. Heily touched briefly on the early history of the district—the gold-mining activities of the past, the rise and decline of the town of Whroo, the present-day more stable industries (dairying, honey and other products of the Red Ironbark forests) which had replaced the hustle and bustle of the mining era. Mention was made of the importance to adjacent towns and to the whole State of the Goulburn River, its weir and the Waranga Storage Basin—source and life-blood of inland irrigation farming over much of the Mallee and Wimmera.

Cr. Heily spoke also of several problems that were concerning the people of his district and suggested that these might be worthy of serious study by field naturalists. One problem was the spread throughout the forests of the parasitic Tangled Dodder-laurel (*Cassytha melantha*), while another was the inexplicable and almost simultaneous dying of old Ironbarks in many parts of the district. In speaking about the wild flowers, he knew they would find favour with all, since, in many places nearby, they grew in profusion and afforded one of the special attractions of Rushworth.

He commended us to the care of Mr. Ken King, who had grown up in the district and, as an officer of the Forests Commission, was familiar with all the natural history enjoyments it had to offer. In reply, the writer, speaking as President of the Club and leader of the excursion, thanked the Shire President, Cr. Heily and all those people at Rushworth who had so kindly and warmly welcomed our party.

A little more than 104 miles from Melbourne, Rushworth is situated among the eastern foothills of the Colbinabbin Range, which runs northwards as a spur from the main Divide. It is thus in the Goulburn Valley, although geologically not a part of it. The district provides an interesting study in vegetational changes that

appear with a change in phytography. There are four quite well-defined regions, each possessing its own characteristic plant and animal life. To the north and north-east of the town lies the great Waranga Basin—once a savannah plain sparsely populated with Grey Box and River Red Gum, a place of lagoons and backwaters from the Goulburn where, in days of yore, the aborigines lived and hunted, where seed was plentiful. The blackfellow has gone and few traces of his existence now remain. The lagoons and backwaters have now merged their identity with the vast inland storage basin and the only occupants representative of an earlier era are the birds and a few trees, many of the latter but gaunt skeletons standing part buried in the waters of the lake.

Back in Rushworth there is a broad swathe of "Whipstick" intersected by the main street. In fact, here and there in the town can be seen numerous examples of the Green Mallee (*Eucalyptus viridis*) which have been allowed to remain and prosper under the care of home gardeners. Mrs. and the late Mr. Rich were extremely proud of their avenue of fine Green Mallées. Under the unusual and considerate attention received, these grew to a height of more than 50 feet—atypical, straight-boled trees. They failed, however, to survive the change of ownership which occurred a few years ago.

On the much fossicked and pitted slopes on either side of the town the characteristic "whipstick flora" is to be seen (denoted by the letter "w" in the appended check-list). So concentrated were the diggings on the south-east side of the town that the Whipstick, if it were ever there, has entirely gone from the flats and now little other than Drooping Cassinia remains.

The transition from Whipstick to Red Ironbark is made to appear less abrupt than might be expected by the appearance of Blue Mallee (*Eucalyptus odorata*, var. *angustifolia*), Grey Box intermingling with the dominants. Most of the showy plants are found among the Red Ironbark which, for the most part, occurs in remarkably pure stands over many square miles of country, extending from the north-western outskirts of the township right down to South Bailston and perhaps beyond. Where there is intermingling, its principal associate is the equally valuable Grey Box. With preponderance of the Box, one may often observe Cassinia thriving to the detriment of other undershrubs which might otherwise be expected to occur.

The fourth unit of any ecological significance consists of the moist, almost treeless, flats or meadows which occur infrequently almost as pockets. Such flats are to be seen among the Ironbark, Box or Red Gum and they are generally of relatively small area. Examples were examined at Whroo to the south of Rushworth and at Hammond to the north-east. In fact they occur most

frequently along the railway line, one such meadow lying less than a mile from the Rushworth railway station. In such places were found Bulbine Lilies mingled with Broughton Pea and with hosts of other showy herbaceous plants obscuring numbers of the ephemeral pigmy plants that characterize such moist flats.

After the late arrival, our party made its way to Growlers' Hill, "at the back of the town," for a brief inspection of the nearest wild flower garden. The shapely bushes of Nodding Rice-flower on the hill above the old reservoir attracted much attention, but the abundance of Common Beard-heath, Daphne Heath, Common Fringe-myrtle, Bent Gnolonia, Grey Everlasting, Austral Grass-tree, Mountain Grevillea, both Prickly and Silky Guinea-flowers, and several species of orchid provided a sight that will long be remembered by many of us. In succeeding days Growlers' Hill became the pre-breakfast resort of a number of the early risers, for here one found the flora of both the Whipstick and Ironbark.

It was on Growlers' Hill that one of the children found a recently emerged Gum Emperor moth and where the abundance of avifauna delighted the bird observers. The notes by Mr. H. C. E. Stewart on the bird-life of the district will give some indication of the attractions in this direction.

On Friday we travelled to Whroo, an old mining settlement about five miles south of Rushworth. A short stop was made to examine an interesting coppice of Red Ironbark, which the writer recalled visiting more than ten years ago; it has changed very little in the intervening years.

The eucalypts on an area of two or three acres had been cut to ground level for experimental distillation and the surviving sub-surface stems had coppiced as a low-growing, luxuriant "mallee" type of bush. The soft blue tones in the foliage of coppiced gums were in striking contrast with the surrounding dark green leaves of the normal Ironbarks, and passers-by could hardly fail to notice the area.

What changes the decade has wrought are to be found in the character of the accompanying vegetation. Where a few Hibbertias and a small number of annuals once constituted the "in between" plants, one now finds rich perennial flora composed of such plants as Twiggy Bush-pea, Daphne Heath, Slender Daisy-bush, Nodding Rice-flower, Gold-dust Wattle, Narrow-leaf Bitter-pea, Common Correa, Common Beard-heath and the two Guinea-flowers. Perhaps the most conspicuous of the shrubs was a Daisy-bush (*Olearia teretifolia*) observed by us only in this one place where the shapely and floribund plants were numerous.

At Whroo some time was spent examining the relics of old mine-shafts, tunnels and puppet-heads, the puddling basins and the ingeniously contrived crushing and washing plant, all of which

were slowly crumbling into decay. Our guide, Mr. King, even demonstrated the absorbing art of panning for gold—whether or not with positive results I do not recall!

Whroo is a place of some historic note and it was learned that the "big hole" on Balaclava Hill, into which we descended, resulted from the detonation of several tons of dynamite in an effort to hurry-up the acquisition of gold that lay beneath the hill. Many thousands of pounds worth of gold were won from this Balaclava Mine, but seepage of water—so often the bugbear of miners—eventually led to its abandonment. With electric power and modern pumps Balaclava may yet yield more of its treasures and the face of Whroo and its famous hill be changed once more.

Although we did not see stringybark anywhere else in the district, in the depths of the "big hole" there grew one solitary tree which, through the accidental loss of the specimen branchlet, was not positively identified; it is possibly the Brown Stringybark.

On the nearby gravel and quartz rises, in places furrowed and pitted by fossickers, were seen several old plants of the Sticky Boronia (*B. dentigera*). Careful inspection revealed a number of seedling plants which are probably doomed to a brief existence. The pestiferous Dodder-laurel and its common associate, the Drooping Cassinia, were especially abundant in and around Whroo, but in those spots where they are absent there was a very rich development of showy shrubs and herbs. It is only hereabouts that the blackberry seems to have become established in the Rushworth district, but the pest is little more than holding its own and it is unlikely that it will ever become such a nuisance as in the wetter southern and eastern parts of the State.

The heathy scrub near the old Whroo cemetery was a delight to behold—acres of *Calytrix*, *Pimelea* and *Grevillea* mingled with Wax-lip Orchids, Sundews and Beard-heath. Twiggy Bush-pea, Flax Lilies, Grass-trees and Silky Tea-tree were all there—a community very like that on Growlers' Hill. In the warmth of a sunny afternoon the air was filled with the scent of flowers, with the murmur of bees and the songs of birds. We searched for an aboriginal rock-well which is reputed to be on the summit of one of these hills, but we did not locate it. The well is of interest in having provided the only constant water supply for natives who dwelt nearby.

South-east of Rushworth and about eight miles beyond Whroo is an area designated on Forests Commission maps as the "Buffalo Block." On Saturday, with several young people from the town, we journeyed to this region and in the afternoon went on a sight-seeing trip to the Goulburn Weir.

The main attraction at Buffalo Block was the under-shrubbery of its Ironbark forest—substantially the same as on the Growlers' Hill Ironbark stand and around Whroo, but with the added

interest of many Fairy Wax-flower bushes and Fringed Spider-orchids. The orchid flora, although not especially rich in species, is prodigal in plants, and the abundance of Common Wax-lip Orchid (*Glossodia major*) was remarked on by all. A carpet of pigmy plants occupied the little shrubless patches that occurred here and there. No fewer than sixteen species of such plants were counted in one "garden"—*Helipterum*, *Dracera*, *Hydrocotyle*, *Centrolepis*, *Myriocephalus*, *Crossula*, *Rutidosia*, *Wahlenbergia*, *Styloidium*, *Veronica* **Bartschia*, and **Microcala* were some of the genera represented, native and exotic* thriving in company.

We lunched under the shade of a fine old Ironbark and were intrigued by a lone specimen of *Casuarina*—the only one of its kind seen in the whole district. It was the survivor of a pair of trees, and evidently a male plant (no cones could be found); from the habit and nature of the bark and branchlets, we concluded that it was a Buloke (*Casuarina Luehmannii*). The appearance of a "solitary" such as this one is usually a matter for conjecture. Is it the sole survivor of a former stand of the species or did it arrive there accidentally—a seed from afar, dropped by chance to germinate and grow without hindrance from man or beast? A similar puzzle was presented by an aged Cypress-pine growing in the Whroo cemetery. Is it also a sole survivor or was it planted there, perhaps as a living memorial?

After Mr. Dakin had, with considerable ceremony, photographed us we moved on through byways lined with Grey Box, over cleared paddocks, past settled areas and an orange grove, past the only stand of bracken fern seen on the trip, to the borders of Reedy Lake and beyond. From Reedy Lake to the Goulburn Weir the roadside reserve afforded a number of "canoe trees," some of them splendid examples of aboriginal workmanship. The Grey Box, tree of preference in the days gone by, provided many a native with a nicely-rounded strip of bark which he shaped into the form of a canoe to paddle around the lake and backwaters of the adjacent river. One felt that such trees have a unique history and, where they occur in such abundance as in this locality, the whole road should be declared a National Monument; not one of the trees should be allowed to suffer at the hands of men, whether private or official vandals.

On the return trip a short stop was made at Reedy Lake where, it was hoped, the bird-life might repay investigation. Very few species were seen; the aquatic birds were noticeably absent, although thousands of them are known to frequent the area at times. The northern margins of the lake have at least one feature of interest in the "potted" River Red Gums that may be seen there. Many of these gums had been sawn down in the distant past and now in the stumps that were left, slowly to rot, seedling gums have germinated. Grown themselves to the stature of sturdy

trees, the seedlings present a curious spectacle—as of trees growing in large wooden tubs. Dozens of such "potted" trees may be seen.

Later, another stop was made to explore an attractive meadow beside the road from the lake to Whron. Here we found a wealth of swamp-loving epiphytes, some of which were exhibited a fortnight later at the Club's Australian Nature Show. Here were seen the typical wet-soil-lovers: Broughton Pea, Buttercups, Small Trigger-plants, Sundews, Angled Lobelia, Water-milfoil, etc. Many of the species were so insignificant as to pass undetected until a magnifying lens was brought into use.

Sunday—our final day—was profitably spent by a morning trip to the Waranga Basin and its main outlet channel. Birds were far less abundant than had been expected, and the herons, spoonbills, pelicans, cormorants, swans, ducks and gulls that usually frequent the waters of the lake were either not observed or seen only in small numbers.

The botany of the area was striking. A little vegetation existed on the borders of the channel, mainly grasses and rushes; but the embankments on either side of it were almost entirely devoid of plants. In spots where a little earth had lodged in the red clay and ironstone an occasional plant of Sand-spurrey might be found, but this grew better as shapely little "bushes" in the crevices of masonry protecting the walls of the channel near its main outlet.

In grass-land of the surrounding Grey Box plains flourished numbers of small herbaceous plants (*Helipterum* and *Cotula* species, Pussy-tail, Wrinklewort, Bindweed, Stonecrop, Bluebell and Wolly-head), chiefly mingled with introduced grasses whose predominance is attributed to the long-continued grazing of the plains. Because of our short stay, the botany and ornithology of the Basin area were barely touched; but it can be said that, apart from a few magnificent hushes of the Broom Bitter-pea (*Daviesia genistifolia*) which grew on the bank of a subsidiary distributing channel, shrubs were noticeably absent.

From the Basin we set off for Rushworth again and noted the lush green of farmlands on the outskirts of Stanhope—a place we had been especially invited to see by the Shire President, himself a farmer in that district. That we did see so much of the whole region is a tribute to Mr. King, whose kindness in acting as guide was heartily appreciated by all. Those who participated in the excursion are conscious of much that remains to be seen and much that would repay intensive study. But these are pleasurable tasks for any who may undertake an excursion to Rushworth at some future date. Our own experience has indicated that members of the Field Naturalists' Club can expect a very warm welcome from friends at Rushworth.

Regretfully we left for Melbourne and home in the early afternoon and on the way paused to inspect the promised Hammond meadows—lovely fields of wild flowers beside the railway line near a station of that name. Plants not previously seen, which were noted in this locality, include the Basalt Daisy, New Holland Daisy, Wild Flax, Blue Devil and the introduced French Catch-fly, *Bellardia*, Snail Burr-medick and Woolly-headed Clover.

Our next stop was for tea at Seymour, then an uneventful trip home with the pleasure of listening-in at 6 o'clock to the "Wild Life" session as we passed over the Divide, in a brief shower of rain; and so down "Pretty Sally," admiring the perfect rainbow and colourful sunset.

II. Systematic Enumeration of the Vascular Plants Observed In and Around Rushworth

By J. ROS GARNET

The interest in such a list as the following centres in the information it gives with regard to the composition of certain plant communities typical of northern Victoria. As mentioned in my report on the excursion, the Rushworth district lies across a boundary separating Mueller's north-west and north-eastern geographical sectors. The boundary is somewhat arbitrary, since both divisions share the mid-northern Tertiary plain, the geological nature of which contributes, in a substantial measure, to the character of the vegetation. For those interested in divisional and locality records, some will appear to be new records for either the north-west or the north-east, according to which division one would refer this particular district.

In the accompanying list:

- (f) denotes the Ironbark forest association, such as occurs commonly at Whroo, on the Buffalo Block and on parts of Growlers' Hill.
- (d) " the shrubless patches often seen in the Ironbark forests. These differ from the meadows in that they lack, almost entirely, a grass cover and, generally, are extremely circumscribed in area.
- (c) " the campestric or wet-meadow association, as along the road between Reedy Lake and Whroo and at Hammond.
- (m) " the community found on the shores of the Basin and to a lesser extent of Reedy Lake—a type of marsh vegetation which develops where there is permanent non-flowing water.
- (s) " the association of the savannah plains, as seen to advantage near Waranga Basin—the Grey Box grasslands.
- (w) " the Whipstick association, as found on Growlers' Hill.
- (") " that the plant has been authentically recorded from the district, but not seen during the excursion.

It is not claimed that this enumeration even approximates a complete check-list of the vascular flora, and the writer is well aware of several grave omissions: e.g. although much of the area is grassland, not a single species of the large family *Gramineæ* has been determined with certainty, the season being too early for inflorescences at the time of our excursion—this omission must be rectified before it is possible to indicate the composition of Grey Box savannah.

PTERIDOPHYTA

Polypodiaceæ

- Asplenium flabellifolium* (f)
- Cheilanthes tenuifolia* (f)
- Pteridium aquilinum* (s)

SPERMATOPHYTA

Pinaceæ

- Callitris* sp. (Whroo Cemetery)

Cyperaceæ

- Scirpus calocarpus* (c)
- S. antarcticus* (c)
- Carex appressa* (f)

Centrolepidaceæ

- Centrolepis strigosa* (d)
- Aphelia gracilis* (c) (d)

Juncaceæ

- Juncus bufonius* (f)
- Luzula campestris* (f)

Liliaceæ

- Burchardia umbellata* (f)
- Anguillaria dioica* (c)
- Bulbinia bulbosa* (c) (f)
- Thysanotus Patersonii* (f)
- Dichopogon strictus* (f)
- Arthropodium minus* (s)
- A. milleflorum* (c) (f)
- Cœsia vittata* (c) (s) (f) (f)
- Dianella revoluta* (c) (f) (w)
- Lomandra multiflora* (f)
- L. filiformis* (f)
- Xanthorrhoea australis* (i)

Amaryllidaceæ

- Hypoxis glabella* (c)

Orchidaceæ

- **Prasophyllum nigricans* (f)
- Calochilus Robertsonii* (f)
- **C. Richæ*
- **C. imberbis*
- Thelymitra antennifera* (f)
- T. aristata* (f)
- T. pauciflora* (f)
- T. rubra* (d) (f)
- **Microtis unifolia* (c) (d) (f)
- **Caleana major* (f)
- **C. minor* (f)
- Acianthus exsertus* (f)
- A. reniformis* (i)
- **Eriochilus cucullatus* (f)
- Caladenia angustata* (f)
- C. cucullata* (f) (w)
- C. caerulea* (f) (w)
- C. carnea* (f) (w)
- C. dilatata* (f)
- Glossodia major* (f) (w)
- Diuris maculata* (f)
- D. sulphurea* (f)

SPERMATOPHYTA (contd.)

- Pterostylis barbata* (i)
- P. cycnocephala* (i)
- P. longifolia* (f) (w)
- P. Mitchellii* (w)
- P. mutica* (f)
- P. nutans* (f)
- P. nana* (w) (f)
- **P. parviflora* (f)
- P. pusilla* (typical form) (w)
- **P. robusta* (f)
- **P. Woolfsii*

Casuarinaceæ

- Casuarina* (?) *Luehmannii* (f)

Proteaceæ

- Grevillea alpestris* (f)

Santalaceæ

- Exocarpos cupressiformis* (f) (w)

Loranthaceæ

- Phrygilanthus eucalyptifolius* (f)

Chenopodiaceæ

- Rhagodia* sp. (f) (w)

Amaranthaceæ

- Trichinium spatulatum* (s)

Portulacaceæ

- Calandrinia calyptrata* (w)

Caryophyllaceæ

- Spergularia rubra* (c) (s) (f)

Ranunculaceæ

- Clematis microphylla* (i) (w)
- Ranunculus lappaceus* (c) (f)

Lauraceæ

- Cassutha glabella* (f) (w)
- C. melantha* (f)

Droseraceæ

- Drosera pygmaea* (c)
- glanduligera* (f)
- auriculata* (c) (d) (f)
- Planchonii* (d) (f)

Crassulaceæ

- Crassula Sieberiana* (c) (d) (i) (s) (w)
- C. colorata* (d) (f)
- C. macrantha* (d) (f) (s) (w).

Pittosporaceæ

- Pittosporum phillyreoides* (w)
- Marianthus procumbens* (f)
- Bursaria spinosa* (f)
- **Cheiranthra linearis* (f)
- Billardiera cymosa* (w)

Leguminosæ

- Acacia aspera* (f)
- A. armata* (f)
- A. acinacea* (f) (w)

SPERMATOPHYTA (contd.)

- A. diffusa* (f)
A. pycnantha (f) (w)
A. verniciflua (f) (w)
A. vomeriformis (f)
Daviesia corymbosa (f)
D. ulicina (f)
D. genistifolia (s)
Pultenaea largiflorens (f)
Dillwynia floribunda (f)
Swainsona procumbens (c)
Hardenbergia monophylla (f)
Geraniaceæ
Erodium cymeorum (c)
Geranium pilosum (d) (f)
Linaceæ
Linum marginale (c)
Rutaceæ
Boronia dentigera (f)
Eriostemon obovalis (f)
Correa reflexa—glabrous. var.
 (f)
Sapindaceæ
Dodonaea cuneata (w)
Dilleniaceæ
Hibbertia sericea (f)
H. stricta (f)
H. acicularis (f)
Thymelæaceæ
Pimelea spathulata (f)
Lythraceæ
Lythrum Hyssopifolia (c)
Myrtaceæ
Eucalyptus albens
E. hemiphloia (s)
E. odorata, var. *angustifolia*
 (w)
E. camaldulensis (m)
E. viridis (w)
E. sideroxylon (f)
E. sp. (a stringybark)
Leptospermum myrsinoides (f)
Melaleuca uncinata (w)
Calytrix tetragona (f)
Haloragidaceæ
Haloragis tetragyna (f)
H. elata (f)
Myriophyllum integrifolium
 (c)
M. propinquum (m)
Umbelliferæ
Hydrocotyle callicarpa (f) (d)
Eryngium rostratum (c)
Daucus glochidiatus (f) (s)
Epacridaceæ
Astroloma humifusum (f)

SPERMATOPHYTA (contd.)

- Melichrus urceolatus* (f)
Leucopogon virgatus (i)
L. rufus (f)
Brachyloma daphnoides (f)
Gentianaceæ
Sebzæ ovata (d)
Convolvulaceæ
Convolvulus erubescens (c) (s)
Labiataæ
Prostanthera aspalathoides (w)
Scrophulariaceæ
Mimulus repens (m)
Glossostigma elatinoïdes (c)
Plantaginaceæ
Plantago varia (c) (f)
Rubiaceæ
Asperula conferta (c) (f)
Lobeliaceæ
Lobelia anceps (c)
Pratia sp. (probably *P. erecta*)
 (c) (m)
Isotoma fluviatilis (c) (m)
Campanulaceæ
Wahlenbergia gracilentata (d)
 (s) (w) (c)
Goodeniaceæ
Goodenia geniculata (c) (f)
 (w)
Scaevola(?) *microcarpa* (c)
Brunoniaceæ
Brunonia australis (f)
Stylidiaceæ
Stylidium graminifolium (f)
S. despectum (c)
Levenhookia dubia (c) (f)
L. Sonderi (c)
Compositæ
Olearia teretifolia (f)
Vittadinia triloba (c)
Brachycôme basaltica, var.
gracilis (c)
Cotula coronopifolia (c) (f)
 (m) (s)
Centipeda Cunninghamii (s)
Isoetesopsis graminifolia (c)
 (m)
Myriocephalus rhizocephalus
 (c) (s) (f) (d)
Craspedia uniflora (c) (f)
C. globosa (c)
Cassinia arcuata (f) (s) (w)
Rutidosis multiflora (c) (f)
 (s) (d)
Millotia tenuifolia (d)
Leptorrhynchus squamatus (c)

SPERMATOPHYTA (contd.)

- Helichrysum apiculatum* (c)
H. obcordatum (f) (w)
Helipterum corymbiferum
 (c) (s)
H. pygmaeum (s)
H. demissum (f) (s)
H. australe (c) (s) (f) (w)
 (d)
Stuartina Muellieri (f) (s)
Erechthites quadridentata (f)
Cymbonotus Lawsonianus (c)
 (f)
Microseris scapigera (r) (f)

INTRODUCED SPECIES

- Primulaceæ
Anagallis arvensis (f) (s)
 Scrophulariaceæ
Bartschia latifolia (c) (d)
 (f) (s)

SPERMATOPHYTA (contd.)

- B. trisago* (c)
Veronica agrestis (f) (w) (d)
 Caryophyllaceæ
Moenchia erecta
Silene gallica (c)
Tunica prolifera (c) (f) (s)
 Gentianaceæ
Microcala quadrangularis (c)
 (d)
 Geraniaceæ
Erodium moschatum (c)
 Leguminosæ
Medicago minima (c)
Trifolium tomentosum (c)
 Compositæ
Hypochaeris glabra (f)

III. Bird Notes on Rushworth

By H. C. E. STEWART

Broadly, the Rushworth district has three contrasting zones, each with its distinctive avian types—the auriferous slopes of Mallee Whipstick and Red Ironbark, inhabited by the Mistletoe-bird and the Crested Bell-bird; the lightly timbered Grey Box and Red Gum forests supporting Wood Shrikes and Parrots; and the extensive water expanses of the Waranga Basin and the Goulburn Weir, the domain of a large aquatic bird population.

A local youth, John Williams, proved a valuable bird guide, and members were amazed at his prowess in locating nests. Growlers' Hill, overlooking the town, was the first area visited. Besides its rich and varied native flora, this place had its complement of birds, which were very amenable to observation. The first nest proved to be that of a Red-capped Robin, in a Mallee; it contained two eggs which hatched out before we left Rushworth. The adult birds permitted a close view of their charming deportment, and the vivid colour of the male bird. In a low bush of *Melaleuca uncinata* the nest of a Yellow-winged Honeyeater, with one egg, was found; but later the nest was despoiled, presumably by some enemy bird. The woody root of a dead eucalypt, protruding from a mine hollow, cunningly concealed a nest, afterwards identified, by the young it contained, as that of the Buff-tailed Thornbill.

The nesting burrows of three species of Pardalote—the Red-tipped and Spotted, both very common, and the Striated, not so common—were to be seen in excavated ground. The deeper mine tunnels were favoured nest sites for Welcome Swallows and Fairy

Martins. No nests of Mistletoe-birds were discovered, though the species was abundant, and the cheerful notes of Crested Bell-birds were frequently heard.

The proximity of Growlers' Hill enabled several visits, principally before breakfast, when the bird chorus was at its best. The list for the Hill also included the Willie Wagtail, Yellow-tailed and Brown Thornbills, the Brown Weebill, Rufous Whistler, Black-faced Cuckoo-shrike, Brown Tree-creeper, White-shafted Fantail, Harmonious Thrush, Pallid, Fan-tailed and Bronze Cuckoos, besides several kinds of Honeyeaters. In a garden near the hotel, a trio of locally termed "Speckled" Honeyeaters, handsome birds seeking nectar in a *Crevillea*, was subsequently determined as the Lanceolated Honeyeater (*Plectorhyncha lanceolata*), a species new to most of the party.

The trip to Whroo next day further extended the bird list. As we passed an inlet to the Waranga Basin, a pair of Black Ducks, with young brood, was disturbed from the rushes, and here Black Swans, Dusky Moorhens, Black Cormorants and a Pelican were noticed. Entering south to the Ironbark-Whipstick again, Wattle-birds, Noisy Miners, Red-backed Parrots and Galahs were frequently met with. The open cut of the old Balaclava Mine afforded splendid cover for nesting Fairy Martins and Pardalotes. Red-tipped Pardalotes were seen to fly in and out of a nest of a Fairy Martin, one of a cluster of four on a cliff, which Mr. Paul Fisch photographed. The Pardalotes had either made the Martin's nest for their own, or had the usual nesting tunnel extended beyond.

On Saturday's excursion the floral attractions of Buffalo Garden held breathless admiration for the best part of the morning, but we noted many of the birds already enumerated, with the addition of the White-fronted Tree-creeper, Blue Wrens, White-browed Scrub-wrens, a King Parrot, a large Brown Hawk, and our sharp-eyed scout found us the nesting hollow of an Eastern Rosella. By the aid of an improvised ladder, a substantial eucalypt bough, all the party in turn climbed up to peer into the nest, with its five white eggs. Shortly afterwards, when other members were shown the nest, the bird had returned and laid its sixth egg.

Near the Goulburn Weir, during the afternoon, a White Spoon-bill was seen, a Galah's nest inspected, Little Pied Cormorants and White-faced Herons listed. A stop at Reedy Lake on the return journey enabled a record to be made of a pair of Wood Ducks, Black-fronted Dotterels, Spur-winged Plovers, White Cockatoos, Kookaburras and Orange-winged Sittellas.

On the last morning, a visit to the open level country around the south-western edge of Waranga Basin permitted observation of Black-backed Magpies, Magpie Larks, a nest of the Australian Raven, the owner watching us suspiciously a respectable distance

away, and a very inquisitive Cuckoo-shrike poking about the large stick nest. Several nests of Noisy Miners and Wattle-birds and an old nest of a Whistling Eagle were identified. The behaviour of a pair of Red-kneed Dotterels suggested their nest somewhere near. John Williams climbed a Red Gum to investigate the leafy home of a Ringtailed Possum which, when disturbed, scampered quickly to the topmost branch of the tree. On the way back to the town nests of Finches (undetermined species) were located in Boxthorn, and a company of White Ibis foraged in a paddock.

On most of our sorties we came across Red-backed Parrots, Galahs, Rosellas, and White Cockatoos, but a known resident of the district, the Cockatiel, was not observed. Once when the coach was stopped to examine miniature plants by the roadside, three Pied Currawongs disported in a tall tree. At another stop a thick carpet of blossoms beneath Ironbarks indicated a recent raid by Lorikeets.

IV. Rushworth—A Mild Appreciation

By J. BLACKBURN

As I am not a botanist, entomologist, geologist or any other "ist", any report that I could write would not have the slightest effect on the final account of the trip. It is the whole pattern of nature which attracts me—colour, and form and relationship. The symmetry and balance in every wild flower, the spider zigzagging down its web, the great Emperor Moth hanging on a twig drying its wings, the snake under the stone, the tingling adventure of an hour-to-hour existence of the scampering cotton-tail—all these to me are the facts that fit into a great pattern, and that to me is the story of any trip.

However, I must descend from the eulogistic and jot down some of the impressions of this trip.

Firstly, the variety and abundance of flora on Growlers' Hill. It seemed almost unbelievable that there could be so much concentrated into one small area. On that first afternoon I gathered 33 varieties of flowers—and I expect that number was doubled by the botanists. The Red-capped Robin and his wife and home were the "darlings" of that afternoon to me; he was so proud to turn his red breast and cap into the sunset, the better to show it off. It was a before-breakfast visit to him on the Saturday that provided Mrs. Jennison and myself with another find; sitting, watching him, we also noticed some Buff-tailed Thornbills very busily flitting in under a small cliff-face, and, on investigation, we found

their nest—the smallest nest imaginable, built into the side of quite hard ground, with a little protective piece of bark sheltering the entrance—and there were two babies!

At Whroo and Balaclava Hill it was not difficult to imagine the pulse of activity which must have animated this district when the gold fever was at its height; but now Nature has done her best to weather and cover and blend the scars into the general colour tone. The numbers of children buried in the Whroo cemetery and the comparative early age at which the men and women died tell how inexorable life must have been in those early days; but, observing the eagerness with which our own party watched Ken wash a pan of soil, who can deny that the "fever" still races lightly through each of us?

The outstanding impression to me in that afternoon ramble was the size of the Wax-lip orchids. It never ceases to amaze me that orchids thrive so well in the most uncompromising soil—they seem such delicate and fragile blooms that one would expect Nature to tend them in luscious places.

At Buffalo, as on Growlers', we had seemingly acres and acres of *Calytrix*, vying for pride of place with the Fairy Wax-flower. I expect the same would have been apparent on Growlers' if we had been there during the sunny part of the day, but at Buffalo there seemed to be about two dozen bees to each square foot of flower. The little natural rock garden found by the leader was a delight, and it was pleasant to sit and ponder on what circumstances had caused some 30 varieties of tiny plants to foregather and live together harmoniously in about three square yards of soil.

The Goulburn Weir provided photographers with their first good chance to capture scenic beauty, and shutters clicked busily. It was interesting to trace the course of this water after it left the weir, and again on the Sunday, after the water left the Waranga Reservoir; for here man has stopped the natural desire of the river—as of all rivers—to reach the sea, and has, instead, given the water back to the land through the irrigation system.

I expected to see more bird life around the Waranga Reservoir, but it was probably a case of "you should have been here last Sunday"; the herons' nests told as good a tale of activity as the birds themselves.

Our thanks are due to the leader for his thorough arrangements, to Bill for his capabilities as a driver, and especially to Ken King for being our guide, philosopher and friend throughout a most interesting experience.

Absolvi meam animam!

OUR "NATURALIST" CONTRIBUTORS AND CONTRIBUTIONS

(A Statistical Survey for 1948)

Volume 64 of the *Victorian Naturalist* (1947/8) revealed that, out of 543 financial members, there were only 49 (almost exactly 9%) who contributed anything at all to the pages of the journal—and several of these writers were not even Club members!

As the December issue went to press, a brief inventory showed that this regrettable state of affairs has by no means improved throughout the past year. We cannot escape the fact that our journal is very lop-sided with respect to both contributors and subject matter. Membership has now risen to about 560; but, for the twelve months of 1948, ten members wrote 167 pages of the articles and notes in the *Naturalist*, which covered 264 pages altogether (if we except the 24 pages of Proceedings and Exhibits). Thus, less than 2% of Club members have contributed 63% of the entire journal, and the same ten names (with a few others) have appeared very frequently for years past. Must they continue to shoulder such a responsibility?

Concerning articles, the subject matter has been allocated as follows.

Botany—91 pp. (34%)	Entomology—18 pp. (7%)
[incl. 40 pp. on Orchids]	General Zoology—17 pp. (6%)
Personal—40½ pp. (15%)	Geology—14 pp. (5%)
Ornithology—28 pp. (11%)	Ethnology—2½ pp. (1%)

Orchid articles are out of all proportion to the numbers and importance of these plants in the natural world, but our orchidologists are great enthusiasts. On the other hand, we hear practically nothing of the vast and inexhaustible treasures of the sea—fish, molluscs, sponges, algae, etc. The Editor can only publish those MSS. that members send along and, once again, he appeals in particular for a constant flow of short paragraphs on a variety of subjects. Surely a few lines a year would be no hardship to the other 90% of members from whom we've never heard!

—J.H.W.

STRANGE BEHAVIOUR OF A CUCKOO

At Toolern Vale on October 23, 1948, the nest of a Yellow-tailed Thornbill (*Acanthiza chrysorrhoa*) was discovered by a small party of observers consisting of Mr. Chalk, Miss Balasam, Mr. and Mrs. Bird, and myself. While looking at the nest, I was attracted by a bird flying swiftly into the next tree, and recognized it as a Bronze Cuckoo (*Lamprolaima phaeopus*). It moved about amongst the branches, remained quiet for a few seconds, then flew straight to the nest of the Thornbill, and, after hanging on the side, climbed up a little so that it could reach into the nest, only the tip of the tail remaining in sight. The Cuckoo then pulled out an egg, turned its head to the right and dropped the egg to the ground. Once more it put its head into the nest and withdrew another egg, turned its head to the left, and dropped this egg to the ground also. Then it flew away.

Careful examination showed the egg first dropped to be that of the Thornbill, and the second one that of a Cuckoo. Both eggs were highly incubated. The shell of the Thornbill's egg had marks made by the bill of the Bronze Cuckoo; the other egg was broken to pieces, but incubation was more advanced than in that of the Thornbill.

It would be interesting indeed to hear the theories of other ornithologists in explanation of this strange happening which we were lucky enough to see.

—H. J. BRANDY.

LEARNING NATURE'S SECRETS THE HARD WAY

By EDITH COLEMAN, Blackburn.

Year after year Wattle-birds nest in our tallest gum trees, so high that the cradles sway alarmingly in windy weather.

Watching the parent birds feeding their two-day-old young on September 14th, we noticed that the mother bird seemed to sense the approach of a windy gust, and returned to cover her nestlings in the swaying nest, until there was a lull, when she again joined the male bird in his chase for insects. They would rise, drop and

swoop, then rise again, appearing to be interested in nothing but insects for the first few days. Later they foraged in the flowers of Bushy-yate (*Eucalyptus Lehmannii*) and pink-flowered Yellow Gum (*E. leucosylon "rosea"*), getting, one assumed, much nectar in both gums.

When the young left the nest, each would perch on a cluster of Bushy-yate flowers obtaining plenty of nectar without stirring from the perch. Later they, too, foraged on both trees, which flower simultaneously.

On October 5th, one young one was found dead under a tree. A glance at its contracted feet showed how well adapted they are to cling to



Feet of Wattle-bird, open and closed, showing how securely the nails lock over twig—or on wrist.

nest or branch in windy weather. The toes, with their long, curved nails, should "lock" over a twig. One sometimes learns Nature's secrets the hard way, and those feet recalled a painful episode:

Last season one of my daughters heard a bird screaming, long after midnight. She rushed out just in time to take a nearly fully grown Wattle-bird from a neighbour's cat. The bird clung so tenaciously to her right wrist, its claws embedded in the tender inner surface, that she was obliged to call for help. It was some time before her sister could separate the claws without hurting the bird and adding to the pain her sister was so gallantly enduring. It needed two hands to unlock them, the nails overlapping, like a split key-ring. The bird was placed in a safe place, and next morning it had flown away.

At Healesville (October, 1948) two Wattle-birds had been coming to the "bird table" for a week. As the visits ceased on November 4th, I assumed that the birds were feeding young on insects. A few days later they came for soaked bread, but carried none away. They were apparently feeding the nestlings on nectar from gum trees, which are flowering especially profusely this year. Later they carried away bread, and soon there were four Wattle-birds at the table. It was pretty to see them playing among native cherry trees, just like children at "hide-and-seek." I had not before noted their habit of clinging, sidelong (like the Yellow Robin) to the boles of gum trees.

One curious call is made with the beak raised vertically, and it is then that the red wattles and yellow on the underparts are seen. It is, indeed, a shapely, handsome bird.

"SHRUBS AND TREES FOR AUSTRALIAN GARDENS"

(Book Review by E. E. PESCOTT)

It would hardly seem to come within the scope of the *Naturalist* to review a book on horticulture, on garden trees and shrubs, and it is quite possible that this is the first review of its kind to appear in our pages. There is a certain gap between horticulture and botany that is somewhat difficult to bridge; but this gap has been bridged in Mr. E. F. Lord's recent book (4to, 453 pp., Lothian Publishing Co., Melbourne), which is of intense interest to all lovers of Australian plants.

Shrubs and Trees for Australian Gardens marks a new era in book publication for Australia. This is a monumental work and, although it had been expected for a long time, the size and scope surprised those who were waiting for it. The work is usefully planned, and it covers the whole gamut of its title, embracing seven sections. There are extensive and comprehensive lists of trees and shrubs—a first-class reference work on this subject; at the same time, it is not a plant dictionary. Australia is divided into various planting zones and trees are recommended for each of these zones, lists being given also for dry, wet, mountainous, hot and seaside conditions. There are sections devoted to municipal and street planting, to hedges and breakwinds, and to many other purposes.

But what is most valuable to the naturalist, and to the botanist, is the extensive and descriptive list of Australian trees and shrubs herein lies the real reason for this review. About 120 pages are taken up to describe native subjects, and it is fortunate for students of these plants that the author has kept them listed in separate sections, as well as alphabetically.

The lists are right up to date, especially in the Eucalypt Section, several species being here popularly described for the first time. The two dozen pages devoted to Australian trees other than eucalypts and acacias, and the 240 pages devoted to Australian shrubs, contain many unfamiliar species.

It is customary for a reviewer to have a paragraph beginning with "but"—yet I refrain, as the work is too good for criticism and fault-finding. Reference must be made to the wonderful illustrations. There are nearly 200 of them, most of which feature Australian flowers, and 15 are in colour. I can only describe these colour pictures by the word "wonderful". We can trace the handiwork of Mr. Bert Reeves in the pictures, which seem to be even beyond his usually high standard. The photography is first-class,

and I doubt if the colour plates of *Eucalyptus tetraptera* and *Brachyotium discolor* could ever be excelled.

The book has a first-class series of indices, and the whole format is a credit to the author, publisher and printer alike. Such a compendium of knowledge and experience must have entailed considerable research by the author, and the Club is fortunate indeed to number him as one of its most important office-bearers.

MONTHLY NOTES FROM PORTLAND F.N.C.

By NOEL F. LEARMONTH

At the November meeting of the Club an unusual number of interesting specimens was exhibited by members. Our leading botanist, Mr. Cliff Beaglehole, had just returned from a month in north-western Victoria, including a fortnight at the Kalkyne National Forest, where he was accompanied by his cousin Les, and Mr. L. G. Chandler. He made an extensive collection of plant life, ranging from the foliage of towering River Red Gums (*Eucalyptus camaldulensis*) to the tiny *Elatine gratioloides*, which lies prostrate on drying mud, and returned with approximately 250 indigenous vascular species besides a number of non-vascular plants, notably lichens. Many naturalized weeds were also listed.

This valuable collection shows the richness and diversity of the flora in our great north-western reserve, despite a rainfall of only four inches in the previous nine months, and Mr. Beaglehole exhibited many of his specimens at the meeting. Among them were the Garland Lily, *Calostemma purpureum* (leaves only), and Harrow Wattle, *Acacia acanthoclada*—both confined in Victoria to the Kalkyne Forest, around Hattah Lakes and on nearby sandhills respectively. Eleven different wattles and seven daisy-bushes (including the rare *Olearia subspicata*) were collected, also about 20 members of the Salt-bush Family (*Chenopodiaceæ*).

Logania nuda (a sprawling leafless shrub) was found again; not having been collected in Victoria for more than 80 years, this very rare plant is recorded from only one other locality in our State, viz., Lake Coorong (near Hopetoun), and Mr. Beaglehole is to be congratulated upon re-discovering it at the type area—sandhills near Kalkyne.

Several interesting fungi were represented, collection of these plants having been confined to the tougher species which retain their character without the aid of liquid preservative. Mr. Beaglehole's example of the extraordinary "Stone-making Fungus" (*Polyporus basilidoides*) was a perfect specimen 8½ inches long and 10½ inches in circumference at the widest part. He had dug it out with a pocket knife from between roots in Mallee country south of the "Pipe-line" from the highway to Hattah railway station. In many ways the sclerote of this polypore is analogous to that of "Black-fellows' Bread" (*P. mylitta*) from the moister hilly parts of Victoria.

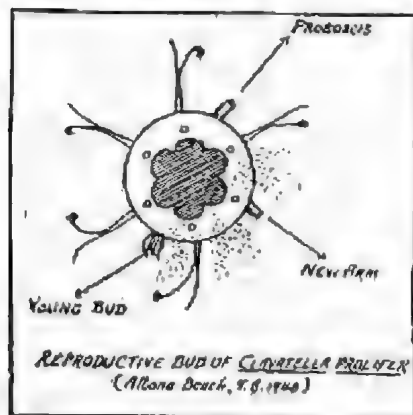
The National Herbarium has received a duplicate set of the majority of Mr. Beaglehole's Kalkyne plants and reports that two of them (a *Lhotskya* and a *Frankenia*) may be new records for the State.

Among other exhibits shown at our November meeting were two orchids rare in the Portland district—Tailed Spider-orchid (*Caladenia filamentosa*) and Tiger Orchid (*Dinris sulphurea*). Both were found by one of our younger members, Mr. George Bennett, the former at Cape Nelson, where it is a mystery how such a delicate flower could survive the wild winds in this exposed locality, and the *Dinris* at "Bats Ridges," a spot famous for orchids. About 90 species of orchids are now listed for the Portland district.

THE CRAWLING "JELLY-FISH" BUD OF *CLAYATELLA PROLIFERA*

By M. E. FREAME, Melbourne

While examining some material containing sand and seaweed, on arrival home from Altona Beach (August 9, 1948), I found a very unusual microscopic animal, resembling a brittle-star. With five "arms" around a brownish coloured disc, it was unusual in having the arms branched at the tips. The lower portions gripped the dish, but the upper free parts, armed with stinging cells, waved about as though in search of food, at times meeting at the centre and forming a small "rosette".



(N.B. Arms are split at the apex only)

wishing to exhibit the specimen at a meeting of the Microscopical Society, I put it in fresh (sea) water for convenience. I discovered later that the "debris" was escaping from a rupture between the arms and probably consisted of reproductive elements. The creature lived for thirteen days.

These small active medusae are the reproductive buds of fixed plant-like organisms (Zoophytes), and, prior to the discovery of one at Port Jackson about 1893 (with 24 arms and body the size of a pin's head), they were only known from the Falkland Islands, Kerguelen Is. and Antarctica. Two species had been recorded from the Northern Hemisphere. It would be interesting to know if they had ever been found previously in Victoria.

MEMORIAL TO THE LATE MRS. BLANCHE E. MILLER

On Saturday, October 23, in delightful weather, about fifty members of the Field Naturalists' Club made a trip to Mr. Vernon R. Davey's sanctuary at Toolern Vale. The quest was birds and resulted in a very successful day.

During the afternoon, members were enabled to pay fitting tribute to the memory of the late Mrs. Miller as the result of a very thoughtful gesture on the part of Mr. Davey. Although Mr. and Mrs. Davey were both prevented by illness from being present, Mr. Davey had made all necessary arrangements for the planting, on behalf of the Club, of a memorial tree in his grounds—a variety of *Baccharis lauroxylon* (Yellow Gum).

The ceremony of planting and dedicating the tree as a lasting memorial to Mrs. Miller was performed by the Club's leader for the day, Mr. A. S. Chalk, who spoke of the excellent qualities possessed by their revered and distinguished late member and expressed best wishes for the speedy recovery of Mr. and Mrs. Davey.

—A.S.C.

SAND-PLAIN FLOWERS NORTH OF PERTH

By J. S. SEATON

On a recent trip to Western Australia to collect living plants of certain wildflowers I was fortunate to have the advice of Mr. C. A. Gardner, Government Botanist at Perth, concerning the most favourable localities in which to search. Most collecting was done at Mingenew, 238 miles north by road from Perth and, incidentally, one of the hottest areas in all Western Australia.

The sand-plains to the east and west of this centre are reasonably accessible and proved well worth exploring. Perhaps the most spectacular shrub inhabiting these sandy regions is the Scarlet Feather-flower, *Verticordia grandis*, which does not extend any farther south than Watheroo. The species is remarkable for its failure to produce seedlings; after I had examined hundreds of bushes without any trace of seedlings, the curious fact was confirmed for me by local residents, and I have yet to hear of a satisfactory explanation. However, as it has been possible to propagate other *Verticordia* species from cuttings, we may hope that this magnificent kind will also prove amenable.

Two other *Verticordias*, both worthy of cultivation and flowering profusely during September, were *V. grandiflora* and *V. picta*. The former has large golden flowers which shade off to a beautiful bronzy colour, while the latter bears copious very pretty pink blossoms. Another species, *Verticordia pannigera*, with small pink flowers, was noticed, but it cannot be compared with the others for showiness.

An erect myrtaceous shrub, *Pileanthus pedunculatus*, bore disc-like scarlet-orange flowers almost throughout this area; on one burnt portion there was a wonderful germination of literally millions of seedlings. Also present was *Pileanthus filifolius*, attaining about two feet in height with even larger flowers of intense geranium red, but it does not flower until later in the year. Unfortunately, even very small plants of this handsome flower have a long tap-root, well down into the subsoil, which renders extraction an extremely difficult business.

In some areas, a floriferous dwarf *Calytrix* with very showy purple flowers made a feast of colour. Another wildflower contributing to the colour mosaic was a *Dampiera* with whitish foliage and vividly blue flowers. Adding still to the variety, there were isolated shrubs of *Grevillea eriostachya* whose long stiff spikes of orange-yellow blossom were reminiscent of glowing torches.

It was with deep regret that I witnessed thousands of acres of sand-plain wildflowers being ploughed in by tractor—the more so because, after one cropping, the land must be rested for some years before a second crop is possible. There is urgent need for adequate reservations, before it is too late, so that posterity may behold something of the floral wealth that has made this State world-famous; such a spectacular display of colour as the sand-plains afford must be understood.

EXCURSION TO WILLSMERE PARK LAGOON, NORTH KEW

A party of twelve members visited the Willsmere Park Lagoon along the Yarra on the afternoon of Saturday, December 4, 1948, and enjoyed a couple of hours' "fishing" for fresh-water insects. Representatives of the following forms were noted in the "catches": water-beetles, boatmen and back-swimmers, damselfly and dragon-flies, may-flies and caddis-flies.

Before disbanding, an informal chat was given, explaining the food habits, respiratory mechanisms, etc., of the various types.

—J. W. R.

WHAT, WHERE AND WHEN

General Excursions:

Saturday, February 19—Launch excursion, River Yarra, downstream and estuary. Leader: Mr. H. P. Dickins. Dredging by Marine Biology Group, conditions permitting. Launch *Lagoona* leaves 2 p.m. sharp from No. 1 Office, Melbourne Ferries, on river bank, below Princes Bridge, Batman Avenue side; returns 5.30 p.m. Tickets, 2/6, from Mr. R. B. Jemison, 3 Linda St., Moreland; available at February meeting.

Saturday, February 26—Murrindiindi and Wilhelmina Falls. Parlour coach round trip of approx. 120 miles, via Heidelberg and Kangaroo Ground, return via Mount Slide and Lilydale. Subjects: Botany and Physiology of Area. Local Guide: Mr. Ivo C. Hammet. Members will traverse easy walk along good track to the Falls. Bring two meals. Calderwood's coach leaves Batman Avenue 8.30 a.m. punctually, and returns to city at 7.30 p.m. Reserved seats, 12/6, with Mr. H. Stewart, 14 Bayview Terrace, Ascot Vale, W.2 (Tel. FU 022, ext. 457), have all been taken up, but must be paid for not later than Monday, February 14, otherwise cancelled.

Saturday to Monday, March 12-14—Week-end to Werrjibee Gorge, Bacchus Marsh. Subjects: Geology and General. Leaders: Geology Discussion Group. Members interested please contact Hon. Sec. of Group, Mr. A. A. Baker, 53 Carlisle St., Preston, N.18, regarding arrangements for camping, hotel accommodation, or day-rail excursions. Early application essential.

Preliminary Announcements:

Saturday to Sunday, March 26-27—Moss Vale and Tarra Valley (for limited party only). Subject: Exotic and Native Vegetation. Leaders: Dr. M. M. Chatterway and Mr. E. E. Lord, with Mr. R. N. Auchterlonie, of Narracan, as local guide. It is proposed to travel by parlour coach, approx. 250 miles, and stay overnight at Mirboo North. Preliminary inquiries with Mr. H. Stewart, 14 Bayview Terrace, Ascot Vale, W.2.

Saturday, April 9—Granite, via Tallarook. Subjects: Scenic and Geology. Leader: Miss Jean Blackburn. Parlour coach from Batman Avenue, 8.30 a.m. Reserved seat bookings, 14/-, with Miss M. N. Elder, 17 Adelaide St., Malvern (Tel. U 7297). Bring two meals. Some walking and climbing necessary, to obtain full scenic advantage of the little known objective.

Group Fixtures:

Monday, February 28—Botany Discussion Group. Royal Society's Hall, Victoria St., 8 p.m. Subject: Grasses. Please bring grasses (native and introduced) as exhibits. New members welcome. Programme for 1949 to be discussed.

Tuesday, March 1—Geology Discussion Group. Royal Society's Hall, 8 p.m. Subject: "Geology of Bacchus Marsh," by Mr. T. C. Bryan. Cordial invitation to general members of the Club, especially those attending the week-end excursion to Bacchus Marsh (q.v.).

Thursday, March 3—Wildflower Garden Group. Royal Society's Hall, 8 p.m. Hon. Sec. of Group: Mr. Harry E. Preston, 12 Bethela St., Burwood, E.13. New members invited.

Friday, March 4—Marine Biology Discussion Group. Royal Society's Hall, 7.45 p.m. New members cordially welcome. Hon. Sec. of Group: Miss W. Taylor, 13 Jolimont Square, Jolimont, C2 (Tel. MY 4269).

H. C. E. STEWART,
for Excursion Committee, F.N.C.V.

The Victorian Naturalist

Vol. 65.—No. 11

MARCH 9, 1949

No. 783

PROCEEDINGS

The monthly meeting of the Club was held at the National Herbarium on Monday, February 14, 1949. The President, Mr. J. Ros Garnet, and about 160 members were present. Apologies for non-attendance were received from Mr. and Mrs. French and Mrs. Swaby. The President extended a hearty welcome to all visitors, and also conveyed cordial greetings from Mr. and Mrs. Colliver, Mr. Noel Lothian, and Miss Thistle Harris, who had all recently been in Melbourne, also from the National Parks Association in Queensland.

The President told members of the removal of a small group of flying phalangers from near Port Fairy to the Portland district. This had been accomplished with the sanction of the Fisheries and Game Department and with the help of Mr. Flahavin, one of our country members. It was considered that the animals would have more chance of survival in the new locality.

Members were asked to stand in silence for a moment as a mark of respect to the memory of the late Mr. Alister Clark, of Bulla, a Club member since 1902. Regret was expressed at the illness of Mrs. Swaby and Mr. Bert Reeves, who, it was sincerely hoped, would both soon make speedy recoveries.

Mention was made of the departure abroad of the Assistant Editor, Miss Ina Watson, to whom Miss Wigan had presented, on behalf of fellow members, a suitable parting gift—in the form of "a nest egg," appropriately wrapped. The meeting was pleased to welcome back Miss Aileen B. Adams, as Assistant Secretary, and it is desired to place on record the appreciation of President and Council for the excellent manner in which Miss Jean Blackburn filled this position during Miss Adams' temporary absence in Rockhampton.

During December the President had been invited to give evidence before the State Development Committee regarding National Parks. Together with Mr. George Hyam and Mr. Stewart, General Secretary of the Associated Walking Clubs, the President had put forward our views, which had been received with interest.

Mr. Baker announced that owing to transport difficulties the proposed week-end trip to Bacchus Marsh had been abandoned, but a day excursion would be run on March 14.

Attention was drawn to an article on Baron von Mueller by Mr. A. H. Chisholm in *Life Digest* for October, 1948.

The beauty of the Geelong Botanic Gardens had given much pleasure to all those who attended the recent excursion there. A movement is afoot in Geelong to revive the Geelong Naturalists' Club, and members are asked to give encouragement to any friends in the district who would help in such a project.

No new members were elected, but the following nominations had been received: Miss Ivy M. Smith, as Ordinary Member, and Mr. A. C. Collins as Country Member.

ACTIVITIES OF THE FISHERIES AND GAME DEPARTMENT

An absorbing address on this subject was given by the Director, Mr. A. Dunbavin Butcher, who began by outlining the rapid expansion and recent increase in the activities of his Department—the result of the accumulated planning of forty years. Broadly, the chief aims of the Department are conservation and management. Inevitably a toll is taken each year of our fishes and game birds by natural hazards, and also by "harvesting" to replenish the nation's "larder". It is the work of the Department to see that this harvesting is properly controlled and a certain equilibrium maintained to ensure future supplies. The various branches of work embrace administration, inspection, education, and research in collaboration with the C.S. & I.R. laboratories.

Members listened with evident pleasure to the address, and found Mr. Butcher's description of the scientific methods now employed by his Department of the greatest interest—particularly of the ecological research being carried out, as at Gippsland Lakes with a view to restoring bream fisheries, and on inland waters to ascertain the living and food requirements of each species.

A vote of thanks by Mr. Fred Lewis, seconded by Mr. Dickins, concluded a lively period of questions, and Mr. Butcher was invited to address our meeting again at some future date.

EXHIBITS

Mr. R. Savage: *Eucalyptus tetragona*, *Isotama axillaris*, *Grevillea Hookeriana*, *G. parvifolia*, *Olearia aculeata*, *Melaleuca pulchella*, *Anigozanthos flavida*, *Calaccephalus Broxeni*, *Leptospermum citratum*, *Pelargonium australe*, *Anga grandiflora*, *Ceratopetalum gummosum* and *Melaleuca thymifolia* (all garden grown at Ivanhoe).

Mr. I. Hammet: *Eucalyptus Stuebeli*, *E. macrocarpa*, and *E. Perriniana* (spectacular species).

Mr. J. Rus Garnet: Cultivated specimen of the N.S.W. epiphytic orchid, *Liparis caelonymoides* Benth.

Mr. J. S. Seaton: *Beaufortia sparsa*, garden grown.

Mr. K. Atkins (Botanic Gardens): *Acacia ulbrichtscephala*, *A. rheticoides*, *Angophora floribunda*, *Baccharis citriodora*, *Baccharis linifolia*, *Bauera rubioides*, *Castanospermum australe*, *Ceratopetalum gummosum*, *Leptospermum citratum*, *Persoonia pinnifolia*, and *Pristania laurina*.

Mrs. M. E. Freame: *Sipunculus* (living in sand or mud); the "Heart Urchin" (spines are naturally absent from the beautiful star-shaped grooves).

NEW BEES AND WASPS—PART IX

Four Undescribed species of *Exoneura*, with Notes on Their Collection, and Description of New Parasites Discovered on the Genus.

By TARLTON RAYMENT, F.R.Z.S.

Introductory

My collaborator in the field, Norman Rodd of Lane Cove, Sydney, has been singularly successful in collecting the twig "nests", eggs, larvae, pupae and adults of many *Exoneuras*, and his conscientious work has greatly extended our knowledge of the rise of a social state in the insect world.

The *Exoneuræ* have only one communal chamber for the entire brood. This utter lack of individual cells in the nursery is both surprising and unique, not only in the *Apidæ*, but also in the whole Order *Hymenoptera*, for in no other genus is there a complete absence of cell-walls.

The absence of cell divisions is much more significant than appears at first glance, for it connotes there are no walls to be demolished, no cell-caps to be pierced, before the young adult can emerge to liberty.

The *Euryglossa*, burrowing in hard ground, sets its young the formidable task of tearing down the hard earthen plug that seals its burrow. The young of *Megachile*, the "leaf-cutter bee," has to saw through a barrier of dry leaves, and sometimes a plug of resin, as well as a tough silken cocoon, before it is free. The progeny of the beautiful blue-banded bees, *Anthophora*, find themselves confronted with a wall of concrete, which must be pierced before they can reach the sunshine.

The young of *Exoneura*, on the other hand, faces no such formidable task on emerging from its natal cradle. They are small, soft bees, incapable, one would conclude, of any arduous effort. They are not even required to cut a way out of a tough brown silky cradle, like so many other honey-gatherers, for there is no silken or papery cocoon. The young bee has merely to walk out, unfettered and unhindered.

The three methods of feeding, too, show a gradual approach to the complex feeding habit of the hive-bee. In certain species the larvae each receive an individual pudding of honey and pollen; the second group provides a communal cake for all the babies; and the third division appears to carry the progressive feeding of predigested "pap" to some length. All these traits are undoubtedly steps in the evolution of the social state, which is seen *in excelsis* in the honey-bee.

The adults, too, depart from a basic law of all solitary bees. No solitary wild bee mother will permit a stranger to roam among

her precious puddings and brood, although the males of solitary bees (*Paracolletes*, for example) often cluster in hundreds to pass the night together in mutual comfort. However, on many occasions, Rodd has taken "tubes" containing eggs, larvae and several females. These specimens puzzled me, until I subsequently satisfied myself that at least three distinct species were present.

It is now definitely established, as a result of Rodd's work, that the females of *Exoneura* will tolerate—perhaps invite and enjoy—the company of females of other species, even though brood in all stages be present.

A singular example was obtained at Brooklyn, on the Hawkesbury River, New South Wales, in February, 1947. A lantana stem was found to contain two robust *E. excavata* Ckll., two equally robust *E. montana* Raym., and one female of the much smaller *E. sub-holmesii* Raym. There was no doubt that the three distinct species were living amicably together. It may be only a case of sheltering from inclement weather, yet such hospitality is quite unknown among solitary wild-bees and, indeed, even the social species, for the honey-bee will attack instantly a tiny *Trigona* that endeavours to enter her hive. Nay, more, she will immediately engage in a death duel with any strange worker of her own species from a hive in close proximity to her own.

NEW SPECIES

There are several new species among the bees taken by Norman Rodd, and specific descriptions of these are appended.

Exoneura apposita, sp. nov.

TYPE. Male—length 5 mm. approx. Black and red

Head transverse, black and shining; lateral face-marks white, reaching a trifle higher than the clypeus; frons rising to a high carina; a basin about the median ocellus; clypeus entirely white; supraclypeal area black; vertex with a few fulvous hairs; compound eyes black, large, but converging below; genae with a few white hairs; labrum white; mandibulae white, with black tips; antennae with scapes white in front, flagellum brownish beneath.

Prothorax with a few long white hairs; tubercles black; *mesothorax*, scutellum and postscutellum black, shining, with a delicate tessellation, and a few white hairs; *metathorax* with a number of white hairs laterally, and these become denser on the pleurae; abdominal dorsal segments light-ferruginous, each with a wide band of black; ventral segments a clear ferruginous.

Legs ferruginous, the coxae, trochanters and hind tibiae black, with much black hair; tarsi red, except the hind, which are black with black hair; claws dark-reddish; hind calcar blackish; tegulae piceous (light-amber in *E. angophorella*).

Wings yellowish; nervures dark-amber; cells: second cubital very wide, pterostigma large and brown, hamuli five or so very weak.

The allotype female looks very like *E. angophorella* Rayment, but the clypeal mark on the new species is clearly defined as a yellow "T" with the cross-arms hooked, and the base thickened; there is a lateral yellow patch on the orbital margins; the front of the scape is ferruginous, and the labrum dark-red; there is an amber spot on the mandibles.

Locality: Jane Cove, New South Wales, leg. Norman W. Rodd, January, 1947 (TYPE and ALLOTYPE in the collection of the author).

A series of males and females, together with many eggs, larvae and pupae in all stages, were taken from a stem of lantana.

Allies: Except for the well-defined face-marks, I do not know how the female can be separated from *E. angophorella* Rayment, but the male is close to *E. hackeri* Ckll., which has black scapes, and also to *E. clarissima* Ckll., which has the second segment of the flagellum white. By the larval appendages this species approaches *E. similima* Rayment. There is a small node, the largest appendage quadri-dactylous having two long "fingers" and two short "fingers". The other segments bear short nodes, the three posterior ones being the longest. The processes of the head are inconspicuous.

Exoneura concava, sp. nov.

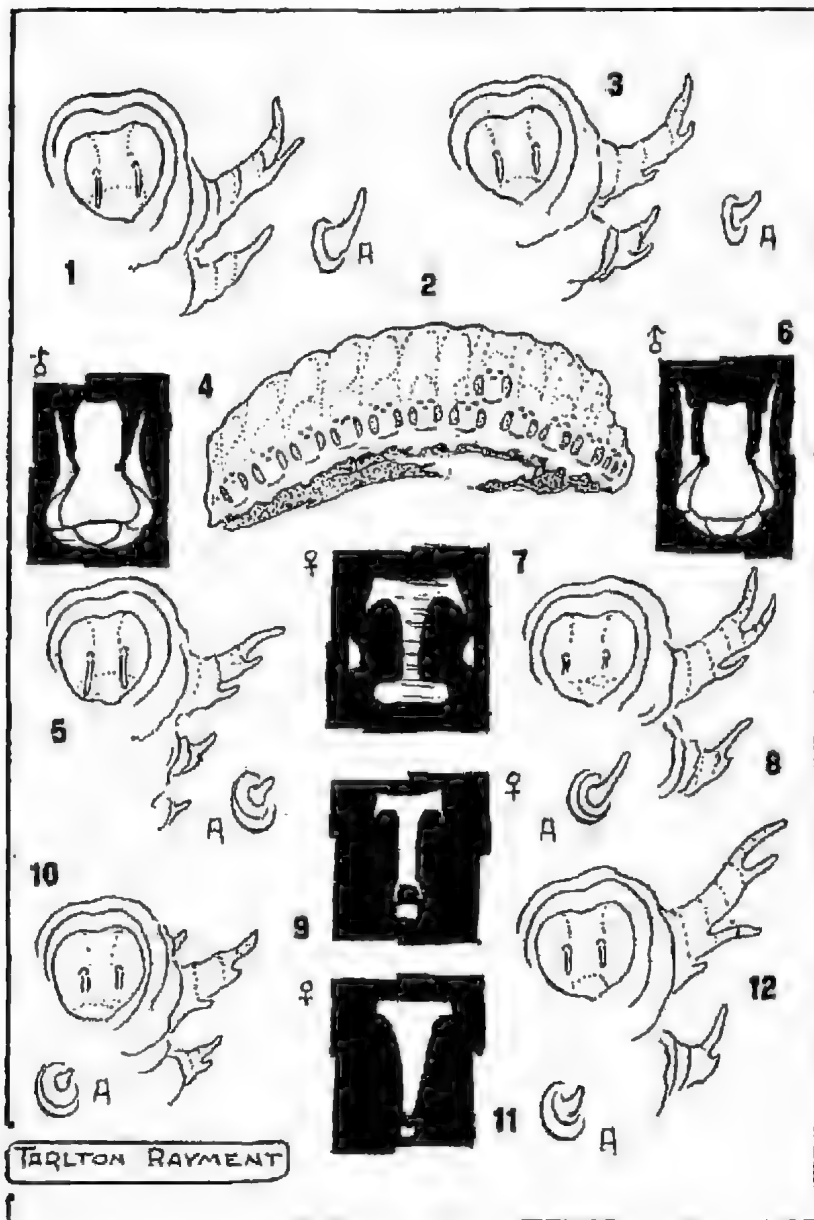
TYPE: Male—length 5 mm. approx. Black, dark-red abdomen.

Head transverse; face quite basin-like, and polished; frons shining; clypeus obscurely suffused with reddish; supraclypeal area the nearest microscopical node; vertex shining, broad; compound eyes, large, converging slightly below; labrum obscurely reddish; mandibulae black, reddish apically; antennae black, flagellum obscurely reddish below.

Prothorax not visible from above; tubercles black, with a fringe of white hair; mesothorax glistening, but still showing a delicate sculpture, and an odd large puncture; scutellum and postscutellum similar; metathorax large, with a distinct tessellation, a few long white hairs which extend to the pleura; abdominal dorsal segments are suffused with blackish, except the hind margins and the apical two; ventral segments only slightly suffused, each with a scanty fringe of yellow hair.

Legs red, more or less suffused with black, but hair is reddish-copper, except on hind tibiae, where there is some black; tarsi red; claws red; hind calcar red; tegulae piceous.

Wings dusky; nervures brownish; cells: the second cubital almost an equilateral triangle, pterostigma dark-brown, hamuli weak.



1. Larval appendages of *Exoneura concava*, sp. nov. 2. Larva of *Exoneura*, probably *sub-holmesii* Raym., heavily parasitized by a minute wasp (dorsal view). 3. Larval appendages of *Exoneura roddi*, sp. nov. 4. Clypeal mark of male *E. variabilis*, sp. nov. 5. Larval appendages of *E. montana* Raym. 6. Clypeal mark of male *E. apposita*, sp. nov. 7. Clypeal mark of female *E. apposita*. 8. Larval appendages of *E. variabilis*. 9. Clypeal mark of female *E. sub-baculifera* Raym. 10. Larval appendages of *E. excavata* Ckll. 11. Clypeal mark of female *E. marjoriella*, sp. nov. 12. Larval appendages of *E. apposita*.

Locality: Brooklyn, New South Wales, *leg.* Norman W. Rodd, February 2, 1947 (TYPE in the collection of the author).

Two females were taken from a stem of lantana, together with three pupae and five larvae, all in a fat, healthy condition.

The first larval appendage is di-dactylous, and the second simple and slender. The other abdominal appendages are long and slender, but segments 5, 6, 7, 8 have only vestigial nodes; the longest are the caudal ones, as in *E. albolineata* variety (see *Vict. Nat.*, Aug. 1948, p. 88, fig. 2). There is some relationship by the appendages to *E. sub-baculifera* Rayment.

Exoneura marjoriella, sp. nov.

TYPE: Male—length 9 mm. approx. Black, red abdomen.

Head transverse, frons rising to a fine carina, finely punctured; clypeus coarsely but distinctly punctured, with a dark-amber mark like a tack with an excessively thick stem (see Fig. 11, page 250); supra-clypeal area high, and distinctly punctured; vertex with a few black hairs; compound eyes with anterior margins parallel; genae prominent; labrum obscure red; mandibulae black, obscure reddish apically; antennae with flagellum reddish beneath, a red line on scapes.

Prothorax not visible from above; tubercles black, with a white fringe and a few long plumose golden hairs; *mesothorax* shining, but a microscopic tessellation, and a few blackish hairs on the anterior "corners", a few large punctures; scutellum and post-scutellum similar; *metathorax* large, with a tessellate sculpture and some golden hair laterally, which extends to the pleura; abdominal dorsal segments a rich dark-chestnut red, with a thick black "I" on one, and a black patch on two; the apex of the abdomen is darker, with considerable black hair; ventral segments red, each with a short fringe of golden hair.

Legs chestnut-red, coxae and trochanters and extreme base of femora black, hind tibiae with much black hair, otherwise legs have golden hair; tarsi red; claws red; hind calcar red; tegulae black.

Wings dusky; nervures brownish; cells: second cubital very long, pterostigma blackish, hamuli six or so, weak.

Locality: Brooklyn, New South Wales, *leg.* Norman W. Rodd, January, 1947 (TYPE in the collection of the author).

The larvae were taken from stems of lantana, and the appendages reveal a close relationship to *E. hamulata*, for the first is tri-dactylous and the third simple, the "fingers" being very short and stout on all. The other abdominal segments bear only very short nodes.

Allies: Clearly approaches *E. hamulata* Ckll., which has hooked cross-arms on the narrower clypeal mark.

The species is dedicated to Marjorie Rodd, Lane Cove.

Exoneura variabilis, sp. nov.

A "nest" series of adult males and females, eggs, larvae and pupae demonstrate how very necessary it is to have *all* these stages for study before describing a new species. In the absence of larvae some of the females of this undescribed species would certainly be determined variously as *E. angophorae*, *apposita*, *angophoralla*, *holmesii*, *obliterata*, and even as other species not so closely related.

The lateral face-marks of these females may be the merest trifling yellow dots; the whole clypeus obscurely suffused with reddish; the base only of the clypeus dark-amber. The entire "face" may be entirely black, as in *E. froggattii*.

Each of the ferruginous abdominal segments bears a band of suffused black, and the hind legs of both males and females have much black hair as in *E. angophorae* Ckll.

The clypeus of the male is white, and this, together with two large lateral marks, makes the "face" almost indistinguishable from that of *apposita*, and only a little different from *hackeri*; which has triangular lateral marks.

The larval appendages, however, at once separate this species from the others named above, for the large appendage is tri-dactylous. The cephalic processes are exceedingly short, and the abdominal nodes long, the three caudal ones being the most conspicuous.

Locality: Narooma, New South Wales, leg. Norman W. Rodd, December, 1946 (PARATYPES in the collection of the author).

In the stem of a "reedy grass or sedge."

FURTHER NOTES ON TWO SPECIES OF EXONEURA

Exoneura montana Rayment

A series of fine robust females—they measure 10 mm. in length—was taken by Norman Rodd from galleries in stems of *lantana* at Brooklyn, N.S.W. These are the largest borings the author has ever recorded for this genus, since they measure $7\frac{1}{2}$ cm in length, with a diameter of 4.5 mm., and are excavated in the dry pithy interior of stems 15 mm. thick.

The white plump larvae are fully 8 mm. approx. in length, and possess only one tri-dactylous appendage, the second having a tiny basal node. The other segments have only short nodes, but the two processes of the head are very long. In its larvae this species approaches *E. hamulata* Ckll.

Exoneura excavata Ckll.

Another series of large robust typical females was taken at the same time as the above, in similar plant stems.

The first larval appendage is reduced to a mere node; the large second one is tri-dactylous, but the "fingers" are shorter and

stouter than on *E. concava* Raym. The other abdominal nodes are exceedingly short, as are the head processes.

REMARKABLE INTERNAL PARASITE

Norman Rodd, in February, 1947, collecting at Brooklyn on the Hawkesbury River, New South Wales, opened a series (about 30) of dry plant-stems of lantana containing *Exoneura* galleries. In one were seven rather hard, dry mummies of what appeared to be larvae of *E. sub-holmesii* Raym.

Under the microscope, the author was able to discern that each body was regularly and closely packed with pupae of some small hymenopteron—a parasitic wasp.

All the pupae were lying in a transverse position, with their heads aligned along the left side in dorsal view. The compound eyes and the minute ocelli appeared as purple patches, separated in twos by three minute triangles of purple dots. These presented a singularly uniform arrangement when the bee-larva was viewed laterally.

When the body was turned over, the other side resembled a microscopic delicate mosaic pavement, although it was actually formed of minute excremental pellets voided by the parasites immediately prior to their entering the pupal stage, and just after the junction of the mesenteron and the proctodeum. Three days later, the crystal-white larvae had become quite black, and the pigmentation was complete.

Seven larvae of the *Exoneura* had been parasitized, and the young wasps emerged on February 15, 1947. Each larval body contained 24 parasites, which connotes that the *Chalcid* mother is aware of the exact quantity of food required to bring her progeny to maturity, for only the dry skin of the bee-larva remains after having served as a communal cocoon. The grand total of wasps that emerged was 168.

Family ENCYRTIDÆ

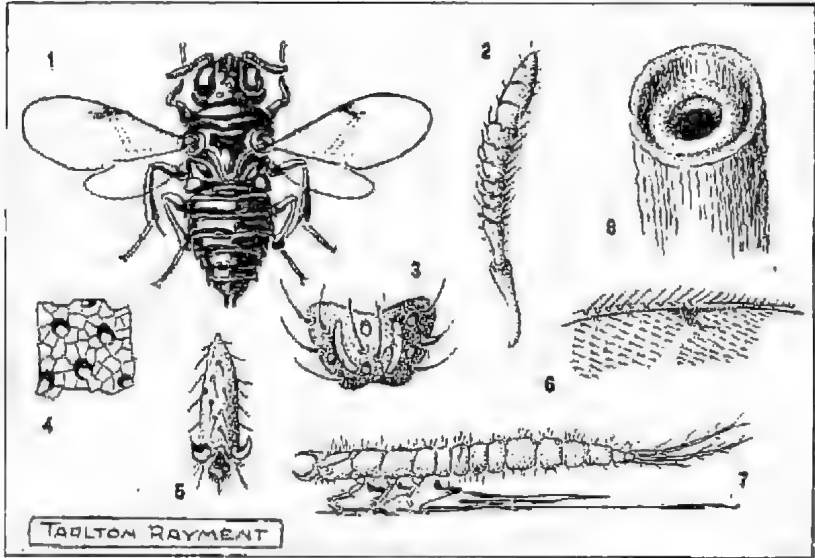
Aphyeus asperithorax, sp. nov.

Chalcids black, 1.5 mm. in length, with a width of .45 mm. *Head* hemi-spherical from above, the vertex broadly rounded, with an obscure bluish-purple lustre, coarsely and closely punctured on a microscopic tessellate sculpture; compound eyes large, bright claret in colour, and claret ocelli widely spaced; mandibles black; flagellum .25 mm. long, the segments becoming very thick apically, and each with parallel conspicuous white organs, the basal segment of the flagellum longest; scape short and slender.

Pronotum well developed; *mesothorax* small, with the sculpture of the head; scutellum very large, and of similar sculpture; *meta-thorax* exceedingly stout; abdomen sessile; gaster amber-coloured.

Legs black, but the coxae and trochanters show bluish lustre; tarsi cream-coloured, with the apical segment suffused with blackish coloration; median tibiae are 4 mm. in length, and the conspicuous calcar is 1.75 mm. long.

Wings large, covered thickly with short hairs, neuration vestigial.



1. Adult wasp, *Aphycus asperithorax*, sp. nov.
2. Antenna of same, enlarged.
3. A segment of the flagellum highly magnified to show the parallel white organs.
4. Sculpture of the mesothorax and scutellum.
5. Fifth tarsal segment of the wasp.
6. Costal margin of the wing.
7. Coleopterous (?) larva found in the "nest" of an *Exoneura*.
8. When the tube is too wide, the *Exoneura* reduce the diameter by a ring of wood pulp at the entrance of the "nest".

The wasp is a typical micro-chalcid, and Tillyard says that the strong median tibiae of the Family *Encyrtidae* are formed for jumping; but these wasps did not show any trace of that habit, although they are able to run quickly.

ACARID MITES

I have several *Exoneura* females heavily infested with amber-coloured Acarid mites, which are widely distributed over the body, along the legs, and even over the wings. Rodd also found the larvae of some coleopteron devouring larvae in the "nest" of an *Exoneura*.

PTEROSTYLIS FURCATA, AN ELUSIVE ORCHID

By W. H. NICHOLLS, Melbourne

At last a long-desired orchid has reached me! It is *Pterostylis furcata* Lindl.,¹ commonly referred to as the "Forked Greenhood" and one of our rarest species. In fact, very few botanists, not to mention orchidologists, have seen and examined it in a fresh condition. Some Tasmanians, in whose State it was originally discovered and to whom I appealed for specimens, ventured to suggest that *Pt. furcata* was now non-existent in Tasmania. So much can be said for its rarity.

Ronald C. Gunn, Hooker's collector, found it well over 100 years ago. Specimens are preserved in the Museum Herbarium at the University, Hobart, also in the National Herbarium, Melbourne. Leonard Rodway, then Tasmania's chief botanist, favoured me with a number of dried specimens some years ago, and the material in front of me as I write was discovered by Archdeacon Atkinson, of Launceston, in the National Park area about 40 miles north-west of Hobart. The specimens were growing in fairly heavy black soil amongst native grass in open patches on the northern bank of the Russell River. Archdeacon Atkinson writes as follows:

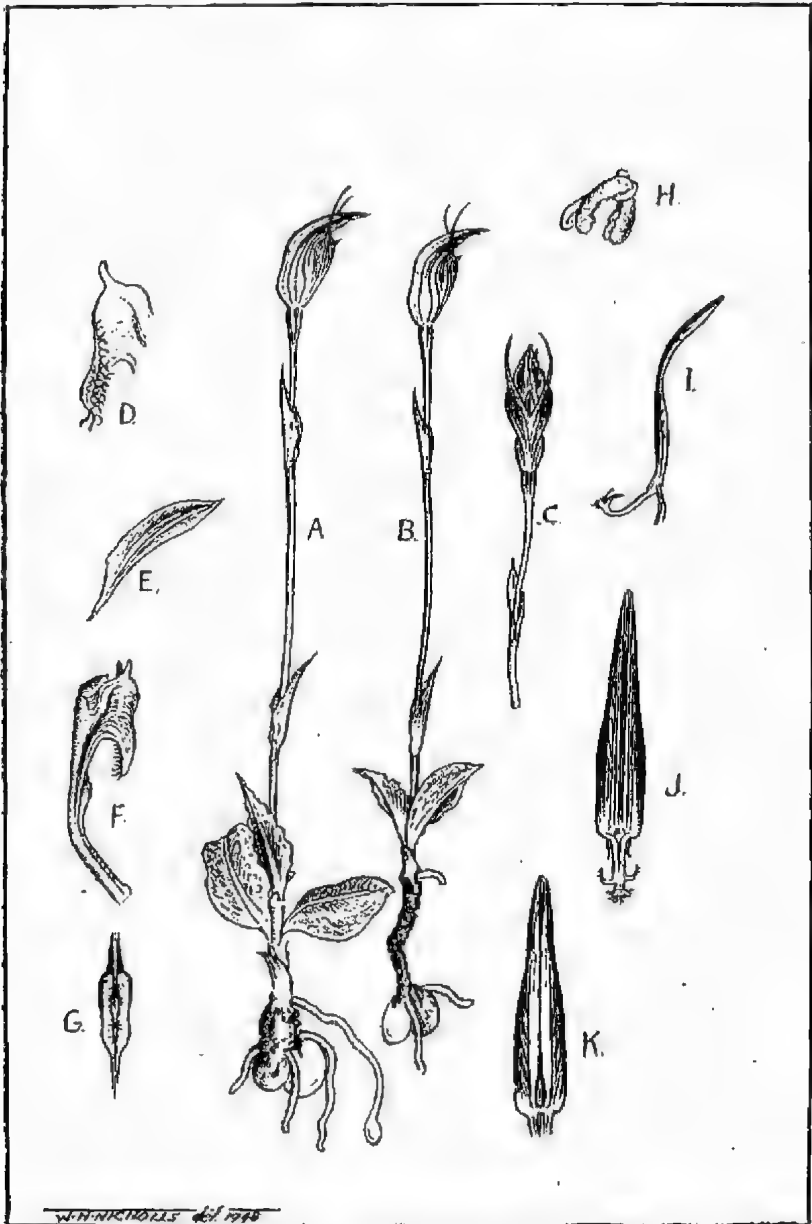
When I first found this colony, none of the plants was more than four inches high, most of them about three inches, growing closely together amongst grass about the same height; here and there were stunted plants of *Lymania* and *Blechnum* with bits of cutting grass and the omnipresent *Pteris*. The ground was fairly damp, probably subject to occasional flooding.

The colony was not large and I hope it will be left alone, as it is the only one I've ever seen. It is rather strange that I have missed it all these years, seeing that I have collected thousands of greenhoods, probably in every part of the State. I am relieved, at last, to know that it actually grows in Tasmania.

Pt. furcata is also recorded for South Australia,² Victoria,³ New South Wales,⁴ and New Zealand,⁵ but some of these records may be doubtful.

R. S. Rogers records it from the Stun-sail Boom River on Kangaroo Island and Mount Gambier. The writer has figured a specimen from the former habitat (see *Vict. Nat.*, xliii, p. 106, 1926). The example was loaned to me by Dr. Rogers, who also reports it from Condah in the Hamilton district of south-west Victoria (I also viewed this specimen). Both are valid records. Dr. Rogers reports *Pt. furcata* as "exceptionally rare on the mainland and on Kangaroo Island."

E. E. Pescott quotes "Buninyong, Dandenong Ranges and the Western district." The Mount Buninyong specimens (coll. Rupp) are now known to be *Pt. furcata* Rogers, the Dandenong Ranges

*Pl. Furcata* Lindl.

A and B—Typical specimens. C—Flower, from front. D—Column wing, showing marginal cilia. E—Petal. F—Column, from side. G—Stigmatic plate. H—Pollen masses. I—Labellum, from side. J—Labellum from above. (Appendage flattened out to show trifold character.) K—Labellum from below. (For natural size of Figs. A, B, C, see letterpress.)

specimen *Pt. foliata* Hk.f., while the Western district record is of Dr. Rogers' Condah specimen. As to New South Wales, H. M. R. Rupp's Kosciusko specimen I have not seen; but the New Zealand *Pt. micromelya* Hk.f. has been considered by Rupp and Hatch as sufficiently close to *Pt. furcata* to be regarded as conspecific.⁵

At irregular intervals anomalous greenhouse specimens (presumably the result of hybridization or "sporting") have come to hand from widely separated areas. One such example may be quoted here:

A *Pterostylis*, which was initially thought to be valid *furcata*, was discovered by Mr. D. Blair on the timbered hills near Wandin in Victoria. Outwardly it had all the features of Lindley's species, but a careful diagnostic examination of the interior structure of the galea revealed it as an anomalous form of Rogers' *Pt. alpina*. This particular example is now in the National Herbarium, Melbourne (Herb., W.H.N.).

Rodway⁶ records *Pt. furcata* as "very common in numerous situations"; also that it is "somewhat similar to *Pt. cucullata* R.Br." (incidentally, so does Bentham⁷). He refers to Hooker's figure over *Pt. podunculata* R.Br. as representing Lindley's *Pt. furcata*, but this figure represents an entirely different species, *Pt. foliata* Hk.f., which is sometimes plentiful in certain parts of the island State, also in Victoria (southern division).

DESCRIPTION OF PTEROSTYLIS FURCATA Lindl.

(Russell River material)

Plant slender, glabrous, 15-18 cm. high. Basal leaves 2-3, shortly petiolate, ovate or ovate-lanceolate, margins entire or crenate, about 1.5-3.5 cm. long. Stem-bracts 2-3, leaf-like, loosely sheathing, 2-2.5 cm. long. Flower solitary, erect, 2.5-3 cm. from base of galea to tip. Galea beaked, projected forward; dorsal sepal and petals equal in length, wholly green and white; petals simple leaf-like, lower tip erect, the sinus acute, the filamentous points embracing the galea and exceeding it by 4-5 mm.; projected forward.

Labellum oblong-linear, wider at the base, gradually narrowing upwards to a narrowly-obtuse tip, erect, curved forward in its distal third, apex protruding but very little through the sinus; appendage curved, trifid, the central lobe tufted.

Column shorter than the labellum, the upper lobes wide with an erect subulate tooth at each upper angle; lower lobes rather acute, the margins with inturned cilia. Stigmatic plate narrow-elliptical.

Flowering during November and December.

In the field it may be mistaken for *Pt. alpina* Rogers, usually a more robust species; but the points of the conjoined sepals are (in *alpina*) reflexed sharply backward and the sinus of the lower lip very wide. These points alone form a ready guide in the field. There are other points of difference also.

Known habitats in Tasmania: "Shaded places, near Launceston and Deloraine" (Gunn), Chudleigh and Cheshunt (Archer); Southport (C. Stuart); Hampshire Hills (Milligan)⁷; Russell River (Atkinson).

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MONTHLY NOTES FROM PORTLAND F.N.C.

By NOEL F. LEARMONTH

While checking some records at the Herbarium recently, the staff came across one of a Nardoo—*Marsilia hirsuta*, the Short-fruited Nardoo—in the Portland district. Details were: "Found by William Allitt, 12/5/1877, on swampy ground on Darlot's Creek near Mr. Learmonth's place at Etterick." In October, 1948, I searched a number of swamps in the locality given and in one of them found a Nardoo growing over a considerable area. The water was up and the floating "four-leaf clover" unmistakable. Early in January, 1949, Mr. Beaglehole found on new damp ground fruiting bodies of the Nardoo and was able to identify it as the species recorded by Allitt 72 years ago. It is strange how this N.W. Victorian Nardoo happens to occur in the far S.W. of the State, and there apparently restricted to one swamp.

On January 9th several Club members made further search for the Forked Spleeuwort (*Asplenium praemorsum*) and the Common Filmy Fern (*Hymenophyllum cressifolium*) reported on Darlot's Creek by William Allitt about 1868. In the junction of this creek with the Fitzroy River is a stretch of very rough basalt barriers and impenetrable swamps where such ferns could remain hidden for years. We did not find them, but will return next October before the summer sun scorches all vegetation on the rocks. However, one new fern was added to the Portland district list by Mr. Beaglehole and identified in the V.F.N. fern book as Delicate Rue Fern (*Anogramma leptophylla*). The area concerned is particularly rich in mosses, lichens, liverworts and ferns, while the swamps themselves contain many species of sedges and rushes.

Our attention was directed to outstanding samples of Jointed and Giant-headed Twig Rushes (*Cladium arifolium* and *C. procerum*), Red-fruit and Brickmakers Saw-sedges (*Gahnia tetragonocarpa* and *G. Clarkei*—not *G. psittacorum*) and the beautiful Drooping Sedge (*Carex longifolia*). A number of birds was also noted, including: Rufous Bristle-bird (*Dasyurus broadbentii*), Sacred Kingfisher (*Halcyon sanctus*), Blue-winged Parrot (*Neophema chrysostoma*) and Wedge-tailed Eagle (*Hierax andax*).

Are there any Australian records of young Cuckoos being fed by old birds of the same species? Late in October last I was walking along a post and rail fence near Tyrendarra and saw on a post ahead of me a young Pallid Cuckoo (*Cuculus pallidus*). As I watched, the bird gave a few plaintive cries and a mature Pallid flew from the grass on to the fence, carrying a grub. The young bird turned towards the newcomer with open mouth, into which the food was placed by the (probable) parent. Then the youngster fluttered to a nearby log and again called several times. The older bird flew into the grass and soon rose with another grub which was also placed in the waiting mouth. Both birds then flew off. So it seems as if the Pallid Cuckoo is not entirely devoid of a sense of parental responsibility.

MACCLESFIELD EXCURSION

Introduction

Notwithstanding dullish weather, about twenty members and friends attended the excursion to Macclesfield on Sunday, November 14. Amongst those present was Mr. W. Perry, past president of the Bendigo Field Naturalists' Club, whose enthusiasm—evident by his travelling some 200 miles to join the excursion—attests the continuing success of the sister club.

The area selected for the excursion comprises approximately 69 acres on the Woori Yallock Creek, about four miles east of Monbulk. Though mainly of virgin forest, the area carries much heavy undergrowth that follows frequent fires. While the ornithologists traversed the denser scrub along the banks of the creek, others of the party concentrated on a marshy area that may be the remnants of an old course of the creek. Much of interest was found, and the major points are detailed under their respective headings.

—A. P. Dunn.

Botany

Although the excursion was primarily for collection of spiders, some members found time also to do a little botanical work. A swamp on the Woori Yallock Creek was the main centre of attraction. A cursory examination showed the surrounding hills of Silurian origin to be covered by Stringy-bark and Peppermint forest. The approaches to the swampy ground yielded *Wahlenbergia*, *Goodenia*, *Stylidium*, *Bauera*, *Paterosmia* and *Dianella* species.

The marsh itself had a dense cover of tussock-grasses, rushes, and members of the *Cyperaceae*. Sun-dews (*Drosera*) were well represented, much interest being evoked by the forked species (*Drosera binata*), which showed variations of growth, habit and colour in the divided leaf. A small cleared area afforded thick patches of Liverwort, enabling the reproductive structures to be studied. In the swamp *Melaleuca cricifolia* and *Leptospermum lanigerum* proved to be the best host plants for the entomological collectors.

Bredemeyera was plentiful in the more saturated spots. Of ferns, the small *Lindsaya linearis* was found hidden amongst grass, while *Gleichenia circinnata* (Coral Fern) was abundant in places. A careful search was not made for orchids, but the Twisted Sun Orchid (*Thelymitra flexuosa*) and some Greenhoods were collected. Clubmoss, Prickly Woodruff, and an *Acacia* were plentiful. A great variety of smaller marsh plants was present, but lack of flowers made identification difficult. As is usual on

poor, "hungry" country, the Leguminosae were abundantly represented, but the height of their flowering period was past.

R. R. Dodds.

Ornithology

No special list of birds was made, but a good variety appeared to inhabit the area. The whistlers were very vocal, and the Oriole called persistently during the day. Another instance of the Willy Wagtail nesting in the same tree as the Magpie-lark was noted. The most interesting note for the day concerned a male Satin Bower-bird that was seen in the vicinity of the camping spot by one of the members.

—Ina Watson.

Entomology and Arachnology

(a) *Insects*. Probably because of the rather dull weather, *Coleoptera* easily dominated the collection. One of the most plentiful beetles was the Ladybird *Verania frenata* Er. (*Coccinellidae*), a species marked on the elytra by a black "7". The male of the Dascillid *Macrohelodes crassus* Blkb., though superficially somewhat like a Ladybird, is easily recognized by the more oval form, while the coloration of the female is very different from that of the male.

The Jewel Beetles (*Buprestidae*) usually are very beautiful, and the two species collected were no exception. These were *Stigmodera macularia* Don. and *S. octomaculata* Savnd., the latter being the smaller and having yellowish elytra marked with eight black spots.

The family *Alleculiidae* was represented by *Alcmeonis pulcher* Bates, which is metallic blue in colour, but having, in most specimens, the head and thorax of a reddish hue. Though also metallic in colouration, the leaf-beetle *Edusa perplexa* Blkb. (*Chrysomelidae*) has greenish elytra and purplish head and thorax. This is a small but beautiful insect. Another Chrysomelid noted was *Parapsis inspersa* Newm., which is much larger in size, and has the yellowish elytra finely spotted with black.

Of the weevils (*Curculionidae*), *Rhinotia haemoptera* Kirby and *Aoptocnemis phaleratus* Er. were plentiful. As the specific name suggests, the former has blood-red elytra.

Hemiptera were also fairly plentiful, particularly *Diaphylo fulvescens* Dall., a greenish bug with red diagonal and marginal markings. *Poecilometris alienus* Walk. and *Pseudopantilius australis* Walk. were also noted.

A few insects were on the wing. These included the Damselfly *Xanthagrion erythroncurum* Sely., the Thynnid wasp *Phymatothynnus monilicornis* Smith, and several native bees.

For the identification of the insects, I am indebted to Mr. C. Oke, of the National Museum of Victoria.

(b) *Spiders*. In an excursion that was devoted more or less to spiders, it would be natural to expect some observations of particular interest, and indeed several were made. Most attention was attracted by a Crab-spider (*Thomisidae*), whose coloration—olive-green cephalothorax and cream abdomen, the latter with a pattern in shades of pink and red—blended remarkably well with the leaves and flowers of the Woolly Tea-tree (*Leptospermum lanigerum*) on which it was found almost exclusively. Subsequent examination proved the spider to be *Diaea rosea* L.Koch, a species recorded previously only from Sydney, N.S.W. In addition to Macclesfield, this new Victorian record must include Mt. Buffalo, as during the past two or three years I have received several specimens from that locality from Messrs. H. C. E. Stewart and Eyre Swarbreck. Mr. Swarbreck found his specimens on plants of *Kunzea Muelleri*, *Eparris hawkei*, and *Micranthemum hexandrum*.

Several species of *Clubionidae* were also collected, notably *Miturga agelenina* Simon, whose nests were well in evidence low down in the grass tussocks of the marsh, and one female identified provisionally as *Cheiracanthium gracile* L.Koch, a species hitherto known only from the male sex, and recorded from Brisbane, Queensland.

Numerous other spiders were noted, and included *Aranca fuliginata* L.Koch, the dorsal markings of whose abdomen show considerable variation, and *Aranca crassa* Walck., whose general shape and coloration effectively camouflage the spider when it is alongside the greyish seed capsules of the Woolly Tea-tree.

—R. A. Dunn.

NEWS FROM COUNCIL, JANUARY 1949

The President reported that a successful hearing had been granted to him, to Mr. G. Hyam and Mr. E. G. Stewart of the Federation of Victorian Walking Clubs, by the State Development Committee at a session to which they were invited to give evidence. The Committee was primarily concerned with the development of tourist attractions, and our representatives took the opportunity of placing evidence before it of the deplorable state of Victoria's National Parks and Reserves, suggesting development and protection along the lines of the resolutions adopted by the recent conference on National Parks.

Maranoa Gardens was again discussed at some length. The implementation of the plan of development drawn up by Mr. Swaby has been disappointing and further efforts are to be made to expedite this work. A planting will take place during the autumn.

Advice that a Fauna Biologist is to be appointed to the staff of the Fisheries and Game Department was received with gratification.

NOTES ON THE A.N.Z.A.A.S. CONGRESS, HOBART

(January 12-19, 1949)

By JANEY RAFF (Club Delegate)

The invitation of the Premier of Queensland to hold the next meeting (28th) of the A.N.Z.A.A.S. in Brisbane was accepted, but the date has not been decided. The President-elect is Professor Sir Kerr Grant, who recently retired from the Chair of Physics at the University of Adelaide.

The Mueller Medal for the current term was awarded to Professor W. J. Dakin, formerly of the Chair of Zoology at Sydney University. The medal is given by the Association every two years for the most distinguished work by an Australian scientist in Geology, Botany, Zoology or Anthropology. However, now that the Association is meeting more frequently, it was suggested that the awards be made to coincide with the meetings.

Delegates were asked to remind their scientific bodies that it would be a great advantage to the Association if more members were encouraged to become permanent (annual) members, instead of merely joining up at the time of the Congresses.

It was decided to proceed with the establishment of a Marine Biological Station on the Barrier Reef, probably in the Capricorn Group, as originally suggested by Professor Yonge, in proximity to existing settlement and necessary power, water, etc. The station would be for pure research, as a source of information to solve economic problems and as a training ground for young biologists.

The Great Barrier Reef Committee resolved to draw up plans and appoint a sub-committee to frame a constitution. Bodies such as A.N.Z.A.A.S., A.N.R.C., and all Universities are to be approached and when the preliminary work is complete the Government will be asked to subsidize the project.

THE REVISED "BIRD WONDERS OF AUSTRALIA"

(A Review)

Of all the works on natural history, bird books are the most prolific, and those with a popular trend always exercise an immediate appeal to English-speaking people. The publishers, Messrs. Angus and Robertson, Sydney, have therefore shown confidence in that fact by choosing the first of the "Wonder" series of books on the unique fauna of Australia printed since 1934, and re-issuing *Bird Wonders of Australia*, in a third edition, enlarged and considerably revised.

The author, Alec H. Chisholm, hardly needs further appraisal of his qualities as writer and ornithologist. Suffice it to state that in the revised volume he maintains his reputation as the foremost writer of popular bird books in Australia today. Again he reveals a facility for happily blending in clear style an authoritative bird-lore, with proper historical perspective, new knowledge both in field and study, and the power of investing living and loving entities in many of the birds he has chosen.

Many fresh and amazing facts about his bird wonders are now revealed to a larger public, and Mr. Chisholm characteristically extends some of these discoveries into lively speculation. For example, the inexplicable feeding movements of Reef Herons, the subject of provocative discussion a few years ago, causes him to dilate on the radial rays theory.

In keeping with the text, the book is finely illustrated with photographs by the author and other naturalists. Not a few have a Chisholmian flavour by the association of human beings with the birds. One or two others call

for particular attention. K. A. Hindwood's photo shot of Jacky Winter is breathtaking. Though a common species and frequently photographed, the bird in this instance is depicted concealing the nest with the breast feathers. This disclosure of the bird's habit shows why the nest is so small; and also caught by the camera with rare skill is the personality of the sitting bird. The satiny sheen of plumage in the beautiful top picture facing page 6, by R. P. Cooper, confirms the apt vernacular name for the Satin Bower-bird. Not only the ornithological interest, but also the sense of design, in the Mistletoe-bird feeding its young at the nest rightly places this picture as a frontispiece.

The publishers have produced the book (obtainable at 15/-) in worthy fashion. But surely the opportunity was missed to give it a dust cover with a design more representative of the Australian spirit so freely expressed in its pages.

H. C. E. STEWART.

RE-APPEARANCE OF THE BIRD NOTORNIS

In the *Age Literary Supplement* of January 15 is an article by the New Zealand authoress, Miss Elsie K. Morton, concerning the re-discovery of the near-fabulous bird, *Notornis hochstetteri*. We are also given a more detailed account in the February number of *Wild Life* (p. 57).

This bird had been recorded only four times in 100 years, and nothing had been seen of it since 1898.

Deer stalkers and explorers had reported strange bird-calls and outsize footprints in New Zealand's untracked hordland forests, but no one had any proof that *Notornis* had not shared the same fate as the dodo and the moa.

Dr. Geoffrey Orbell, of Invercargill, was a firm believer in the continued existence of the Notornis, and with a party set out before dawn one morning last November on a gruelling climb over densely forested mountains between Lake Te Anau and the Tasman Sea. They came to a little clearing on the edge of a tarn and there, over the waving snow-grass, was a large, strange bird, the Notornis! Coloured photographs were secured. Colour film was necessary, for these goose-sized swamp hens (really a flightless rail) have bright red beaks and legs, iridescent indigo-blue neck and breast, brightening to turquoise on the back, the rest of the body bronze-green.

The Government promptly made a remarkably liberal provision for safeguarding the rare bird—a reserve of no less than 438,000 acres of Fiordland National Park as a perpetual sanctuary. No one is to be permitted even to enter this area or to disturb in any way any bird, nest or egg, under penalty of a fine of £100, three months' imprisonment, or both.

CULTIVATION OF NATIVE FLOWERS

One of the projects by the committee of the *Miss M. Gibson Gardens Trust* is the cultivation and development of native flowering plants.

Information regarding success or failure, etc., of varieties that individual growers are cultivating (under widely differing climates and conditions) would prove a valuable contribution to this research.

As correspondent for the committee, Mr. J. S. Seaton—38 Alma Road, Caulfield, Victoria, S.E.7—would be pleased to hear news from anyone growing native plants (particularly shrubs) in Australia.

WHAT, WHERE AND WHEN**General Excursions:**

Monday, March 14 (Labour Day)—Werrisbee Gorge and Brown Coal Mines, Bacchus Marsh (in lieu of week-end previously announced). Subjects: Geology and General. Leaders: Messrs. A. A. Baker and T. C. Bryan. Train to Bacchus Marsh from Spencer St. at 8.10 a.m.; fare 4/7, second class return. Bring two meals. Easy walk by new route, over area full of nature interest.

Saturday, March 26—Moss Vale. Subject: Exotic and Native Trees. Leaders: Dr. Margaret M. Chattaway and Mr. E. E. Lord. Mr. R. N. Auchterlonie, of Narracan, will guide party over old-established plantation of introduced trees. Calderwood's parlour coach from Batman Avenue, 7.30 a.m. sharp (to return to city about 9.30 p.m.). Route along Princes Highway, traversing part of Grand Ridge road over Strzelecki Ranges one way, and return via Thorpdale and Trafalgar. Two picnic meals required. Reserved seat bookings, 21/-, with Mr. H. Stewart. N.B.: This excursion amended from the cancelled week-end intimated previously, and definite bookings only, accompanied by fare, can be accepted.

Saturday, April 9 Granite, via Tallarook. Subjects: Scenic and Geology. Leader: Miss Jean Blackburn. Parlour coach from Batman Avenue, 8.30 a.m. Bookings, 14/-, with Miss M. N. Elder, 17 Adelaide St., Malvern (Tel. U 7297), have all been taken up, and must be confirmed by payment on or before March 14, otherwise cancelled. Bring two meals. Some walking and climbing necessary to obtain full scenic advantage of this little known objective.

Preliminary Announcement:

Friday to Monday, April 15-18, inclusive (Easter)—Tallangatta. Subjects: Birds and Ecology of Area. Approximate cost of second class rail and hotel accommodation, £4/12/-, plus cost of possible local motor excursions. Leader and further details later. Limited party only, and preference given to members prepared to assist in compilation of locality features.

Group Fixtures:

Monday, March 28—Botany Group. Royal Society's Hall, 8 p.m. Further announcement at March general meeting.

Friday, April 1—Marine Biology Group. Royal Society's Hall, 7.45 p.m. Particulars from Hon. Sec. of Group, Miss W. Taylor (Tel. MY 4269), of 13 Jolimont Square, Jolimont, C.2.

Tuesday, April 5—Geology Group. Royal Society's Hall, 8 p.m. Subject: "Granite Rocks and Their Associations," by Mr. A. C. Frostick.

Thursday, April 7 Wildflower Garden Group. Royal Society's Hall, 8 p.m. Hon. Sec.: Mr. Harry Preston (Tel. MX 2211; Extn. 19).

Saturday, April 9—Geology Group excursion to South Morang Hills. Take morning train to South Morang. Full details from Mr. A. A. Baker, 53 Carlisle St., Preston, or at April Group meeting.

H. C. E. STEWART,
14 Bayview Terrace, Ascot Vale, W2.
(Tel. FU 022; Extn. 457).

Messrs. N. H. Seward, 467 Bourke St., Melbourne, have purchased the entire stock of *The Platypus* by Charles Barrett, and, with the author's permission, will present a free copy to anyone who calls at their Book Department or who writes and encloses a 1d. stamp.

The Victorian Naturalist

Vol. 65.—No. 12

APRIL 8, 1949

No. 784

PROCEEDINGS

The monthly meeting of the Club was held at the National Herbarium on March 14, 1949, the President (Mr. J. Ros Garnet) and about 150 members and friends attending.

Mr. C. W. Brazenor, zoologist at the National Museum, had invited members to attend a lecture on the "Marsupial Fauna of Australia" which would be held in the Museum during May. Those wishing to attend were asked to communicate with Mrs. Pinches or the Hon. Secretary.

Notice was given that the Annual Meeting would be held on June 6—the first Monday instead of the second, which falls on a public holiday.

The President announced a Planting Day to be observed at Maranoa Gardens on Saturday, April 23, and asked members to give the occasion wide publicity.

The following were elected and welcomed into the Club:—As Ordinary Member: Miss I. M. Smith; and as Country Members: Mr. A. C. Collins (Geelong) and the Illawarra Naturalists' Society (N.S.W.). Nominations were received on behalf of Misses R. Potter and E. Prescott (as Ordinary Members).

NATURE NOTES

Mr. H. P. Dickins exhibited some polished pebbles from Anderson's Inlet and asked for an explanation of their lustre. Mr. A. A. Baker said that the current theory favoured a polishing by the action of wind-blown ice and snow, probably during an "ice age".

Miss A. Adams mentioned the growth of plants on brown coal beds, devoid of soil and exposed, at Bacchus Marsh; she had collected six species there, including *Typha angustifolia* and *Polygonum aviculare*.

CAPTAIN CHARLES STURT

In 1831, at the Norfolk Island Penal Settlement, Captain Sturt helped to clear and gain the release of a convict who was serving sentence for a crime he had not committed. The pardoned man became Sturt's firm friend and personal attendant on several subsequent exploring ventures; they maintained a life-long correspondence.

The speaker, Mr. V. Sturt Devenport, was a grandson of that freed man and had made an intensive study of Sturt's life and work. Members listened with the greatest interest to Mr. Devenport as he spoke of the great explorer's experiences while attempting to probe the unknown centre of our continent. The retreat from the interior back to Menindie, with all animals, was accomplished at the phenomenal speed of 28 miles per day, and is an epic in the story of Australian exploration.

Mr. Devenport had visited many of the actual places named by Sturt and illustrated his address with excellent pictures of such historic features as the "DIG" tree on Cooper's Creek, the Poole beefwood tree, Mt. Poole, Dépôt Glen, Piesse's Knob, also glimpses of the modern city of Broken Hill with its expanding plantations and two reservoirs.

A vote of thanks was proposed by Mr. J. H. Willis and seconded by Mr. A. H. Clisholm. Mr. Willis made the suggestion that the Barrier Saltbush (*Enchylaena tomentosa*), which had saved Sturt from a complete breakdown in health, might aptly be renamed the "Sturt Saltbush" as a mark of honour to his memory.

NEW WILDFLOWER BOOK

Miss Jean Galbraith, a valued country member in Tyers, South Gippsland, has agreed to write a popular and well illustrated handbook on our Victorian flowers. The United Press will publish the book, which, it is hoped, will appear before next spring. The price is to be about 12/6, and there will be 100 sections systematically arranged from the humble grasses and sedges to the large and complicated Daisy Family. Those interested in the identification of native plants should not fail to procure what promises to be an excellent "beginner's guide," supplying a long-felt need.

GEOLOGY SIMPLIFIED

All members of the Club, especially those interested in Geology, are cordially invited to attend a series of talks on the simplified study of Geology to be given at four monthly meetings of the Geology Discussion Group this year.

These talks will be based on the book *Geology for Beginners*, by W. W. Watts, and will be adapted to Australian conditions. A series of excursions will follow each talk, to describe in the field the matter dealt with at each meeting.

Meetings are held in the Royal Society's Hall, 9 Victoria Street, Melbourne, opposite the Exhibition Gardens, at 8 p.m. on the first Tuesday in each month.

The following months have been set aside for these introductory talks: May 3rd, July 5th, September 6th, November 8th.

The leader of each talk will be Mr. A. A. Baker, 53 Carlisle Street, Preston, N.18, from whom intending members can have further information.

The book *Geology for Beginners*, by W. W. Watts, is in the Club library, but can be obtained from leading book stores for approximately 9/6 per copy.

ADDITIONS TO THE ORCHIDACEAE OF WESTERN AUSTRALIA — III

A New Species of the Genus *Caladenia* R.Br., also Three New Varieties and Sundry Notes on Other Species.

By W. H. NICHOLLS, Melbourne.

1. CALADENIA RADIALTA, sp. nov.

Planta gracilis, hirsuta, circa 15-30 cm. alta. Foliolum angustelanceolatum, 12-18 cm. longum. Flos solitarius, magnus, viridis, circa 7-9 cm. in diametro. Segmenta-perianthii angustiuscula. Sepalum-dorsale erectum, leviter incurvum, ad basin dilatatum, concavum, longissime caudatum, circa 6-7 cm. longum. Sepalalateralia similia, reflexa, obscure clavata. Petala angustelanceolata, acuminata non-clavata, sepalis angustiora, circa 4-5 cm. longa. Labellum breviter unguiculatum, mobile, cordiforme, trilobatum, viride; marginibus longe radiate fimbriatis; ad apicem atro-purpureum, recurvum; calli lineares, curvi, 4-seriati, ultra flexionem non extendens. Columna erecta, incurva, circa 1.5-2 cm. longa, superne latiuscula alata, ad basin bicallosa. Anthera longe mucronata.

A slender hairy plant about 15-30 cm. long. Stem blotched red. Leaf hairy, narrow-lanceolate, 12-18 cm. long. Flower solitary, large, about 7-9 cm. in diameter, green with reddish and deep maroon markings. Perianth-segments rather narrow, green, with 3 fused reddish longitudinal stripes; dorsal sepal erect, incurved, dilated at base, narrow-lanceolate, filiform with a clavate point, about 6-7 cm. long; lateral sepals similar but wider towards the base, the filiform indefinite clavate points often crossed at the tips; petals similar to the sepals, 4-5 cm., horizontally spreading, not clavate. Labellum large, 3-lobed, green with a deep maroon tip, the tip recurved-cordiform, on a broad movable crimson claw, erect against the column, margins prominently fringed or deeply combed from the extreme base to the recurved tip, the fringe filiform and radiating outwards; lateral lobes green, the mid-lobe deep maroon, calli in 4 rows, deep maroon, linear, of "golf-stick" type, not extending beyond the bend. Column incurved, 1.5-2 cm. long, widely winged, more widely above, 2 stalked yellow hands at the base, another with a prominent point. (Tubers not seen.)

Flowering in October.

Distribution (W.A.): Yarloop (Mrs. E. Scouler, Oct. 1947); Yarloop (Oct. 9, 1948, W.H.N., HOLO- and FARA-TYPE); Pinjarra (R. Auchterlonie, Oct. 1948).

This notable addition to the *Orchidaceae* was found growing in water six inches deep, on the swampy areas a few miles west from Yarloop, also at Pinjarra, with *Cal. pectinata* Rogers growing in association. *Cal. radiata* (*sp. nov.*) has affinities with *Cal. lobata* FitzG. and *Cal. dilatata* R.Br., but differs from both allies in the following important particulars: smaller stature; a smaller, more perfectly fringed labellum, with long fimbriae to the extreme base; a different column and different perianth-segments. The only other *Calodemia* with such a perfectly fringed labellum is *Cal. plicata* FitzG., a comparatively short-segmented species with folded (plicate) tip to the labellum.

As may be seen from the accompanying illustration, this new species is an exceedingly graceful spider-orchid. Mrs. Scouler is to be congratulated on the discovery of such a fine plant.

Type specimens are in the National Herbarium, Melbourne.

2. *CALADENIA DILATATA* R.Br., var. *FALCATA*, var. *nov.*
Sepala-lateralia falcata, apices abrupte erecti.

Kujonup, W.A. (*leg.* W. H. Nicholls, Sept. 26, 1948—HOLO- and PARA-TYPE in Nat. Herb., Melb.).

This interesting variety is distinguished from the typical form by its prominently *falcate* lateral sepals, which are curved upwards on each side of the labellum, as in *Cal. lobata* and *Cal. integra* Coleman. Incidentally, *Cal. integra* was found by the writer growing on the crest of Mount Bakewell, near York. It was abundant in thick, rather tall scrub, and flourishing under the most arid conditions.

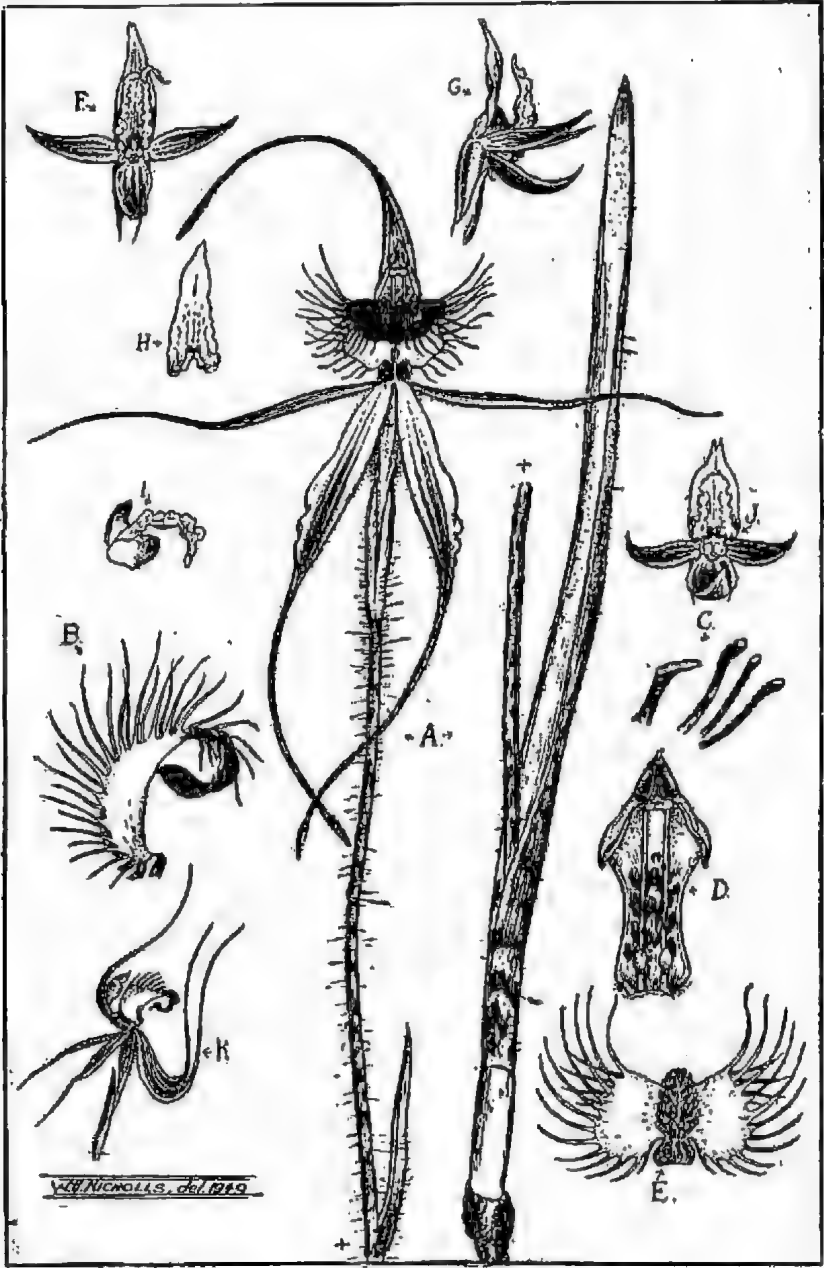
The writer is indebted to Mr. C. A. Gardner for directions which enabled this orchid to be found. The new variety has been located also in South Australia (Mount Lofty Range) and occurs in south-western Victoria.

3. *PRASOPHYLLUM AUSTRALÉ* R.Br., var. *SARGENTII*,
var. *nov.*

Planta omnino prunicolor, sepala-lateralia alba, labellum marginibus saepe integris.

A robust, almost wholly deep prune-coloured plant. Flowers in a compact spike. Lateral sepals pure white; labellum not so markedly voluminous or crisped as in the eastern representative, in fact in some specimens the membranous part of the labellum was entire (not crisped). These differences give to the new variety quite a distinctive appearance. Furthermore, it is restricted to high and often very dry areas.

Habitats in Western Australia: Near York (Oswald H. Sargent); near Beverley (W.H.N., Sept. 1948, TYPE); Bolgart (in "Wandoo country"—Mrs. Rita Erickson).



For explanation, see page 270

4. *PRASOPHYLLUM ELATUM* R.Br., var. *MUELLERI*, stat. and comb. nov. [= *Prasophyllum Muelleri* Andrews¹.]

This variety was given specific rank by Andrews, as it differs from the typical form in the possession of a short yet *distinct claw* to the labellum, as opposed to a *sessile lip* in the latter. The labellum is prominently veined and the callous plate extends almost to the extreme apex.

Andrews later withdrew its claim to specific standing, but apparently no reference to this has appeared in botanical literature. It is undoubtedly a most interesting variety of R. Brown's species, and Dr. Rogers remarked upon it: "The presence of a claw or its absence is of importance, as this feature forms the basis of classification of the genus by Bentham in the *Flora Australiensis*."²

The variety *Muelleri* is a widely distributed form throughout south-western districts of Western Australia.

The largest specimens of *Pr. elatum* seen by the writer during a recent visit to Western Australia were located near Busselton. These outstanding examples (two specimens) attained a height of 5 feet (approx. 152 cm.), the stem towards the base being 2 cm. wide.

5. *PRASOPHYLLUM GRIMWADEANUM* W. H. Nicholls (*Vet. Nat.*, LXIV, 1948, p. 174).

Additional specimens of this attractive plant were found in the original habitat during the month of September, 1948. Fire had entirely destroyed the thick tall scrub hereabouts and the orchids were growing quite exposed to the elements. However, several specimens attained a height of 90 cm., with spike of blooms over 40 cm. in length. *Caladenia latifolia* also flourished in myriads over an extensive area.

KEY TO ILLUSTRATIONS

- A—*Caladenia radiata*, sp. nov. B—Labellum, side view. C—Calli from labellum-lamina. D—Column from front. E—Labellum from above.
 F—*Prasophyllum australe* R.Br., var. *Sargentii*, var. nov. (A flower). G—Flower from side. H—Labellum with entire margins. I—Labellum from side. J—A robust flower type.
 K—*Caladenia dilatata* R.Br., var. *falcata*, var. nov. (Figures A to E about twice natural size, other figures reduced.)

1. *Journ. Proc. Mueller Bot. Soc., W.A.*, I, No. 9 (June, 1902), 19.

2. *Trans. Roy. Soc. S. Austr.*, XLIV (1920), 335.

EXHIBITS (MARCH 14)

Mr. V. Sturt Devenport: Selection of minerals from Broken Hill mines; original letters of Captain Charles Sturt and his son Napier, also photographs of the Sturt family.

Mr. R. D. Lee: Photographic studies of eucalypts and of the Wilhelmina Falls (Murrindindi) from the recent excursion on February 26.

NEW BEES AND WASPS — PART X

By TARLTON RAYMENT, F.R.Z.S., Melbourne.

Family HYLAEIDAE

Pachyprospsis celmisiae, sp. nov.

TYPE: Female—length 4.5 mm. approx. Black.

Head transverse; face with a few white hairs; frons, clypeus and supra-clypeal area all polished, with a few scattered punctures; vertex long; compound eyes large, reniform; genae polished, with a few white hairs; labrum black; mandibles shining black, reddish apically; antennae with dark scapes, flagellum ferruginous beneath.

Prothorax not visible from above; tubercles black, with a fringe of white hair; mesothorax highly polished, a few scattered punctures; scutellum similar; postscutellum rough; metathorax with area polished and a few white hairs laterally; abdominal dorsal segments black, an excessively delicate sculpture, hind margins broadly amber; ventral segments with some pale hair.

Legs orange-ferruginous, coxae and femora black; tarsi similarly ferruginous; claws reddish; hind calcar amber, dentate; tegulae amber.

Wings clouded, longer than the abdomen; nervures dilute sepia, strong, basal strongly arched; cells: the second cubital acutely angled at apex, and typical of the genus; pterostigma blackish-brown; hamuli not visible.

Locality: Shore of Lake Catani, Mount Buffalo, Victoria, leg. H. C. E. Stewart, Dec. 27, 1947.

The new species approaches *P. nitidiceps* Ckll., which has a dull mesothorax, *P. angophorae* Ckll., with a tessellate sculpture on the mesothorax, and *P. aurantipes*, which has yellow mandibles. The specimens are not easy to study owing to the presence of a mould. These small bees were very active on flowers of the Silver Daisy, *Celmisia longifolia*.

Euryglossa catanii, sp. nov.

TYPE: Male—length 6.5 mm. approx. Black and purple.

Head black, transverse, scanty white hair; face with a few loose white hairs; frons with fine longitudinal striæ on a granular sculpture; clypeus shining, convex, a tessellate sculpture, a few scattered punctures; supra-clypeal area similar, but rising to a fine carina that encircles the median ocellus; vertex with black hair, occiput with white; compound eyes large, reniform; genae finely striate, with much white hair; labrum black; mandibulae black; antennae long and black, submoniliform.

Prothorax excessively small; tubercles black, with a tuft of white hair; pleura shining and tessellate; mesothorax shining black, a fine tessellate sculpture, scattered inconspicuous punctures,

some black hair on anterior lateral margin; scutellum similar; postscutellum with more white hair; metathorax with a very large enclosed shining area, with a delicate tessellation, and a few fine oblique striæ anteriorly, much white hair laterally; abdominal dorsal segments of a deep rich bluish-purple, and a tessellate sculpture, a few dark hairs apically; ventral segments with a little white hair.

Legs black, shining, a few white hairs; tarsi piceous, a few straw-coloured hairs; claws dark brown, hind calcar amber; tegulae dark amber.

Wings suffused with dark sepia; nervures dark brown, strong; cells: the two large cubitals subequal, the second receiving both intercubitus nervures; pterostigma large, dark brown; hamuli six, strong.

Locality: Reed's Lookout, Mount Buffalo, *leg.* H. C. E. Stewart, January 8, 1948 (TYPE in the collection of the author).

This species approaches *E. jucunda* Sm., but is not very close. It is easily known by the purple abdomen and very dark wings. *E. jucunda* has ferruginous antennae and pale tarsi; it was described from Champion Bay and Swan River, Western Australia.

The male was observed by the collector to spring the "trigger" of *Stylidium graminifolium*. Many flies and bees succeed in releasing the bent style of these flowers.

The species is dedicated, at the request of the collector, to the late Carlo Catani, who did so much to open up the Mount Buffalo Plateau.

NEWS FROM COUNCIL, FEBRUARY 1949

Encouraging growth continues at the Hawthorn Junior Branch of the F.N.C.V., according to the organizer, Mrs. M. E. Freame, who reported an attendance of over 80 at the November meeting. The children's enthusiasm is gratifying and it is hoped that a few of them will assist at the Maranoa Gardens planting on April 23.

The consideration of plans for any future Show continues to take a prominent place in Council discussions but no decision has yet been reached.

The Club's financial position is again causing concern. In spite of all efforts to keep expenditure down, rising costs are forcing the Council to consider means of raising additional income.

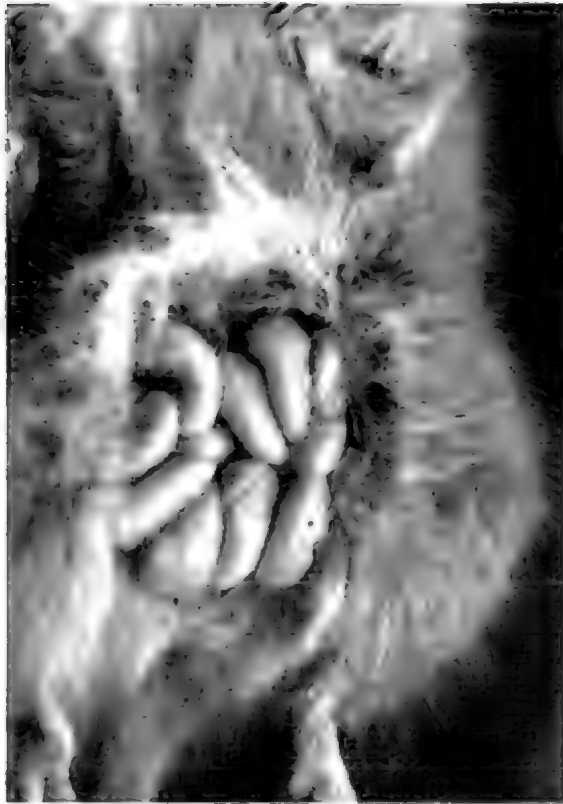
YARRA RIVER BIRD NOTES

On December 27, 1947, at Fairfield (on the Kew side of the Yarra) two young Dusky Wood-Swallows (*Artamus cyanopterus*) were perched on a dead eucalypt branch, with the parent birds on each side of them. The parent nearest to me flew away and returned very quickly with a brown butterfly. In being given to the young bird, the insect was dropped, when both birds dived for it, and it was retrieved before touching the ground.

I did not record the White-winged Triller (*Lalage tricolor*) at Heidelberg during the summer of 1947-48. They were present the two previous seasons, and I have now recorded them again for the 1948-49 summer season.

H. J. BRADY





Left: Like a cluster of "cocktail sausages," the fortnight-old pink youngsters of *Antechinus flavipes* have no outside protection and are bumped over any obstacles by their mother.
Right: With bulging six weeks-old young clinging tightly to her teats in the open pouch area, a mother *Antechinus* is shockingly handicapped in her nocturnal hunt for food. Note the clawless hallux or big toe on each hind foot of the parent.

Photo.: David Fleay.

THE YELLOW-FOOTED MARSUPIAL MOUSE

By DAVID FLEAY

In times that are now long gone I camped one autumn night with a "cobber" in the tin-roofed, hessian-sided store hut of a bush apiary. It was the only structure for miles on the "Stony Rises" property of Mr. Jim Anderson, between Smeaton and Campbelltown in central Victoria, and it stood among outcropping masses of basalt and handsome spreading Yellow Box eucalypts. Our aim was the capture of a Brush-tailed Tuan—that handsome, alert and dashing marsupial hunter, a specimen of which had been in the habit of bargling the hut for sweet sips of honey.

The "Bee Bloke"—as our absent host was familiarly known in the district, had gone to great lengths to make his store house proof against pilfering by furry bandits, and the only light penetrating the dim interior came through a narrow strip of fly-wire encircling the hut immediately under the roof. However, there was a newly broken hole in this band, with clinging tell-tale hairs.

Throughout the night we dozed and watched, but the darkness passed and it seemed that the vigil had been in vain. Suddenly, however, in the dim grey light of dawn, a sharp-nosed wide-eared face appeared on the outside of the gauze wire and, with characteristic quick jerky movements, there entered the hut through the obviously familiar entrance hole—not our long-expected quarry—but a Yellow-footed Bush Mouse, one of its smaller and very handsome relatives. This first sight of an animal new to us was the signal for a quick plugging of the hole and the start of a lively chase. Ten minutes later, however, we gazed in despair at a mass of overturned boxes, tins and spare hives in which there was not the slightest sign of our visitor. Following several lightning-like journeys round the bag walls of the hut, the little marsupial had departed even more suddenly than it had come.

However, some days later we caught him in a curious and totally unexpected manner. It turned out that he and a fellow "mouse" were dwelling in an empty hive near the hut. They gave themselves away by characteristic quarrelling notes, "chit-chit-chit-chit," such as we hear today from Swainson's pouched mice living in the walls of our bush home at Badger Creek, and all we had to do was to push a large cork into the front "doorway"!

Among the lesser pouched animals the Yellow-footed Pouched Mouse (*Antechinus flavipes*) is practically unknown to the ordinary observer, but it merits interest and admiration because of its keen alert hearing, warm russet-coloured fur, amazing rapidity of movement and its unique zoological standing.

With male specimens attaining the size of a half-grown rat, i.e., up to eight inches in length from nose to tail tip, and females from half to three-quarters the size of the more robust sex, this

representative of the broad-footed pouched mice is remarkably variable in measurement. It is a sharp-nosed, keen-scented seeker of insects, nectar, small birds, little lizards and, particularly, of common mice—wherever it can find them. Skins of these rodent pests are usually so thoroughly cleaned up that the peeled skin is left turned inside out.

Whereas the smaller chocolate or reddish-brown Swainson's Pouched Mouse (*A. swainsonii*) favours the rain forests of southern Victoria and Tasmania, the yellow-footed species takes over among sparsely timbered granite ranges or basalt country north of the divide in Victoria. It also favours the sandy box ridges of Murray River areas and the Sydney sandstone outcrops, and it ranges widely over mainland Australia. In secluded hollow limbs, or hidden rock crannies in such habitats, it builds a large nest of eucalypt leaves arranged in a circular manner and packed neatly on long edges like cards to enclose a central cup-shaped resting place.

Known to bushmen as the bush mouse or marsupial mouse, and still familiar to many naturalists as the Yellow-footed Phascogale, this bright, clean fellow is one of the many smaller mouse-like marsupials. It stands out from the others because of its comparatively large size, robust appearance and its unusually handsome colouring.

With such a wide range over mainland Australia, though not occurring in either Tasmania or New Guinea, it is scarcely surprising to find that the general colour of the acrobatic climber and runner is, like its size, somewhat variable. Apart from the typical species, a North Queensland, a South Australian and a West Australian race are recognized. In all of them the buff or yellowish tone of the broad feet remains fairly constant. Victorian examples of this compactly built marsupial are of a general warm grey, suffused yellow above, with head and neck conspicuously grey. The ventral surface is yellowish to rufous, feet yellow, with sides of body rufous or golden tan. The tail, which is shorter than the combined head and body, is uniformly covered with close stiff hair, rufous below and coloured above like the dorsal body surface. With the typical widely opening jaws of a predatory mammal and dentition resembling on a small scale that of its relative the native cat (*dasyure*), the Yellow-foot is capable of vigorous biting powers, and male specimens draw blood readily if unwisely handled. The ridged foot pads and long claws which assist them to climb so agilely about trees and rocky places also enable the animals to run practically upside down over the roofs of rock caverns.

Particular attention has been directed to the yellow-footed marsupial mouse by Professor Wood Jones, who pointed out that this animal's special interest from a zoological point of view lies

in its representation of a marsupial base form. In the whole of its anatomy it shows itself to be a remarkably generalized animal and it is but little modified from a basal mammalian plan stereotyping the simple creature that could be considered ancestral to most of the marsupial radiations that gave us the hopping, climbing, parachuting, digging, hunting and even aquatic forms.

It is unfortunate indeed that the yellow-footed bush mouse is such a simple, trusting creature, lacking any great degree of cunning or proper appreciation of danger, for as a destroyer of cockroaches and other harmful insects this small animal has few equals. It becomes too intent on hunting activities in the presence



Mother Yellow-footed Pouched Mouse, about two-thirds natural size, with blind and almost naked seven-weeks-old young clinging to her sides and under-surface. This is the pouch-leaving stage.

Photo.: David Fleay.

of prey, and I well remember an early dawn in the Daylesford district, Victoria, when, hearing a commotion among roosting sparrows and observing fluttering wings in roof guttering, I reached up and pulled down a sparrow with a yellow-footed mouse attached. Oblivious to all else, the attacker persisted in its bulldog grip even when carried away! Similarly, it is not difficult to lure the animals into box traps baited with honey-soaked bread or pieces of meat while watching proceedings from a nearby vantage point.

Domestic cats and the common fox have been responsible for clearing the yellow-footed bush mouse from many of its former haunts and it is unfortunately true that wherever settlement spreads the doom of this little animal and others like it appears to

be merely a matter of time, unless, of course, netted-in areas with a staff to control marauders are established in suitable country. In a few short years I have noted its final disappearance from areas where formerly it was possible to watch the bright-eyed little fellows running a few feet at a time along sun-bleached logs, stopping with a characteristic jerk and as quickly moving sideways, forwards, or circling a tree trunk in their own inimitable style. Crepuscular and nocturnal, they often investigated our camps in their haunts, and in the dusk or very early morning it was no uncommon thing to see the hind quarters and tail of a busy Yellow-foot projecting from an open jam tin among the scattered provisions as the small "hobo" had the time of his life.

The method of carrying and caring for young is of exceptional interest, for, following a general rule that the smaller the marsupial the greater the size of a brood, our Yellow-foot (at least in Victoria) takes the palm for large families; and, though text books indicate the maximum number of teats in the pouch as ten, I have counted the total in various individuals caught as 8, 10, 11 and even 12! Thus the number of young carried at a time is distinctly variable, and it seems that there are more joeys born than there are teats to accommodate them, with a resulting survival of those first to the "post".

Indistinguishable in its off-season resting condition from the rest of the ventral surface, the pouch cannot truthfully be referred to as such, for it is not an enclosed pocket as in the narrow-footed pouched mice (*Sminthopsis*) and is therefore merely a pouch area. In the northern Victorian habitat of this species this area usually begins its seasonal development in early August with shallow skin folds appearing longitudinally on each side and longish white hairs growing from the anterior edge and to a lesser extent on each side, so that they give a certain amount of protection later on to the otherwise completely exposed young. Within the pouch itself there appears a growth of reddish or rusty hairs. The mammae become evident as red-pointed dots. In the case of breeding these marsupials in captivity and by experience in catching them with box traps in the Broadford-Tallarook area, Victoria (where Mr. G. M. Crowl was an invaluable assistant), it appears that the time of birth seldom varies from the middle of August, and the female animals get away by themselves in neatly manufactured, stacked-leaf nests in hollow trees, fallen logs or crevices in rocks.

Newly-born joeys are only 4.5 mm. in total length, pink in colour, and are scarcely visible in the long white hairs already referred to as projecting from the fore part of the pouch. The tiny naked offspring grow fairly rapidly, but are inseparably attached to the teats from which they depend for some 35 days. As the climax of this period approaches, the unfortunate mother is fearfully hampered in her activities, for the young are like so many

PLATE VIII



Enlarged to nearly twice natural size, this ventral view of female Yellow-footed Marsupial Mouse is remarkable in showing twelve newly-born young attached to the full number of teats in the open pouch area.
Photo.: David Fleay.

"cocktail sausages" clustered about her abdomen, and it is understandable that, being so handicapped, her condition becomes poor and she is an easy mark for natural enemies. However, at the end of the 35-day period the young are capable of relinquishing their hitherto unbroken grip of the individual mammae and drinking at will; but for most of the day, for two ensuing weeks, they still grip tightly and present an amazing spectacle as they squirm *en masse*. Towards evening the mother gently shakes or vibrates her abdomen to persuade the youngsters to be loose in the nest so that, free as the wind, she may skip about the bush, the rocks, curled bark and fallen logs seeking items of food.

Almost impossible to photograph on account of its swift and lively movements, a yellow-foot presents the only reasonable opportunities for pictorial success at the stage when the mother is loaded with large "stick-fast" young. In fact, should one of the bunch become detached and cry "Siss—siss—siss" she endeavours to stay put for the temporarily unseated youngster to climb again on to the overloaded band wagon.

At the first sign of a stage of partial separateness the babies, which are still blind, show greater development at the head end, both as to size and faint covering of thin fur. Their eyes open within a few days of nest resting; fur quickly becomes thicker, spreading posteriorly over the whole body, and, if lifted from the nest during daylight, each infant utters the repeated sibilant cry of "Siss—siss—siss," until seizure of the mother's fur or teats in strong little jaws and forefeet lulls further anxiety in the comforting sense of security.

At three and a half months the now active, sharp-featured and streamlined little fellows make excursions of their own, having become practically independent of the faithful mother and never having seen their father, who (sad to report!) would, if he inadvertently stumbled over his children alone in their tenderer stages, become a cannibal in the worst sense of the word. To see a bush mouse family, complete with mother, peering at one as a mass of black-eyed, sharp-nosed, alert faces from the gum leaf nest is a unique and fascinating sight. Such families are very noisy, indulging in mock quarrels with much sibilant hissing. Young bush mice of this species are even more foolhardy and venturesome than the adults, and, round about the month of December, many come to untimely ends in such escapades as ill-judged leaps into half-empty honey tins in bush apiaries, diurnal scampering in full view of watchful kookaburras, or innocent exposure to the pitiless attentions of cats, both wild and domestic.

Doubtless in older days many such youngsters formed easy and tasty prey for that largest of the so-called marsupial mice, the swift merciless and rat-sized Brush-tailed Tuan (*Phascogale lapoualafa*).

THE MITCHELL RIVER DELTA

By H. T. CLIFFORD, Melbourne.

During a recent camping tour in the Bairnsdale district I made several trips to the Mitchell Delta or, as local residents call it, "The Spit". From the town the river flows in a southerly direction for about five miles and then changes its course, turning through a right angle at Eagle Point Bluff. From there to its mouth it flows between two narrow strips of land jutting out into Lake King; these are the delta. The breach at the Bluff which allows the river at present to flow north into Jones Bay was formed during a flood about twenty-five years ago.

The accepted explanation for the formation of the delta is as follows; Since the Mitchell flows into the waters of a quiet lake, there are no currents at its mouth to move away the suspended sediments carried there by the stream; in consequence, they are deposited at each side of the mouth, which grows out into the lake.

Before endeavouring to disprove this deltaic origin, I beg to suggest another. Previous to the post-glacial rise in sea level which drowned so much of our coastline, suppose the Mitchell River to have meandered across a broad flood plain. It was the submergence of this tract which formed the present Gippsland Lakes. If we assume that the sluggish stream flowed between levée banks, as the Murray does now, then we can interpret the raised banks between Bairnsdale and Eagle Point Bluff as levées which continue out on to the drowned plain as a false delta, having escaped such drowning because of their slight elevation.

It is the origin of these raised banks which is the key to the problem. Now, if they are deltaic in origin, then Bairnsdale must stand at the head of an ancient gulf which has been divided in two by the delta and has subsequently silted up. Under these circumstances, the cliffs along the river from the Bluff to the town would be marine in origin. Of this there is no evidence; but, in fact, they belong to the same series of river cliffs which extend for a further twenty miles upstream. Furthermore, if there be a true delta, it must have built directly out into the lake until it touched the opposite shore at Eagle Point Bluff, where it was deflected through a right angle and grew out for another four and a half miles until almost reaching the northern shore of Lake King.

Since a recent flood caused the river to breach its bank, as already mentioned, we would expect this new direction to have been the one adopted during the formation of the delta—that is, assuming for it a deltaic origin. Further evidence in favour of the levée origin comes from meanders within the delta tract which are not reflected in any way in the shape of "The Spit".

Considering all these facts, I think we can reject the deltaic origin of the structure and replace it by one of drowned levées,

VICTORIAN FERN AND CLUBMOSS RECORDS — II.

By N. A. WAKEFIELD and J. H. WILLIS

(Continued from January issue, p. 217)

12. *Botrychium lanoria* (L.) Sw.—Near the Ram's Horn, Upper Buchan River area, amongst Snow-grass at 5000 feet (N. A. Wakefield, 29/1/1949)

Although the parsley-like Meadow Moonwort (*Botrychium australe*) is widespread, if uncommon, in the eastern half of the State, its little congener is so rarely seen that any record usually excites great interest. Bentham (*Flora Aust.*, VII, 690) cited the following localities for Victoria: "Snowy plains on the Ovens, Goulburn, Coboga [i.e., Colongra] and Mitta Mitta Rivers," all based on collections made by F. von Mueller in the 1850's—only the two last-named are now represented at the Melbourne Herbarium. Nothing apparently was then heard of the moonwort for nearly 80 years, when (12/11/1931) Henry Morgan re-located a patch of it between Cobongra and Mt. Hotham. The discovery was of such moment that an illustrated article on the subject appeared in this journal (XV, VIII, Jan., 1932, p. 177). Subsequently, Mr. W. H. Nicholls found a specimen at the Mt. Howitt hut, about 5500-ft. altitude (Dec., 1934), and W. Hunter collected material (now in Melbourne Herbarium) along the Ingeegoodbec River, 10 miles east of the Cobboras (Nov., 1938). The present Ram's Horn record is the fourth in recent years (since 1930) and it is likely that other occurrences will be reported from that wide belt of alpine and sub-alpine terrain between Mt. Howitt and the sources of the Murray.

As to other States, Moore and Betche (*Handbk. Fl. N.S.W.*, 1893, p. 501) specify: "Southern Dividing Range, on dry banks in loamy soil," but there is no N.S.W. material in Melbourne. J. D. Hooker, quoting Gunn (*Fl. Tas.*, II, 1860, p. 154), says: "Common, ascending to 4000 ft."; while Spicer (*Plants of Tas.*, 1873, p. 146) writes: "Common on grass." Thereafter, *Botrychium lanoria* seems to have waned in Tasmania (probably owing to land utilization and increasing pasturage), because 25 years later L. Rodway (*Tas. Flora*, 1903, p. 281) describes it as "scarce, but widely distributed." There are two Tasmanian collections at the Melbourne Herbarium, viz., "Shady banks of St. Paul's River," *leg.* C. Stuart about 1850, and one made a century later—"Hill above Ouse River," *leg.* T. E. Burris, 1/1/1949. Cockayne (*N.Z. Plants*, 2nd ed., 1919, p. 211) stated: "In the latter region [i.e., New Zealand] it has been recorded only from one spot—south-western slopes of Mt. Torlesse, at 2700 ft., where it was found many years ago by J. D. Euy, but has not been re-discovered."

13. *Sticherus flabellatus* (R.Br.) St. John-Howe Ranges, extreme S.E. Victoria, in a jungle gully about 2 miles S.E. of "Marshmead" homestead (N. A. Wakefield and J. H. Willis, 24/10/1948).

This lustrous and elegant fan fern was previously known from only one spot in Victoria, viz., Swampy Creek, towards Genoa Peak, on the western side of Maffaccanta Inlet.

14. *Macroglena coudata* (Brack.) Copeland—Head of Shepherd's Creek (E branch), 1 mile E. of Gembrook (C. Begg, 1947).

Jungle Bristle-fern is abundant on trunks of *Cyathea Lichardtia* and *C. australis* in parts of the Howe Ranges. It is less common in the Mt. Drummer jungle, 30 miles west, and the only other locality for Victoria is Gembrook—a remarkably isolated occurrence more than 200 miles from Mt. Drummer. Robert Lucas found the little epiphyte at Gembrook in November, 1876, and his collection (in National Herbarium, Melbourne)

was responsible for our Census recording of "*Trichomanes humile*"—a mis-determination. Fern enthusiasts have searched in Gembrook gullies for years, but the honours must go to Mr. Charles Begg (a local resident keenly interested in his district flora) who at last, 70 years after Lucas, has succeeded in re-discovering *Macroglossa*. Unfortunately it is on private land liable to be cleared.

15. *Notholaena vellea* R.Br.—Limestone cliffs, Murray River, at Boundary Point, extreme N.W. Victoria (J. H. Willis, 30/8/1948)—*first record for the State*.

Woolly Cloak Fern differs manifestly from its commoner ally, the Bristly Cloak Fern (*N. distans*) in having the whole under-surface of the fronds thickly blanketed with pale rupestric woolly hairs. It is a plant of drier country and (with the possible exception of woolly *Pleurosorus*) probably the most drought-resisting fern in the Commonwealth. *Notholaena vellea* occurs on mountains throughout Central Australia, as far north as Borrooloola on the Gulf of Carpentaria, and even penetrates the inhospitable Nullarbor region. J. M. Black lists the Flinders and Musgrave Ranges and the Far North as habitats in South Australia, but apparently the Barrier Ranges and Upper Darling hills were the nearest recorded occurrences to our State. Last August three live plants were found at Boundary Point in the extreme north-west corner of Victoria, with a rainfall of about 10 inches p.a. These occupied crevices in limestone rock above high cliffs of the River Murray, within a few chains of the South Australian border fence and in badly eroded, rabbit infested country. The specimens were all stunted, several dead clumps also being seen; so the future of this addition to our flora would seem uncertain.

16. *Asplenium obtusatum* Forst.—Granite Quarry Point, Cape Woolamai area, Phillip Island, in rock crevices near the sea and rare (Mrs. Paul Fisch, 22/5/1948); Ram Head, near mouth of Wingan River, E. Victoria (N. A. Wakefield, 2/12/1948).

Hitherto the Blunt Shore Spleenwort was recorded from three localities only—Islands of Bass Strait near Wilson's Promontory, Lady Julia Percy Island near Portland, and sea cliffs south of Mallacoota [*Vict. Nat.*, LIX, Oct. 1942, p. 112]. We can now record it as abundant on maritime granitic rocks east and north-east of Ram Head.

17. *Cystopteris froggilla* (L.) Bernh.—Native Dog Flat, near head of Buchan River, in a gorge at 3700 ft. (N. A. Wakefield, 29/1/1949).

Our previous paper (Jan., 1949, p. 215) drew attention to the finding of this rare fern in a second locality, viz., Little River Falls, north-east of Wulgulmerang, at only 2500 ft. It has now been located about 18 miles to the north-west, where quite plentiful on one rock face in a gorge at the lower end of Native Dog Flat.

18. *Cyclophorus rupestris* (R.Br.) C.Chr.—Head of Sherbrooke Gully near Memorial Gates, Dandenong Ranges (Geo. Hand, Nov., 1947).

In the jungle gullies of East Gippsland, Felt Fern is conspicuous, but it is a long call from its last stronghold of the Mitchell Gorge country (Deadeock and Bull Creeks, etc.) to the Dandenong Ranges, over a hundred miles farther west. The recent collection of this creeping fern in Sherbrooke Forest is paralleled by the appearance of another jungle species (*Macroglossa caudata*) at Gembrook. The generic name *Pyrrhosia* (1803) antedates *Cyclophorus* by eight years and will therefore have to stand; the combination *Pyrrhosia rupestris* has probably been made by the Chinese pteridologist, Ching.

19. *Lycopodium carolinianum* L.—Near Maramingo Creek, about six miles N.E. of Genoa, E. Victoria, in a wet peaty bog (N. A. Wakefield, 18/12/1948)—*verified record for the State.*

This remarkable cosmopolitan (except Europe) clubmoss is unique in having leafy stems which creep and root extensively like rhizomes. Collection of the plant is a difficult business, so firmly are the main shoots anchored to the wet soil. There are only very short, or scarcely any, ascending barren branches; but the fertile ones stand erect, 1 to 6 inches high (including the cone-like spike). Leaves of the rhizomic branches are crowded, narrow-lanceolate, acuminate, and not above 4 mm. long in Australian examples, while those of the spike are larger and loosely erect.

J. D. Hooker attributes the species, in Tasmania, to "boggy places; not uncommon," and also includes Victoria in his distribution list (*Fl. Tas.*, II, 1860, p. 157). But there are no collections from our State at Melbourne; indeed, the National Herbarium possesses only two sheets from the whole continent—Moreton Island, Queensland (*leg.* F. von Mueller, Aug., 1855), and a West Australian specimen of Drummond's (No. 351) which matches perfectly the recent Maramingo samples. Cheeseman gives the only New Zealand locality as a peaty swamp near Kaitaia, North Cape district; so apparently the species is rare in most parts of Australasia, and its addition to the Victorian flora is of considerable importance.

(Concluded.)

THE LATE MR. ALISTER CLARK

It is with great regret that we have to record the death of Mr. Alister Clark, a Life Member, who first joined the Club in 1902. Mr. Clark was born and lived for most of his long life on the family estate, "Glenara," at Bulla, one of the nearest large grazing properties to Melbourne. Commencing his education in Hobart, he attended the famous Scottish public school, Loretto, afterwards graduating as B.A. at Cambridge. Returning to Australia, he took over the Glenara estate from his father and, in addition to grazing interests, he became noted both in the hunting field and as a polo player. He was also a foundation member of the Royal Melbourne Golf Club. Mr. Clark was interested in horse breeding and racing; he became chairman of the Moonee Valley Club in 1917, and retained the position until his death on January 29 at the ripe age of 85.

During recent years, Mr. Clark seldom attended Club meetings, but he always looked forward to issues of the *Naturalist*. He had a very wide interest in natural history, particularly bird life, which he encouraged in his extensive and beautiful grounds. His old-world hospitality was notable and freely extended to any Club parties or members who visited the Glenara estate from time to time.

Mr. Clark's outstanding interest was as a rosarian and rose breeder, and many varieties of world-wide fame had their origin at Glenara (Sunny South, Lorraine Lee and Black Boy, among others). This fine work was recognized in 1936 by the highest award in the rose world, the Dean Hole Medal—and by election to Vice-Presidency of the Royal Horticultural Society of England. He was also famous as a daffodil breeder, for which work he last year obtained another high award, the Peter Barr Cup. Mr. Clark handed over all the proceeds from any of his raisings to the National Rose Society or for other horticultural projects. Leading horticultural societies now propose to establish a public rose garden in his memory, and this effort will have the enthusiastic support of many naturalists.

G. N. HYAM.

VASCULAR ANATOMY OF ORCHID FLOWERS

By EDITH COLEMAN

Of the structural complexities of orchids none are more interesting than those of the labellum. Recognized by botanists as almost necessary in the pollination of species with irregular perianth-segments, its origin has puzzled orchidologists since Robert Brown's work (1831) fired Darwin's enthusiasm for the vascular anatomy of orchids. From study of the spiral vessels, Brown suggested, and Lindley "cautiously agreed", that the flower of an orchid consists of five whorls—three petals, three sepals and six anthers in two whorls, two or three of which are fused with the middle petal to form the labellum.

Brown traced the vessels by transverse sections. Darwin, tracing them longitudinally, one bundle to each of the 15 theoretical organs, confirmed and elaborated Brown's theory. With only one or two dissentients, this view has had general acceptance. Many abnormal flowers (reversions) have been brought forward to confirm it.

Now, after delicate anatomical study of 40 species of orchids belonging to 24 genera, which he illustrates with drawings of plasticine and wire models, B. G. Swamy (Harvard Leaflet, 1948) finds no evidence in support of the compound theory of the labellum. He finds that it receives the same vascular supply as other segments of the perianth, and hence does not anatomically differ from them.

Darwin believed that two stamens of the outer whorl were fused with the labellum. According to Mr. Swamy, the vessels representing those stamens, when present, are distinctly identifiable in the gynostemium.

Mr. Swamy's researches carry us back to Darwin and his alternating elation and despair over these vessels. He knew that there was a chink in his armour which future botanists might pierce. Two genera (*Habenaria* and the allied *Bonatea*) baffled him, for in these some of the vessels appeared to run to the wrong ovarian groups.

He had written in great elation to Dr. Hooker (later Sir Joseph) telling what he had accomplished, and asked for confirmation, enclosing a sketch of the vessels as he had traced them. He adds: "I am desperately interested. The destiny of the whole human race is as nothing to the course of vessels in orchids." Writing again 19 days later, he is in despair: "For the love of God help me. I believe all my work is smashed. Look at this accursed diagram of the Butterfly Orchis (*Habenaria*) which I examined after writing to you yesterday when I thought all my work done. Some of the ducts . . . run to the wrong ovarian bundles . . . This apparently shows that not the least reliance can be placed on the course of the vessels."

He asks for a specimen of the allied *Bonatea*, from the Kew Herbarium, to soak and examine. Seven days later Darwin writes to thank him for it "and for your comforting sentence about the accursed ducts. I can hardly bear to let the *Bonatea* soak long enough." Hooker advised him to place less value on grounds of generalization in the morphology of plants. This restored Darwin's equanimity and his sense of humour.

It recalled Hooker's pronouncement on a grass he had sent for naming: "It is certainly *Festuca* so and so, but it agrees as badly with the description as most plants do." Darwin often chuckled over this answer from a great botanist!

He found that the vessels in *Bonatea* showed the same irregularity as in *Habenaria*. He wrote (*Fertilisation of Orchids*, 1st ed.): "This anomaly is of importance as it throws some doubt on the view I have taken of the labellum being an organ compounded of one petal and two petaloid stamens." The only answer which he felt he could make to the critic who should challenge his views will hardly stand, in the light of Mr. Swamy's findings. (*Fert. of Orchids*, 1st ed., p. 303.)

It may safely be said that Mr. Swamy's paper would have delighted Darwin, who would have given it the same careful study that he gave to the views of all his critics; for Darwin, "while fearlessly stating his views, was far more ready than most men to admit that he might be mistaken in many respects." (Introduction to *Descent of Man*.) To A. R. Wallace he wrote (August, 1872): "How grand is the onward rush of Science! It's enough to console us for the many errors which we have committed, and for our efforts being overlaid and forgotten in the mass of new facts and new views which are daily turning up."

To Dr. Julius Wiesner, Professor of Botany in the University of Vienna, who had devoted a volume to criticism of his *Power of Movement*, Darwin wrote: "You have shown how a man may differ from another in the most decided manner, and yet express his difference with the most perfect courtesy . . . I have been profoundly interested in your book, and some of your experiments are so beautiful that I actually felt pleasure while being vivisected."

RECENT BIRD RECORDS

Under the heading "Hidden Treasure" (*Vict. Nat.*, Feb. 1949, p. 222), my statements on the occurrence of the Large-billed Scrub-Wren at Mount Buffalo, of necessity much condensed in the printing, convey an impression that the bird is still suspect there. My remarks covered the history of eight observations of this bird, hitherto pronounced as "doubtful", since the locality was remote from its known geographical range. I also referred to the discovery of a nest, with three eggs, described in the *Vict. Nat.*, March 1946, p. 210. This *proves* the bird to be a permanent denizen of the Buffalo Plateau and establishes an altitude record for the species. Since this nest was found, other accredited observers have confirmed the presence of Large-billed Scrub-Wrens at Buffalo.

In the same issue (under "Bird Notes on Rushworth", p. 235) I referred to the Lanceolated Honeyeater (*Plectorhynca lanceolata*), not often seen in Victoria, so perhaps some amplification of our observation is called for. Our little party missed the company of the late Mrs. Blanche E. Miller, who would doubtless have readily identified the bird. She always impressed upon neophytes in the field not only to have a second look, but a *third* one, and to seek proof if possible by at least two independent witnesses. Unfortunately, certification by a competent bird authority was not available, so our first record of the species at Rushworth must remain "not proven".

Those members privileged to watch for several minutes the three strange Honeyeaters together on the late afternoon of our arrival were charmed with their lively grace, their obvious relish of Rosemary Grevillea nectar, and their tuneful whistling. None had seen such birds before, so we asked John Williams, the young Rushworth bird enthusiast, for the strange birds' identity. After a closer look, he pronounced them to be "Speckled Honeyeaters" (local name) and that they had come there only in recent years as visitors. Looking up the bird books afterwards, and on further consultation with John, we ran the bird down as Lanceolated Honeyeater. A sharp lookout was kept during the remainder of our stay, but the birds were not encountered again.

Discussing this record later with Mr. A. G. Campbell, the mind-impression I gave him suggested that our diagnosis was likely to be correct. He had noted the species at Boort, much farther west. When at Bendigo several weeks subsequently I could not obtain from country members there any record of this bird in their district, but Mr. Marc Cohn remembered a Melbourne birdman telling him that some years back the species had been seen several miles east of Bendigo.

H. C. E. STEWART.

WHAT, WHERE AND WHEN

General Excursions:

Saturday, April 9—Granite, via Tallarook. Subjects: Scenic and Geology. Leader: Miss Jean Blackburn. Parlour coach from Batman Avenue, 8.30 a.m. sharp. Bookings, 14/-, with Miss M. N. Elder, 17 Adelaide St., Malvern (Tel. U 7297). Two meals.

Easter (April 15-18 inclusive)—Tallangatta. Subjects: Birds and Ecology of Area. Leaders: Miss M. L. Wigan and Mr. H. Stewart. Train from Spencer St. 7.50 a.m. on Good Friday. Total cost (rail and good hotel accommodation) £4/16/2, plus about 30/- for possible local excursions to Mt. Bogong and Mitta Mitta. Besides aquatic and bush birds, the district contains attractive native plants, and exotic trees will be in autumn foliage. Bookings for a limited party with Mr. H. Stewart (Tel. FU 022, -Extn. 457).

Saturday, April 23—Maranoa Gardens. Annual planting by members. Meet at 2.30 p.m. at main gates to Gardens in Kireep Rd. Take Mont Albert tram in Collins St., alight at Parring Rd. stop. Leaders: Maranoa Gardens Advisory Committee. A good attendance of members desired, with friends, especially those resident in the district.

Saturday, May 7—Monbulk. Subjects: Gully Tree-ferns and Fungi. Train from Flinders St., 9.18 a.m., to Upper Ferntree Gully, thence service motor to Monbulk. Bring two meals. N.B.: This excursion to be confirmed at April meeting, when full details will be announced.

Preliminary Announcements:

Saturday, May 21—National Museum. Subject: Australian Marsupials. Leader: Mr. C. W. Brazenor (mammalogist to Museum). Meet at Russell St. entrance 2.30 p.m. Names of intending excursionists to be registered with Mrs. M. Finches, 8 Thomas St., Brunswick.

Saturday, May 28—Mystery Winter Walk (approx. 6 miles easy going). Leaders: Mr. and Mrs. D. S. Lewis. Nash's bus from Batman Avenue, 9 a.m. Bookings, 7/6, with leaders, 77 Dendy St., Brighton.

Group Fixtures:

Saturday, April 9—Geology Group excursion to South Morang Hills. Take morning train to South Morang. Full particulars from Mr. A. A. Baker, 53 Carlisle St., Preston.

Tuesday, May 3—Geology Discussion Group. Royal Society's Hall, 8 p.m. Subject: "Geology Simplified, Part I," by Mr. A. A. Baker. Beginners welcome.

Thursday, May 5—Wildflower Garden Group. Royal Society's Hall, 8 p.m. Hon. Sec.: Mr. Harry Preston (Tel. MX 2211, Extn. 19).

Friday, May 6—Marine Biology Group. Royal Society's Hall, 7.45 p.m. Details from Miss W. Taylor, 13 Jolimont Sq., Jolimont, C.2 (Tel. MY 426), Hon. Sec. of Group.

Saturday, May 7—Geology Group excursion to Essendon Sand Pits. Subject: "Field Work of Part I." Meet at Essendon railway station, 2 p.m.

H. C. E. STEWART,
for Excursion Committee, F.N.C.V.

HEARD ISLAND VEGETATION

In 1874, Moseley ("Challenger" Expedition) landed for two hours on Heard Island and collected five flowering species and a few cryptogams—apparently the first botanical record for this lonely volcanic outpost. The tangible results of a year's recent work there by Australian scientists is regrettably meagre—poor samples of about a dozen different lichens and mosses only. Has some dramatic change overtaken Heard Island plants in the last 75 years?