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The Victorian Naturalist

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PROCEEDINGS

Members and visitors filled the hall at the National Herbarium to capacity on the occasion of the General Meeting on April 14. The President, Mr. J. R. Garnet, extended a welcome to guests from the Royal Australasian Ornithologists' Union and the National Parks Association.

At the invitation of Mr. Garnet, Mr. Hugh Wilson, President of the N.P.A., presented the Australian Natural History Medallion for 1957 to Mr. Charles E. Bryant. He commented on the relevant past activities of the recipient, including his editorship of the *Emu* for almost thirty years.

Two Honorary Members of the F.N.C.V. were present to receive their membership certificates. Mr. Garnet presented Mr. D. J. Dickison with his, and Mr. N. A. Wakefield made the presentation to Rev. A. J. Maher. The latter gentleman remarked that, though a Country Member since 1917, this was his first opportunity to be present at a General Meeting of the Club.

The subject for the evening was a series of colour slides, taken by participants on the Club's excursion to the Genoa district last December. A detailed record of the expedition is published in this issue of the *Naturalist*.

Nominations were received for Office-bearers and Council Members for 1958-9, the elections for which will take place at the Annual General Meeting in June. The President announced that Mr. C. J. Gabriel was the Club's nominee for the award of the Natural History Medallion for 1958.

The Secretary reported that, through the Maryborough F.N.C., an offer had been made to the Melbourne Club, by Mrs. Jean Nowlan, of twelve acres of land in the Parish of Maryborough, to be held in trust as a Native Plants Sanctuary. Mr. Coghill undertook to inspect the land and ascertain further details during a forthcoming trip to the district.

As regards National Parks, the Secretary told of Council's policy to work in close liaison with the N.P.A. Proposed parks near Bendigo and east of Mallacoota Inlet were receiving support, and three other proposed areas were being investigated further.

Dr. M. M. Chattaway agreed to act as a delegate to the A.N.Z. A.A.S. conference to be held in Adelaide from August 20 to 27. As the F.N.C.V. is entitled to three delegates, any other members who may be able to attend are asked to contact the Secretary.

It was reported that a working-bee would be held in the Club library on April 26, and those who have books out on loan are asked to return them or else give full particulars to the Librarian.

Messrs. B. C. Moore, Leonard H. Angior and L. B. Wallace were elected as Ordinary Members, Mrs. Vera Greaves, Mrs. J. E. Plant and Mr. Albert E. Hemley as Country Members, and Miss Hannah Parker as a Junior Member. All were welcomed by the President to the ranks of the F.N.C.V.

Mr. Garnet extended the best wishes of the Club to Mr. J. H. Willis, who was to leave shortly for England, to take up duty for the year as botanical liaison officer at the Royal Botanic Gardens.

After a series of nature notes and comments on exhibits, the Meeting adjourned for the usual conversazione.

NOMINATIONS FOR OFFICE-BEARERS AND COUNCIL FOR 1958-9

President: Mr. J. R. Garnet.

Vice-Presidents: Dr. W. Grogg, Mr. D. E. McInnes.

Honorary Secretary: Mr. F. H. Coghill.

Honorary Assistant Secretary: No nomination.

Honorary Treasurer: Mr. A. G. Hooke.

Honorary Assistant Treasurer: Miss M. Butchart.

Honorary Editor: Mr. N. A. Wakefield.

Honorary Assistant Editor: Mr. A. B. Court.

Honorary Librarian: Miss M. Argo.

Honorary Assistant Librarian: Mr. A. Burke.

Honorary Excursions Secretary: Miss M. Allender.

Council Members: Messrs. D. Lewis, A. J. H. Fairhall, Mrs. A. Osborne, Misses K. Thomas, M. Lester and F. Phillips.

URGENT MESSAGE FROM THE LIBRARY

A recent check on the Loan Book has disclosed that several members have books and other publications on loan beyond the regulation time of two months. The attention of members is drawn to F.N.C.V. By-law No. 10 (iii) which gives the Librarian power to impose fines and take action to recover overdue loans. However, the Librarian is prepared to waive this action if the members concerned return the books, pamphlets and periodicals in question within a reasonable time from the publication of this notice—by June 30, if possible, or by the General Meeting in August at the latest. Many of these publications have been requested by other members for some considerable time, and it is proposed to publish monthly lists of overdue loans as a reminder to the dilatory borrowers concerned. Among those books most in demand, and which are long overdue for return to the Library, are the following:

Geology of Australia, by Sir T. Edgeworth David.

Furred Animals of Australia, by E. Troughton.

Several books on insects and birds, by Froggatt.

Textbook of Petrology, by F. H. Hatch.

What Butterfly is That?, by Waterhouse.

The Librarian wishes to thank most sincerely the members who joined a small but energetic working-party recently, particularly in view of the fact that they sacrificed a fine, sunny Saturday afternoon to do so.

F.N.C.V. EXCURSION TO GENOA DISTRICT—DEC. 1957

By N. A. WAKEFIELD

The organization of a seven-day excursion by over thirty members of the Club to a distant corner of the State, required a considerable amount of early planning, and its successful accomplishment was in no small measure due to work by the Excursion Secretary, Miss Marie Allender. In June, accommodation was booked at the Genoa Hotel, for thirty persons, from Boxing Day evening until New Year's morning, and a 33-passenger parlour-coach was chartered for the week.

The project seemed ambitious, but the excursion was soon booked out; and thirty-seven persons eventually took part in it, there being two private-car parties camped at the Genoa River, and the writer, who acted as leader, stayed at Mallacoota.

During the week the weather was often overcast with a threat of rain. Quite often it did rain in the evening, but, except for December 31, the days themselves were fine.

Botany and ornithology received major attention, and there were some geologists present, but, as no entomologist accompanied the party, insects were accorded scant attention. However, after the previous Club excursion to Mallacoota, when nine members went there in 1929 under the leadership of Mr. V. H. Miller, insects met with were commented on by Miss J. Raff in a section of the report, "Excursion to Mallacoota Inlet", which appeared in the issue of this journal for February 1930 (*Vict. Nat.* 46: 209-10).

At the conclusion of the present excursion, participants were requested to record their impressions and to pass on notes to the writer for incorporation in a report. As a result, Mr. E. H. Coghill produced a general summary, Miss Helen Aston made a comprehensive bird-list, Miss L. M. White compiled an imposing list of the flora, Mrs. M. Davies wrote a geological report, and other data was supplied by Miss M. J. Lester and Miss E. Dixon. All this has been collated with the writer's notes and memories, to produce the following record of the expedition:

Thursday, December 26

As the writer had travelled to East Gippsland some days earlier, the main report of the day's doings are in the words of Mr. Coghill:

"About twelve boarded the bus at McKenzie's Garage in Kew, and the rest (to make thirty in all) joined in Flinders Street, whereupon we departed at 7.30 a.m., proceeding without incident, having morning tea at Warragul and lunch on the roadside near Bairnsdale. At Kalinna we stopped to admire the view at Lakes Entrance, and again stopped in the township for a short break. Near Orbost we turned aside for another view, the Snowy River Flats, with the railway running across them on a series of trestles. It reminded us

of the views from the railway from Cairns to Kuranda in North Queensland.

"There was tea at Cann River, where we met our leader, Mr. Wakefield, and were supplied with hot water by some of his local friends.

"From Bairnsdale on, many banksia trees, heavy with fruiting cones, were beside the road, also big clumps of a saw-sedge. We reached Genoa by about 9 p.m."

The plants Mr. Coghill refers to are the Saw Banksia (*B. serrata*), a conspicuous and attractive tree throughout the excursion area, and the saw-sedge (*Galinia clarkei*) which sometimes attains a height of about fifteen feet.

Mrs. Davies' comments on the country traversed are as follows:

"From Warragul to Rosedale we drove through the part of the Gippsland Plains which consist of Cainozoic sediments and are non-marine. These are made up of the lignites (brown coal), sands, clays and gravels. From Rosedale to Orbost the plains are marine, overlain by sands and gravels brought down by stream action. At Providence Ponds evidence could be seen of the so-called 'lake country' which meets the sea at Lakes Entrance. These Ponds are gradually drying up and being reclaimed by reeds and low hardy shrubby plants that can grow on old sand-dune soil that has not much humus.

"At Jemmy's Point near Lakes Entrance we saw a portion of the cliff-face where our late member Mr. F. Cudmore collected many specimens, which are now housed in our National Museum. On a hill-top before Orbost we were able to handle some Torrent Gravels that are a feature of East Gippsland Plains. According to Professor Sherbon Hills, these gravels were deposited by torrential streams and they contain pebbles of rock types that occur in the Eastern Highlands. They can be found up to 700 feet above sea level and probably represent rock waste derived from the erosion of the Highlands when preliminary movements of uplift took place in Pliocene times."

Friday, December 27

Some members were out early to look round the tiny township of Genoa. It consists of a hotel, garage plus café, store plus post office, school, hall, the homes of Forests Commission and Country Roads Board employees, and several scattered farm-houses. It is 323 miles by road from Melbourne, only ten miles from the New South Wales border, and thus almost half-way between Melbourne and Sydney.

In the latter part of the morning, the coach and cars took the party to a sedge-swamp, which borders Maramingo Creek, about six miles from Genoa in the direction of the border.

The surrounding forest comprises mainly Silvertop (*Eucalyptus sieberiana*), Yertchuk (*E. considniiana*), and Gum Myrtle (*Ango-*

phora floribunda). The last was particularly interesting, as it showed advanced buds and flowers, and members were able to see the pointed calyx-lobes and rounded petals which distinguish it from the eucalypts it so closely resembles. This tree is the sole representative of its genus in Victoria, and it is confined in the State to the Genoa-Mallacoota district.

Under the light forest coverage there was a great variety of shrubs and wildflowers, including numerous of the intriguing duck-orchids (*Calceana major*); but it was those that are restricted to this eastern corner of our State that interested the observers most. In this category there were the Narrow-leaved Geelung (*Persoonia linearis*) with its remarkable laminated crimson inner bark, and the deep-mauve blossoms of the Hairy Fan-flower (*Scacvola ramosissima*).

An interesting discovery was the Variable Bossea (*Bossiaea heterophylla*) which is known in Victoria from only three other East Gippsland localities.

The "swamp" itself is of black peaty soil, saturated with water even in summer and covered with a dense sedge growth, mainly of Button Bog-rush (*Gymnoschoenus sphaerocephalus*—the well-known "Button Grass" of Tasmania) and a species of sword-sedge (*Lepidosperma limicola*) which was recently named by the writer (see *Vict. Nat.* 70: 75, August 1953).

The Tall Yellow-eye (*Xyris operculata*), two species of "Fairy Aprons" (*Utricularia dichotoma* and *U. lateriflora*) and the Slender Clubmoss (*Lycopodium laterale*) attracted particular attention; and at the same place there were numerous small plants of the Flax-leaf Heath-myrtle (*Baeckea linifolia*), another species which is restricted in Victoria to this far-eastern corner.

The three junior excursionists, Misses Helen Aston, Barbara Hooke and Rae Milton, who were away from the main party, succeeded in flushing three Ground-parrots (*Pezoporus wallicus*). This was certainly the highlight of the day, and it constitutes a new locality record for this rare bird.

Lunch was eaten by the bridge where the Prince's Highway crosses Maramingo Creek. There, a solitary Japanese Snipe was disturbed, some excellent views were obtained of the Gippsland Yellow-tufted Honeyeater, and, strangely enough, there were a few Rufous Songlarks in the light forest.

In the afternoon the vehicles made their way for about ten miles along a lateral road towards Wangrabelle, and the party walked down through the forest of *Eucalyptus numerosa* to a very attractive stretch of the Genoa River. A long reach of still water gave way suddenly to a great expanse of granitic rocks about which the waters tumbled and cascaded for several hundred yards with attractive pools here and there.

In a small lateral gully a number of White-naped Honeyeaters came down into the tall shrubs of Twiggy Heath-myrtle (*Baeckea*

virgata) to investigate the intruders, and the Hairy Skullcap (*Scutellaria mollis*) was growing about the ground. This last was discovered at Mallacoota by Mr. Miller's party just in time for its inclusion in A. J. Ewart's *Flora of Victoria* in 1930.

On one overhanging rock-face there was a square yard or so of the brood-combs of one of the Vespid paper-wasps (*Polistes variabilis*); but it was the variety of shrubs that attracted most comment. The Kanooka or "Water Gum" (*Tristania laurina*) was in flower, there were clumps of White Sallow Wattle (*Acacia floribunda*), "Tonghi Bottlebrush" (*Callistemon subulatus*) and White Kunzea (*K. ambigua*), and the several tea-trees included *Leptospermum emarginatum*. All these five are Gippsland species that are not found elsewhere in Victoria.

Other riparian shrubs about these granitic rocks included the Slender Westringia (*H. eremicola*), *Leptospermum obovatum*, Tree Lomatia (*L. fraseri*), Woolly Wattle (*Acacia lanigera*), Slender Tea-tree (*Leptospermum sericatum*) and the true Manuka Tea-tree (*L. scoparium**).

Here and there in the rock crevices were clumps of the recently named "Snowy River Daisy" (*Brachycome riparia*) which is always mauve-coloured along the Snowy but invariably white along the Genoa River.



Paper-wasps, Genoa River.

Saturday, December 28

This was a big day for the party, for the goal was fifty miles away, a little beyond Eden in south-eastern New South Wales.

The road is sealed for eight miles, from a little beyond Genoa just to the State borderline. We think this has been done by the Victorian Country Roads Board solely to impress those crossing the border, the Prince's Highway being gravel-paved from there to Eden; but, alas, it is gravel-paved also for over fifty miles on the other side of Genoa too, back into Victoria!

* This is a large-flowered, broad-leaved form, usually riparian and rather uncommon. It contrasts strongly with the widespread *Leptospermum juniperinum*, which has hitherto been confused with it. For further information on this and others of the genus which are mentioned in this report, see *Vict. Nat.* 72: 43-7 (July 1955).

A stop was made between Narrabarba and Kiah at a spot which the writer considers was collected over by Baron von Mueller during his expedition to the Twofold Bay-Genoa district in September 1860. It seems to be the origin of the "Womboy'n Ranges" of his published reports and specimen-labels.

The place was an elevated, almost level tract of the ridge country, with a soil of coarse white sand and fine quartz gravel, and its botanical interest may be gauged from the fact that the following plants were seen in a fifty-yard radius.

There were *Banksia spinulosa*, which does not occur in Victoria; Sticky Bush-pea (*Pultenaea viscosa*), Finger Hakea (*H. dactyloides*) and completely prostrate plants of the so-called "Tall Cone-bush" (*Isopogon anemonifolius*), each of which is known from only one Victorian locality; *Gompholobium glabratum*, *Conospermum taxifolium* and *Bossia ensata*, none of which is in our published *Census of Victorian Plants* though each is now known to occur in the State; and similar rare East Gippsland species such as Clustered Poranthera (*P. corymbosa*) and Beardless Bog-rush (*Schoenus imberbis*).

The coach was taken about a mile along a lateral road, where a fine panoramic view was obtained of the environs of Eden. The town is situated on a peninsula between Nullica Bay and Calle Bay, which together comprise the aptly named Twofold Bay. On an outcrop of rocks below the road at the stopping-place, there were several clumps of Rock Orchid (*Dendrobium speciosum*), a species that reaches Victoria only in the Genoa-Mallacoota district.

When the town was reached, most of the party walked almost to the end of the headland, where a gale-force wind made it difficult to keep one's feet. There they saw thickets of the Bracelet Honey-myrtle (*Melaleuca armillaris*) and clumps of *Westringia fruticosa*. The latter is remarkable in that it reappears along the eastern coast of Tasmania but misses Victoria completely! In the Eden town area, there were trees of *Eucalyptus longifolia*, a species abundant from Narrabarba northwards but not native anywhere in Victoria.

Lunch was eaten behind the dunes of Calle Bay, and the vehicles then went on to Bellbird Creek, four miles northerly from Eden. This is a pocket of subtropical "jungle", and the party saw the palm-like *Ticghemopanax murrayi*, which was discovered there by Mueller in 1860 and named by him in honour of a local police officer. There was an abundance of Violet Mint-bush (*Prostanthera violacea*), and clumps of native fig-trees (*Ficus aspera*) perched on the brows of the creek-side cliffs. No *Ficus* species grows native in Victoria, nor does *Ticghemopanax murrayi* or *Prostanthera violacea*; in fact Bellbird Creek is the southernmost Australian locality for all three.

In the same jungle patch the Molucca Bramble (*Rubus moluccanus*) was abundant, there were trees of Gully Gum (*Eucalyptus smithii*) and shrubs of *Acacia subporosa* and *Pittosporum revolu-*

tum. All four of these reach Victoria only in far-eastern Gippsland. Birdlife was not much in evidence, but a lovely little Rufous Fantail was displaying itself in a clump of fig-trees.

Sunday, December 29

Mallacoota was the goal both for this day and the next. It is reached by fifteen miles of road that winds through a mixed forest mainly of Bloodwood (*Eucalyptus gummiifera*), Silvertop, Gum Myrtle and Saw Banksia. A White-necked Heron was seen on the Genoa River flats, and at Double Creek a colony of Bell-Miners was filling the bush with music.

Mallacoota is a scattered area comprising mainly commercial fishermen's homes, holiday houses, and shops which cater mainly for a large seasonal influx of tourists. The foreshore along the lake is attractive, with shortly grassed slopes, numerous trees — mainly Bracelet Honey-myrtle and Gum Myrtle, jetties and moored boats. Several miles away, across the lake, the Nadgee mountains (over the border) and the Howe Ranges comprise the skyline, while on the sea horizon further to the right one sees Gabo Island with a lighthouse at the southern end.

The party was divided into equal parts; half stayed on land and eighteen were taken aboard the *Fairlie*, a motor launch belonging to our local Country Member, Mr. Frank Buckland.

Under his expert guidance, the boat party set out to see the nest of a pair of White-breasted Sea-eagles, to visit two of the holdings across the inlet—"Fairhaven" and "Lakeview"—and to investigate the Goodwin Sands. The itinerary was almost completed when the boat's magneto declined to function further, and the *Fairlie* was towed home by another of the Buckland launches that was passing by at the critical time.

Meanwhile, the land party, under the guidance of the leader, made back towards the township. A Great Crested Grebe and a stately White Egret were seen in a reach of the inlet, and there were both Goldfinches and Greenfinches on the Star Thistles beside the road round the foreshore.

Some time was then spent in a little jungle pocket known as Shady Gully. There, the tiny Jointed Mistletoe (*Korthalsella opun-*



Funnel-web's Lair in Log.

tin) was seen parasitic on trees of Lilly-pilly (*Eugenia smithii*). This mistletoe has a wide distribution, extending from tropical Africa, Madagascar and Mauritius, through southern Asia and Indonesia, to Australia. In this continent it occurs in all mainland States, one of its localities being Cooper's Creek in South Australia. *Korthalsella* was first found in Victoria near Orbost, by Mr. F. Rohlfus, in about 1936, and it occurs also in the Cann River valley, always on Lilly Pilly trees in these areas.

In Shady Gully, some of the party were fortunate enough to see the Black-faced Flycatcher, and other birds there included a solitary Satin Bower-bird and a Nankeen Night Heron. Finally, two of the lovely hanging nests of the Brown Warbler (*Gerygone richmondii*) were located, one twenty feet up in a Lilly-pilly tree and the other in a Musk Daisy-bush (*Olearia argophylla*). At the latter, the usually elusive little birds allowed themselves to be viewed satisfactorily.

One episode in Shady Gully could hardly be described more aptly than in Miss Lester's report:

"Though the Sydney Funnel-web Spider has been known in the Mallee district for only about twelve months, one of our party must choose to sit beside the granddad (or rather, grandmum) in them all. As she sat down on an old log she pointed to the spider's nest beside her. One man declared that it was the nest of a Funnel-web, but Miss Muffet sceptically replied that she had never heard of a Funnel-web nesting in a rotting tree. However, in feigned alarm, she moved to another log. As the informant continued to insist that it was a Funnel-web, the sceptic finally turned to Mr. Wakefield. His was a joyous response: 'Yes, a big one, too', and he proceeded to dig it out with a knife. The 'stocking' of close-meshed whitish web went down for about an inch, then turned at right angles along the grain of the log and continued for another five inches. The spider was in the toe of the stocking—a black, unprepossessing creature about 1½ inches across. Later, we turned up some half-inch specimens under bark on the ground, but they seemed rather unexciting when we already had the big matriarch securely boxed and pocketed."

Actually, there was a second moss- and lichen-covered log with evidence of occupancy by a Funnel-web Spider, showing an old tunnel mouth as well as a new one. These were left undisturbed, to be photographed later, this being done towards evening. The overcast sky added to the gloom of the jungle, and the needle of the exposure meter registered no movement at all. So the Kodak Super XX film was given a 10-second exposure with aperture at F16, and the result may be seen on the opposite page.

The occupant of this log was a female, even larger than the other—the largest specimen of *Atrax robustus* yet found in Victoria. A few days later, the writer came across a smaller example of the same species in the hollow butt of a small fallen tree in the Mount Drummer jungle.

The recording of these details, especially of the occupancy of jungle logs by this spider, makes a valuable supplement to the story of the species in last month's issue of this journal (*Vict. Nat.* 74: 174-8).

Between Shady Gully and the township there was a grove of Gum Myrtle on which there were growing examples of the wide-spread Common Mistletoe (*Phrygilanthus eucalyptoides*) and the uncommon Long-flower Mistletoe (*Dendrophthoe vitellina*), the latter with showy clusters of erect orange flowers. Here and there, actually parasitic on one or other of these mistletoes, were clumps of the Golden Mistletoe (*Notathixos subaureus*). It is interesting to learn that neither of the last two species grows anywhere in Victoria except about Malla-coota.

The land party lunched in the vicinity of the residence of Mr W. Hunter, another local Country Member of this Club, who was, unfortunately, laid up in the Bairnsdale Hospital at the time of the excursion. While the meal was progressing, a family of White-winged Choughs, which had been tamed by Mr. Hunter, came gliding down from the trees to be fed.

The coach proceeded then along the Betka Road to the bridge over the river of that name, and members walked along an extensive dune spit to find that the mouth of the river was cut off from the sea by a large deposit of sand. Several Red-capped Dotterels and four Hooded Dotterels were seen, and a Pied Oyster-catcher's nest was found with two eggs in it.

A short excursion was made amongst a surf-washed stretch of huge rocks, and, in the beach gravels, a few water-worn pebbles were found of the red Cabo Island granite which had been cast up there ten miles from their home location.

Members then traversed a band of scrub where the Coast Mistletoe (*Phrygilanthus celustroides*) was seen, growing on the Coast Banksia (*B. integrifolia*). This is another interesting East Gippsland mistletoe; it extends west to the Lakes Entrance area and is always parasitic on species of banksia.

The vehicles went on afterwards to the open heathlands which overlook the sea in the vicinity of the disused Malla-coota Aerodrome. It was interesting to see there numbers of isolated clumps of Bloodwood, growing like mallee-scrub, only several feet high but with clusters of "gum nuts" to indicate maturity.

Two orchid species were among the wildflowers — the Horned Orchid (*Orthoceras strictum*) and Large Tongue-orchid (*Cryptostylis subulata*). Also, there was a great abundance of *Spyridium cinereum*, an attractive little plant with a remarkable distribution. It was found there by Mueller in 1860 but was identified until recently with the Tasmanian *S. serpyllaceum*, and it is known otherwise only from a spot to the north of the Grampians.

Here and there were examples of another paper-barked geelung (*Persea lewis*) which has very broad pale-green leaves, and the

intriguing little Erect Violet (*Hybanthus vernonii*) the flowers of which seem to consist of but a single mauve petal. Neither of these two is found anywhere west of the Snowy River.

The sea-cliffs at this spot were extraordinary, and they are aptly described in Mrs. Davies' geological notes:

"Genoa is in granite country, then between the granite and the coast is Ordovician overlain some miles from the sea by Pleistocene and Recent sands, clays and alluvium. This Ordovician strata can



Eggs of Pied Oyster-catcher, Betka River.

be seen to advantage on a cliff-face near the aerodrome. This bastion of rocks is composed of slates and sandstones in all shades of reds and mauves, interspersed by layers of orange, white and, here and there, greys and blues. And all these layers upon layers have been twisted and contorted into synclines and anticlines, dips and verticals, by the tremendous forces of nature acting upon them."

Two of these masses of rock were actually great arches, with huge tunnels underneath, and the more daring members of the party who made their way through these passages, found in them a dozen or more nests of the Welcome Swallow.

On the heathlands there were Emu-wrens and Yellow-winged Honeyeaters in the clumps of bushes, and a pair of Black-shouldered Kites were hovering up above. There were exclamations of admiration when two White-breasted Sea-eagles went past, a little out to sea, and comment was made on the aptness of John Gould's description of these birds as resembling moths or butterflies.

Monday, December 30

Despite a ten-mile launch trip by Mr. Buckland the night before to borrow magneto parts, the *Fairlie* was finally declared out of action, but fortunately it was possible to hire another launch elsewhere, the *Bluchbird*, for the day's programme. Mr. Haase took charge of the land-party for the day, and those who had not been out on the water the day before, embarked with the excursion leader in the *Bluchbird*.



Gulls and Terns at Goodwin Sands

As the boat followed the channel round the islands adjacent to the township, the party saw three White Ibis and three Royal Spoonbills in the shallows. Cormorants were represented by three species—Black, Little Black and Little Pied, and there was a party of Hoary-headed Grebes on the water. Two White-breasted Sea-eagles were soaring aloft, and their nest was observed in a tall tree at the head of a small gully on the north side of the main lake.

Eight of the party landed on the Goodwin Sands, while the boat took the rest on a tour of the north-eastern reach of the lake. The Sands comprise some hundreds of acres, most of which was covered at the time by several inches of water, with two islands supporting a growth of salt-marsh vegetation and an occasional boobyalla and clump of honey-myrtle.

Birdlife was particularly abundant. Hundreds of Black Swans, a similar number of Grey Teal and many Coots were feeding in the shallows, there was a party of fifteen Eastern Curlews and a score of Pied Oyster-catchers, and on the sand-spits about twenty Pelicans and over thirty Little Black Cormorants were resting.

Investigation of the first island brought to light two large young of the Caspian Tern. These crouched amongst tide debris and trailing vegetation, depending on their camouflage, while the agitated parents screamed overhead. There were several small groups of



Young Caspian Tern at Goodwin Sands.

both the Little Stint and the Sharp-tailed Sandpiper, a number of Red-capped Dotterels ran here and there, and a few White-fronted Chats were flushed from the low vegetation.

For many years this first islet of the Goodwin Sands had been used as a breeding ground by Silver Gulls, but about four years ago these birds shifted to an island near the Mallacoota township. As the party paddled across the several hundred yards of shallows towards the second island, the concentration of birds about it made it obvious that it was serving its turn for nesting.

The vegetation was of short salt-loving grasses such as Coast Rat-tail Grass (*Sporobolus virginicus*), Bearded Glasswort (*Salicornia australis*), Creeping Brookweed (*Samolus repens*), and numerous tussocks of Knotted Club-rush (*Scirpus nodosus*). Every yard or so there were gulls' eggs in nests or mottled young ones crouched amongst the herbage. In the middle of this, a group of

PLATE I



At the Crested Tern Rookery, Goodwin Sands.

Above: Some adult birds on nests.

Below: Young bird and egg.

about a hundred Crested Terns had appropriated a few square yards of ground and their eggs and young were concentrated into it with only about a square foot for each family.

As the party looked these colonies over, a number of the larger chicks, both gulls and terns, took to the shallow water. The adult terns herded their young into a compact group, protecting them from possible attack by gulls, and began shepherding them back to the rookery. The adult gulls showed no such concern, and it was the opinion of some that they were likely to attack and kill those of their own young that had strayed from cover, so the party moved away from the nesting-grounds in order to minimize the disturbance.

As the group made its way back towards the rendezvous with the *Bluebird*, they saw a pair of Little Terns (*Sterna albifrons*) on a sand-spit. This species is a summer visitor to the eastern shores of Australia, breeding along the east Victorian coast as far west as the Gippsland Lakes.

At about 1 p.m. the *Bluebird* again reached Mallacoota township, where the coach and the other excursionists were waiting. After lunch, the Pied Oyster-catcher's nest was visited on the Betka sand-spit, and all went on then to the heaths and cliffs near the aerodrome.

A small party drove for a short distance and then walked a few miles along a track that more or less follows the coastline. A great variety of birdlife was seen, including Beautiful Firetails and Whip-birds in the tea-tree thickets, Emu-wrens and Striated Field-wrens in the heaths, a young Horsfield Bronze-cuckoo, and a pair of Sacred Kingfishers visiting a nesting hollow with food.

Tuesday, December 31

The day was spent along a twenty-mile stretch of the Prince's Highway, between Genoa and Mount Drummer; and though intermittent heavy showers soaked many to the skin, the ardour of the excursionists refused to be damped.

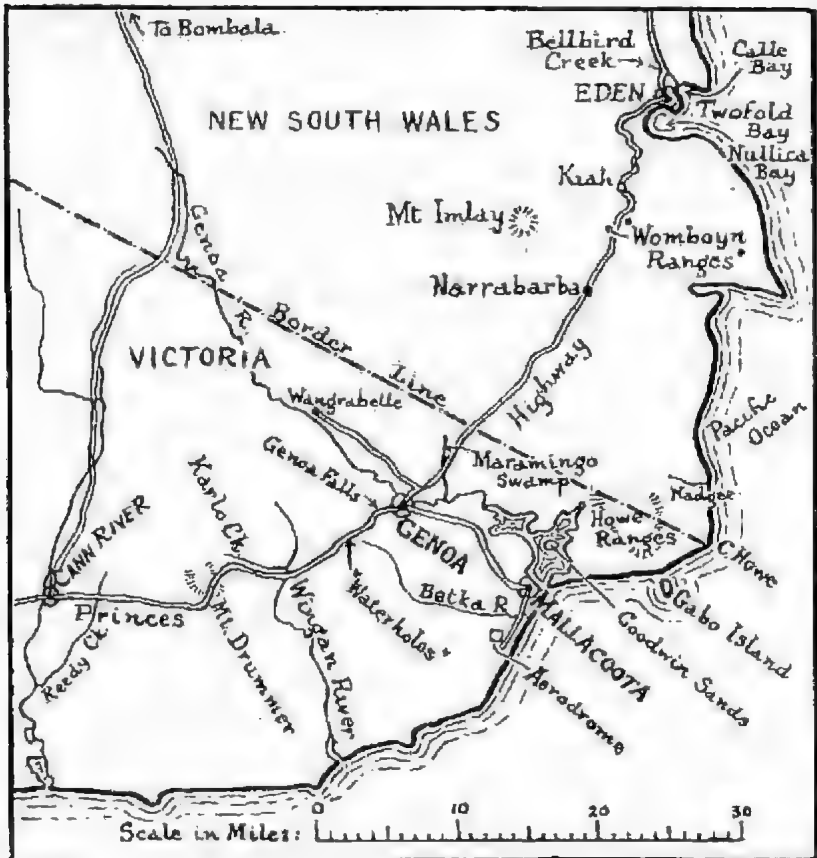
The first halt was at Genoa Falls, where a small creek has carved out a spectacular little gorge in the granitic rock—a flat, bare slope surrounded by walls, ledges and great blocks, decorated with shrubs and masses of ferns.

Again the party saw Forked Sundews and Fairy Aprons; *Kanookas* were in flower, and clumps of Streaked Rock-orchid (*Dendrobium striolatum*) were here and there on the rock-faces. On a ledge there was a tuft of the rare Rough Maidenhair (*Adiantum hispidulum*), the species that makes the frontispiece of the Club's fern book. At this spot, Miss Allender made a collection of mosses and lichens, fifteen species in all, and these are listed in the appendix to this report.

A few miles on, a halt was called to see the attractive Purple Goodenia (*G. barbata*) flowering beside the road, and a solitary tree of yet another paper-barked geebung (*Parsoonia lucida*) was

inspected. It was the discovery of this latter specimen, by Mr. W. Hunter in 1940, that added the species to our census of the Victorian flora.

Further along were the "water-holes", an area where treeless tracts alternate with clumps of Silver-leaf Stringy-bark (*Eucalyptus cephalocarpa*) and the paper-barked *Leptospermum attenuatum*.*



General Map of Genoa District.

The open areas were mostly covered with short sedge growth (*Cyperaceae*) and rushes (*Restionaceae*), alternating with stretches of Spear Grass-tree (*Xanthorrhoea hastilis*). Yellow-eyes (both *Xyris operculata* and *X. gracilis*) were abundant, as well as the Spike Goodenia (*G. stelligera*) and the Rush Lily (*Sowerbaea juncea*).

* In Victoria this species is confined to the near-coastal country east of the Snowy River, though its name has been used hitherto for the widespread *L. scribneri*.

An interesting discovery was a number of tufts of a guinea-flower (*Hibbertia rufa*), a species recently collected by Mr. J. H. Willis at Reedy Creek near Cann River and named by the writer, but not found, prior to the F.N.C.V. excursion, anywhere else in Victoria.

One member located a bird's nest, probably of the Brown Quail—a depression in the ground containing four empty egg-shells. The young ones had left the nest immediately they were hatched and so there had been no need for the parents to remove the shells.

At Wingan River, further observation was made of birdlife. There were a pair of Whistling Eagles and a flock of fifteen Wood Duck; an Eastern Shrike-tit and a party of Yellow-winged Sittellas were seen in the trees, and in the distance there was a very vocal flight of Pied Currawongs.

At Karlo Creek, lunch was eaten in the coach while rain poured down outside, but members favoured going on to Lind Park (Mount Drummer) nevertheless.

A dozen of the most intrepid donned waterproof garments and went down below the highway at the 305-milepost, into the wonderland of Blackwood (*Acacia melanoxylon*) and Lilly-pilly, gigantic "monkey-ropes" of Water Vine (*Cissus hypoglauca*), and the medley of ferns.

In one spot there were the five Victorian species of tree-ferns, including the great Skirted Tree-fern (*Cyathea marcescens*) which was unknown to science until its discovery there by the writer in the early 1940's. There was a great abundance of Creeping Shield-fern (*Lastreopsis microspora*) and Prickly Tree-fern (*Cyathea leichhardtiana*), both of which were added to our Victorian Census when discovered at Mount Drummer by Mr. F. Robbins about twenty years ago, and neither of which is known from anywhere further west.

Along the little creek where huge fern-clad Kanooka trees, reminiscent of the Myrtle Beeches of the mountains of central Victoria, and here and there was the Gippsland Waratah (*Telopea orcadoides*) growing to tree size. A full account of the Mount Drummer jungle may be found in *Vict. Nat.* 70: 12-15 (May 1953).

Again, Miss Allender gave attention to the "lower" plants, collecting the mosses and fungi indicated in the appendix: and she found too a beautiful little amber land-shell that Mr. C. J. Gabriel identified as *Helicarion caviari*.

Leaches were particularly active, owing to the wetness of the foliage, and they took advantage of our visit so avidly that the question has since been asked, "What do they live on when there are no field naturalists about?"

The coach returned to Genoa in good time for members to make preparation for the morrow's 320-mile run back to Melbourne.

APPENDIX

Cryptogamic plants collected by Miss M. Allender on December 31, 1957, and identified by Mr. J. H. Willis:

Genoa Creek Falls

Lichens: *Thysanothecium hyalinum*, *Cladonia aggregata*, *C. macilenta*, *C. pyxidata*, *C. verticillata*, *Parmelia perforata*, *Stereocaulon ramulosum*, *Usnea ceratina*.

Mosses: *Polytrichum juniperinum*, *Dicnemoloma sieberianum*, *Dicranoloma hillardieri*, *Macromitrium Parcheri*, *Hedwigia imberbis* (new to County), *Tortella calycina*, *Campylopus clavatus*.

Mount Drummer Jungle

Fungi: *Trametes lilacino-gilva*, *Polyporus rufidum*.

Mosses: *Papillaria flavo-limbata*, *Fissidens pallidus*, *Ptychomnion veinure*, *Pterygophyllum dentatum*, *Rhizogonium spiniforme*, *Leucobryum caudatum*, *Camptochaete ramulosa*, *Thuidium furfurosum*, *T. laciniusculum*, *Acanthocladium extenuatum*, *Hypnodendron arcuatum*.

MICROSCOPICAL GROUP

At the meeting of this Group on April 16, Mr. C. Middleton explained how to get the best out of an ordinary microscope. With the help of his micro-projector he demonstrated the differences between the ordinary achromatic objectives and those of the apochromats. He discussed, too, the various sub-stage condensers, illuminating lamps, setting up and adjustments.

On May 21 the meeting will be a group effort on the mounting of insects and parts thereof, as a practical demonstration. Those with experience in this are asked to bring along apparatus and to pass on knowledge to others. This will be appreciated very much as such is far more enlightening than textbook study.

WHAT, WHERE AND WHEN

F.N.C.V. Meetings:

Monday, June 9—Annual General Meeting and Presidential Address.

F.N.C.V. Excursions:

Sunday, June 8—Schubert's Nursery, Bowmore Road, Noble Park. Take 1.37 p.m. Dandenong train from Flinders Street to Noble Park, or meet at 2.20 p.m. at station.

Group Meetings:

(8 p.m. at National Herbarium, unless otherwise stated.)

Friday, May 16—Botany Group. To begin at 7.45 p.m. with "Botany for Beginners", by Mr. A. J. Swaby. Subject for evening: "Growth Along a River", by Mr. W. L. Williams. There will be someone at the corner of St Kilda and Domain Roads at 7.40 p.m. to accompany members to the Herbarium.

Wednesday, May 21—Microscopical Group. (See details above.)

Monday, June 2—Entomology and Marine Biology Group, in Mr. Strong's rooms in Parliament House at 8 p.m. Enter through private entrance at south end of House.

Wednesday, June 4—Geology Group Subject: "Living Fossils", by Mr. Nielsen.

—MARIE ALLENDER, Excursion Secretary,
19 Hawthorn Avenue, Caulfield, S.E.7

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PROCEEDINGS

Mr. J. R. Garnet presided at the General Meeting of the Club held at the National Herbarium on May 12. It was announced that extra copies had been published of the *Victorian Naturalist* for May 1958 so that they would be available for purchase by those who wished to have the full record of the recent F.N.C.V. excursion to the Genoa district.

The Meeting was informed that the remaining stocks of Miss Jean Galbraith's *Wildflowers of Victoria* were to be disposed of by the publishers, and it was decided that this Club should purchase the stocks on Miss Galbraith's behalf, pending a decision as to what should be done with them.

The subject for the evening was a talk entitled "How to Collect Insects", by Mr. A. N. Burns of the National Museum. He showed a series of coloured slides of typical country likely to produce good results from a collector's point of view. After answering several questions, Mr. Burns was thanked by the President for his interesting and informative address.

The President reported that the Moomba Nature Show had been very successful. From it, £50 had been donated to the Lord Mayor's Fund, and approximately £150 had been put aside as working capital for next year's show.

The Secretary announced that a letter had been received from the Forests Commission, advising that 950 acres of the You Yangs had been set aside as a Forest Park. There was a report, too, of steps taken to deal with foxes in Sherbrooke Forest and of plans to protect lyrebirds' nests with fences.

Several new members were elected to the F.N.C.V. Mr. Ronald B. Thompson, Mr. Reginald Thurgood, Miss Gladys M. Leslie and Miss Patricia M. Carolan became Ordinary Members; and Mr. R. B. Price and Mr. T. M. Thorn were elected Country Members.

An appeal was made by the committee organizing the next Club Nature Show, asking members to make an effort to provide an entomological section showing life histories of common garden insects, spiders and such.

Miss M. Elder conveyed to the Meeting the greetings of the Portland Club, which she had visited recently; and the President thanked several contributors to the recently established Club Improvements Fund. After several nature notes and comments on exhibits, the Meeting was adjourned for the usual conversazione.

EXCURSION TO POINT LONSDALE

On January 19, the writer led a Club excursion to the Point Lonsdale district. About thirty members made the journey by parlour-coach, and the leader met the party at Marrus Hill State School. A stop was made to see the general layout of the district, with the former islands, which are now Queenscliff and Point Lonsdale, the filled ground behind them with Swan Bay and a string of lakes still holding water, and the Rip and the Mornington Peninsula beyond. It was mentioned that the vegetation appearing along the roadside, banksias, acacias and an occasional grass-tree (*Xanthorrhoea australis*), was formerly characteristic of the whole area, the "tea-tree" scrub—mostly *Leptospermum laetivatum*—having taken possession within living memory.

Next stop was at Laker's shell works, where the deposits of semi-fossil shells, which are dug for lime and shell-grit, were examined. As stated in E. D. Gill's "Geology of the Queenscliff and Point Lonsdale Area",* the shells are all of well-known modern species, though mostly mud-loving types, not reef forms such as are now prevalent in the exposed area from Queenscliff outwards.

From there the party visited the salt lake, where the shell is washed, ground and bagged, pausing on the way to see a stand of *Phalaris tuberosa*, the grass which can cause "phalaris staggers" in stock under conditions of cobalt deficiency.

Lunch was taken at the leader's cottage, and afterwards a group of enthusiasts visited a few vacant allotments where some of the native vegetation has been preserved in this very urbanized area. Very few flowers were noticed, but the characteristic leaves of the Running Postman (*Koeleria prostrata*) were very common and some hakeas and other shrubs were observed.

The weather had become bitterly cold, but nevertheless a visit was then made to the Lonsdale Reef. Many interesting specimens were collected in the rock pools, including a sea anemone, which was green instead of the usual reddish shade, and a sea elephant. These were displayed in a portable aquarium, thoughtfully brought by Mr. McInnes, and ultimately restored to the sea.

As reported at the February meeting, a black swan was observed standing among a group of gulls on a portion of the reef entirely surrounded by deep water of the open sea.

The cottage was again visited for afternoon tea, and the party returned to Melbourne.

—E. H. COGHLEN

F.N.C.V. LIBRARY: OVERDUE LOANS

The following titles are urgently required for checking and reissue, as they are asked for constantly. Would those holding them please return by June 30 if possible or by the August General Meeting at the latest.

Origin of Continents and Oceans.

Catalogue of Minerals—G. E. English & Co.

Guide to the Collection of Fossils in the National Museum

Pebbles, by E. J. Dunn.

The Story of the Heavens, by R. Bull.

Prodromus of Palaeontology in Victoria, by McCoy

The Building of Australia, by W. Howchin.

Central Australia, by C. T. Madigan.

Physiography of Victoria, by E. S. Hills.

Coal and its Story, by E. A. Martin.

Geology of New Zealand, by J. Park

The Star World, by A. G. de la Crommetin

Through Space and Time, by J. Jeans.

The Natural History of Clay, by Searle.

* *Vic. Nat.* 65: 38 (June 1948)

A TRIBUTE TO CROSBIE MORRISON

By J. R. GARNET

Philip Crosbie Morrison was educated at University High School and the University of Melbourne where, in his first year, he won the Baldwin Spencer Prize as the student who showed the greatest ability and promise in practical zoology. Later, he was awarded the Godfrey Howitt Natural History Scholarship in Zoology and took out his degree in science with final honours in zoology. In continuance of his academic studies he took part in the 1925 Barrier Reef Expedition and finally won his Master's degree. Other expeditions for biological research in which he took part were to Central Australia and, in more recent years, across the Nullarbor with Sir Russell Grimwade.

He was an admirer and disciple of Dr. Leach, and of Donald Macdonald whose writings as a naturalist were familiar to those of us who were old enough to read the *Argus* during the first two decades of this century. He, in fact, reported for the *Argus* in his early years and perhaps, in this way, discovered in himself his flair for journalism. He was then unknown as a natural history writer, for the field was well covered by men of the experience and calibre of Charles Barrett and Alex. Chisholm.

However, when Sir Keith Murdoch was seeking a young man to produce a periodical natural history magazine, he was persuaded by Sir Russell Grimwade that Crosbie Morrison was the man for the job. Thus, in 1939, Australia's *Wildlife Magazine* was born—in a year quite unpropitious for a publication of the kind which most journalists would have believed to be a luxury. In those grim years luxury it may have been, in other hands, but under the editorship of Morrison and with the substantial resources of the *Herald* behind it, it prospered beyond expectations, quite evidently fulfilling a real need in this country.

It is a tribute to its editor as much as to its contributors that it survived those years of the Second World War and, for some years more, the death of Sir Keith Murdoch, who had been prepared to write off the financial loss which accompanied its publication during the post-war inflationary period. During the fifteen years of its publication, the concepts of nature conservation crept into the minds of large numbers of Australians who hitherto had given little thought to matters of that kind. One may well believe that, in those years, there were few homes in which *Wildlife* was quite unknown and to the occupants of which its editor was not more than a name. His Sunday evening radio session was something quite unique and, when it became a sponsored programme, there was no lack of competition for the sponsorship. That its popularity was not entirely due to the magazine is evident from the fact that it continued for some long time after the demise of the journal.

Unfortunately, his resumption of an association with his old paper, the *Argus*, was brief because of the disappearance of that paper from the Melbourne scene, but his talents as a broadcaster were an assurance that the theme of nature protection would still be kept before the public. Through the medium of radio he was known, literally, to the people of a whole continent.



By courtesy: Melbourne Junior Chamber of Commerce.
The late P. C. Morrison.

His nature study broadcasts to schools, through the Australian Broadcasting Commission, have helped to sow the seeds of a love of nature in the consciousness of many an Australian child. At the time of his death he was preparing a series of television programmes with the same objective. Another of his educational activities was the series of lectures on nature study and elementary biology delivered under the auspices of the Council of Adult Education. His classes were always popular and were packed with adult pupils eager to learn something of the fascinating story of natural history. During the war he undertook lecture tours for the military authorities and, at remote camps in the South Pacific area, his talks on nature topics were something more than a pleasant diversion from the asperities of army camp-life.

He was a gifted speaker—one who was able to present his subject in a pleasant and "down-to-earth" manner, always with an infusion of humour and apt allusion. It was inevitable that with such a talent

there should be many calls upon his time, calls which he rarely refused.

Crosbie Morrison was also a keen photographer, whose enthusiasm and skill in nature photography was often revealed in *Wildlife* and appreciated too by those who had the pleasure of listening to his illustrated talks and lectures. Some measure of his enthusiasm may be gauged from the size and weight of the equipment he carried on expeditions such as those he undertook with the R.A.O.U. To carry around a pack of cine cameras, tripods and other instruments, avowed by his companions to weigh little short of one hundred pounds, was no mean feat. This kind of pack accompanied him during his scrambles around and on Ayers Rock!

His interests were by no means limited to natural history. Music and literature found ample place in his hours of leisure and, endowed as he was with an excellent memory, he was rarely at a loss for an apt quotation. He was one of that team of knowledgeable people who answered all sorts of questions and provided some quiet fun to radio listeners in years gone by in the session called "Information Please". However, it is as a member of our own Club—the Field Naturalists Club of Victoria—that he was best known to us.

He was admitted to membership in July 1918 on the nomination of the late Mr. George Coghill and our present Honorary Member, Mr. A. D. Hardy, and for a short term—from June 1919 to January 1920—he acted as the Club's Honorary Secretary. His membership was later allowed to lapse, but in August 1937 he rejoined and for the two years 1941-2 and 1942-3 became President, continuing until June 1945 as a member of the Club's Committee. It was during this period that he was in his heyday as the great publicist of natural history and nature conservation. Through *Wildlife* and the Wildlife radio session which was listened to eagerly throughout the length and breadth of the Commonwealth and beyond—in New Zealand as well—Crosbie Morrison became a household name to hundreds of thousands of Australasians and, more than that, he influenced a high proportion of them to think sympathetically and understandingly about the world of nature and to give thought to the concepts of wildlife protection and conservation. In recognition of his sterling work in this field he was awarded the Australian Natural History Medallion for 1947, an award for which he had, for some time past, consistently refused to accept nomination because, as he explained, there were other and older men worthy of the award who should take precedence of him.

With the commencement of the long campaign for improving the administration of our national parks, Crosbie Morrison lent the full weight of his influence and support. He used his magazine and broadcasts to further the cause whenever opportunity presented itself. He acted as Chairman of the several conferences of the combined societies when they met to plan the campaign and, whenever

a deputation was needed to press home a point in political circles, he could be relied upon to lead it with distinction.

It was inevitable that he should have been elected as first President of the Victorian National Parks Association in 1952, an office which he held until the time of his appointment in May 1957 as Director of National Parks, the chief executive officer of the Authority he had helped to bring into existence. It is indeed unfortunate that the Victorian National Parks Authority should have lost, so soon after its establishment, the services of one who still had much to contribute for the betterment and development of the nature protection reserves of this State.

For some years past he has taken an active interest in the activities of the National Museum (to the Board of Trustees of which he was reappointed earlier this year). He was a past President of the Royal Society of Victoria and, for many years, a member of its Council, a member of the Committee of Management of Wilson's Promontory National Park up to the time of his appointment as Director of National Parks; Chairman of the National Parks and National Monuments Standing Committee of the combined natural history, out-door recreational and educational organizations and President of its successor, the National Parks Association; a member of a number of other well-known natural history clubs and societies, both Victorian and interstate; and a member of several social clubs such as the Savage, Beefsteak, Bread and Cheese and Melbourne Rotary.

All of these made calls upon his time, but through them he gathered together a tally of friends in all walks of life and in all parts of the Commonwealth—friends who, in mourning his death, remember him as a knowledgeable, genial and friendly gentleman whose passing on March 1, 1958, is a loss that we can ill afford.

In the minds of all of us there are already memorials to Crosbie Morrison, but the writer of this valedictory who has worked in close association with him for many years believes that the greatest tribute that we can pay to his memory is to strive to continue the kind of work he did so well, that of bringing to the people of this great country a knowledge and appreciation of its remarkable flora and fauna, to develop in the public a frame of mind which will lead Australians to not merely tolerate the presence of such oddities but to strive eagerly for their protection and conservation in the environment that nature has evolved for them.

If we want another and more tangible memorial our Club may call upon his one-time listeners and readers for contributions to a fund which can be devoted to the task of carrying on from where Crosbie Morrison left off.

As a Club we are saddened by his death and so feel something of the grief that, so suddenly, has descended upon his family. To his widow and sons we offer our deepest sympathy and condolences,

NATIVE BURIALS AT GUNBOWER

By A. MASSOLA*

Almost half-way between Echuca and Kerang, set amidst rich grazing lands on the banks of Gunbower Creek, lies the peaceful township of Gunbower. The name itself is of aboriginal derivation, its original form being variously given as Gumbower, Gunbower and Kaubowro, but its meaning was quite clear: tortuous. This is a fitting name for the creek, as it takes innumerable twists and turns before rejoining the Murray.

Because of the abundance of water, fish and game were plentiful in this district, in fact it is still famed for duck shooting and fishing. It is therefore not surprising to find that the natives who originally owned it, the Joti-jota, were a strong, well-organized and powerful tribe, although as early as 1853 they had already been reduced to only thirty-five in number † They occupied the whole of the country on both sides of the Murray enclosed by a line from Cohuna to Echuca, then to Shepparton, some miles west of Tocumwal, then across the Murray to Tuppal, Conargo, Deniliquin, and back to Cohuna.

They traded, and fought, with the Taungurong to the south, as witnessed by the stone implements now found on their camping sites, the material for which originated at Mt. William, near Lancefield. Other implements on these sites appear to have come from the Western District, and possibly these reached the Joti-jota through the tribes west of them on the Murray.

Not very much is known about these people; however, J. T. Hinkins, who was manager of the Gunbower Station in 1845, left a diary, extracts from which were published in 1884 by his widow, under the title *Life Amongst the Native Race*. Apart from a single paragraph (which will be given in full later) from the pen of the distinguished naturalist W. Blandowski, this is the only first-hand information we have of the Joti-jota.

We gather from Hinkins that the natives' mode of life was of the usual Murray River pattern. They hunted kangaroos and other game, netted ducks, fished, and collected seeds and roots. The men were of fine physique, often well over six feet tall and built in proportion. The women were smaller and, at least when young, quite pretty.

Like all natives, they were very superstitious and credulous. They believed that death could not occur through natural causes, but that it was always due to the machination of some enemy, on whom vengeance must always be taken. The taking of kidney-fat was practised, the strangling-cord being used in this process. During their

* Curator of Anthropology, National Museum of Victoria.
† See *Letters from Victorian Pioneers*, p. 145.

initiation ceremonies the two front teeth of the upper jaw were removed. Hinkins also describes the ordeal to which a young warrior was subjected as a sequel to his having "stolen" a woman from the Goulburn Tribe (possibly the Taungurong Tribe). This ordeal consisted of his having to survive the attack of six men from the girl's tribe, who would in turn hurl clubs, spears and boomerangs at him. Fortunately, he was able to parry all this, and consequently, honour being satisfied, he was allowed to retain his prize, much to her satisfaction.

Regarding their burial habits, Hinkins states that he was present at the interment of an old man, and, as it is of some interest, his version is quoted here in full. He states that

they dug a grave five or six feet deep in a sandhill. They choose sand because it is not so much trouble to dig into. After digging the grave they laid sticks at the bottom of it. The body was then wrapped in an opossum cloak and laid on the top of the sticks in the grave. They then set up a most horrible howling, especially the lubras, and everyone threw something—a stick, rag, leaf, piece of skin, in short anything they had or could lay hold of on top of the corpse. It should be mentioned in passing that the lubras wear mourning, which consists in plastering the hair with white clay. One of their number—the "Medicine Man" whom I had named Billy Bull, made an oration over the spot, at the end of which he ran away howling, and I saw no more of him for two or three months. . . . After he left the grave the others filled it up with loose sand. . . . They have a custom of carrying about with them the dead bodies of their children till they rot away. One day I was much annoyed by a terrible odour coming apparently from the blacks' camp, and on enquiry I found that it arose from the dead body of a young child which the poor mother had wrapped up in her opossum cloak and fastened to her back, with the intention of carrying it about with her till the bones rattled.

Blandowski, who spent three months in this district at the beginning of 1857 and who could have given us some very good information, dismisses the natives with the following paragraph:

The Loddon Tribe or Gunbowers are of an athletic figure, wild, resisting civilization well; but even they diminish in numbers in a most deplorable manner. Nearly all of them now possess fire-arms. They live principally on *Jypha* or calamites roots, which they bake. In January they collect in large numbers to enjoy the fishing season on the Murray. Playing at sham-fights, is their amusement. In February they commence to fight in earnest with the neighbouring tribes, and have several hard combats. Their burial grounds are of a long oblong form, like their shields, and from 100 to 120 yards in extent.*

Lest the mention of fire-arms should cause surprise, it may be well to state here that in the archives of the Public Library there is a letter written "from the Native Camp on the Banks of the Yarra, 30th March 1840, by Assistant Protector Thomas", and addressed to Chief Protector Robinson, informing this latter gentleman that the natives (of the Yarra Tribe) were in possession of fire-arms which they obtained from settlers.

* *Trans. Phil. Inst. Vict.*, 2 (1857).

It seems clear from the above account that the natives, of this locality at least, chose a fairly large sand-hill and set it aside as a burial ground for the tribe's dead. It is possible that the spot was then shunned by the living, although it does not appear that the natives had much dread of going near graves, or even of handling bones. Still, it is very rarely that one finds occupational signs near these burial grounds.

Judging by accounts of burials further down the Murray, a hut of reeds was then erected over the grave and the dead man's fishing net spread over it. At times a slight brush fence was built around the grave and small fires were kept burning at the foot of this. It seems then, that someone, at least for a time, kept the grave in order. This someone was very likely the widow, or widows, of the dead man, and the caring for the grave would terminate with their remarriage. After this the grave would be neglected, and with the passing of a very few years the actual spot of burial would be forgotten. This may account for the finding of skeletons interred just above another.

Sand-hills are widely distributed in this locality, so the natives would have had no trouble in choosing one of the right dimensions and shape to use as a burial ground. Geologically these sand-hills are older than the present drainage system, as the courses of the Murray, Gunburn and Campaspe all cut through them. The sand of which they are composed consists chiefly of small particles of glassy quartz stained red by iron oxides. The hills appear to have been formed by wind action, possibly the sand being driven from the slight depressions which are always close to them and which appear to mark former water basins.

On Gunbower Island, on the left side of the Baggots Creek Road, about four and a half miles from Gunbower township, one of these hills is clearly visible. It is known locally as Rowlands Sand-hill, as it has belonged to this family for many years. At one time it must have been quite sizeable, and even now it extends at least 600 ft. by 200 ft., but erosion has cut it in two and has no doubt greatly reduced its area.

The hill we are concerned with is the north-easterly one. This is not very large, measuring 208 ft. by 156 ft. It is consequently an elongated oblong in shape (shield shaped), running north-east to south-west, and the characteristic depression, from which the sand possibly came, is on its north-western flank. The hill is now only about 5 ft. high at its highest point. At one time Murray Pines (*Callitris* sp.) grew on it, and it must then have been quite picturesque as well as shaded and cool, but all that is left of these now are a few half-rotted stumps. There is no question, however, that the hill must have been considerably higher at one time, as the Murray Pine stumps indicate; these have their main roots completely exposed.

Some years ago a 6-ft. irrigation channel was cut through this half of the sand-hill, further dividing it into two unequal parts, which we may call the northern and the southern quarter. On that occasion four human skeletons were found, but no details were observed. However, on January 13, 1955, Mr. E. Ferris of Gunbower noticed another skeleton on this southern quarter. The skull, right shoulder and some ribs had been partly exposed by wind action. Fortunately he has the inquiring mind of a naturalist, and in the present case his observation was of great help, for he carefully noted all he saw. He noticed that the skeleton was in the extended position, lying on its left side, but that the legs were bent at the knees and at right angles to the rest of the skeleton, with the feet at a slightly lower level than the head, which was pointing east. The head appeared to be cushioned on the left arm, facing south and slightly face down, with the left hand slightly under and behind the head. The right arm extended along the side, and at the rear of the body.

In close proximity to the hands were a number of artifacts and other objects, a list of which is as follows:

By the left hand—

- Axe head, 2½ in. by 2 in. of diabase, from Mt. William near Lancefield. This is a typical edge-ground axe from this locality.
- Axe sharpener (portion) of coarse sandstone, from the Grampians. (The groove in it fits the above axe perfectly.)
- Implement of unknown use, made of ferruginous slate, from Central Victoria; it is 7 in. long and 2½ in. across its greatest width. Possibly it was used in removing animal skins, as it looks akin to those found in South Australia and there used for this purpose. So far no implement of this nature has been reported from Victoria.
- 3 fragments of animal bones, 2 of which appear to be from the wing of a large bird.
- 9 small pieces of iron oxide (red ochre). These could have been obtained in the district.
- 5 kangaroo teeth (lower incisors).

By the right hand—

- Fragment of kangaroo leg bone, sharpened to a blunt point at one end. Could have been part of a nose-ornament.
- Fragment of freshwater mussel shell.
- 2 small pieces of wood.
- 3 pieces of the fibula of a kangaroo.
- 4 half lower jaws of the Silver-Grey Possum, *Trichosurus vulpecula*, (right-hand side only).
- 3 kangaroo teeth (lower incisors).
- 5 fragments of the double toe (syndactylous metacarpus) of the kangaroo.
- Fragments of milky quartz were strewn about in the vicinity—some in the grave, some on the surface.

The area was well searched, but nothing further was found. Mr. Ferris was good enough to send all the finds to the National Museum, where they are now deposited.

Upon examination by Professor Sunderland of the University of Melbourne, the skeleton proved to have belonged to a male aboriginal between 30 and 35 years of age. In this skull only one of the upper incisors was missing (the right central), and it must have been removed a long time prior to the death of the man, as the bone had completely healed. The first premolar (left) was also missing from the same jaw. The bottom jaw was in perfect condition.

During March 1955 the writer visited the locality and was presented with another skeleton from the same sand-hill. It had been unearthed by a local farmer while digging out rabbits, but no particulars were noted.

During this visit a trench 5 ft. wide and 70 ft. long, running north and south, was dug just east of where the skeleton was discovered by Mr. Ferris. Here I must record the invaluable help received from this gentleman and his two sons, as well as from Messrs. Jack and Jeff Rowlands, in digging this trench. However, nothing resulted from this work with the exception of a human molar, found at ground level, some five feet under the sand.

Exploratory pits were then dug on the other (northern) side of the channel, which, as remarked earlier, divides this portion of the sand-hill in two. Again nothing was found, with the exception of fragments of milky quartz, both on and below the surface. Digging was then started on the south-westerly portion of the sand-hill, beyond the eroded part. But although a very large amount of sand was moved nothing resulted from this work.

Back in Melbourne the second skeleton, previously mentioned as presented by a local farmer, was kindly examined by Professor Sunderland. It proved to be another male, between 30 and 35 years of age. In this skull the teeth were in perfect condition and none was missing.

During October 1957 Mr. Jack Rowlands was removing sand from the hill in which we had dug the trench (the southern quarter) and from which the two skeletons had come, when he noticed bones amongst the sand in his power scoop. Later examination (by Dr. Ray of the University of Melbourne) proved that he had disturbed three human skeletons, a male, a female and a child. Naturally, no burial details could be noted. However, he carefully collected all the remains and, refraining from scooping further, informed Mr. Ferris of what he had found. Together they did some exploratory work and discovered four more skulls just a few inches below the surface. There is no doubt that in a short while these would have been exposed by wind action. As soon as the smallest vestiges of the skulls became visible they very carefully covered them with bags and piled sand on top. Thus the skeletons were not disturbed in any way. A trunk-line call was then put through to the Museum.

The day chosen for the excavation had all the appearance of a feast day. People came from all around, and there was no lack of

PLATE II



Gunbower Excavations.

Upper: Figure 1.

Lower: Figure 2.

enthusiastic and willing diggers. The procedure of the digging was as follows:

First, a square 9 ft. by 9 ft. (enclosing the four skeletons) was marked out, the sides running with the points of the compass. This was to simplify the observing of the direction of the burials. The sand was then carefully removed, a sharp look-out being kept for any implements or bone fragments. As the skeletons became exposed they were carefully uncovered with hand trowels and brushes, and the soil was cut away from around them, so that they were left on raised sand platforms. The excavations were continued to the bottom of the sand, until the hard reddish clayey soil was reached. Unfortunately damp sand is not a solid base, and as the sun and wind were drying it, the sides of the pit and the plinths supporting the skeletons began to crumble, making it essential to work fast. This is the reason why the photographs do not show perfectly perpendicular sides to the walls of the pit or of the plinths, and why the sand was not sifted for implements as it was removed.

As already stated, the skeletons were only a few inches below the existing surface of the sand-hill. About 9 in. would be a fair estimate, although originally they must have been buried about 4 to 5 ft. deep. Three of the skeletons were in close proximity, one being placed on top of another, with a third close by and 3 ft. from the bottom of the sand, while the fourth was slightly more than 4 ft. away and 3 ft. 6 in. from the bottom.

This last skeleton, which I have labelled burial A, can be seen in the background in figure 1. It is the skeleton of a child, 6-7 years old, who had been buried in a flexed position, lying on the right side, with the head, which was cushioned on the hands, pointing north and facing west.

Burial B (seen in foreground of figure 2) is of a female about 40 years of age. She was buried in a flexed position, lying on her right side, with her head lying on her left hand and with the right hand over her mouth. The head was pointing south-east and facing north-east. Her teeth were badly worn, and most of her molars were missing, and they apparently had been for quite a while before death, as the bone of the jaws had healed. The incisors however, though worn, were all present.

Burial C (see middle cranium in figure 2 and just behind knee of burial D in figure 1) is that of a male about 20 years old. In this skeleton the skull had at some time been disturbed, presumably by a rabbit digger, and later reinterred. The facial bones and the lower jaw were missing, and the cranium, with a fragment of the upper jaw leaning against the right parietal bone, was placed on top of the ribs. The rest of the skeleton, however, had not been interfered with. It was lying on its right side, in the flexed position, directly above burial B, but facing in the opposite direction.

Burial D was that of a male about 30 years old. He had been buried in the flexed position, lying on his right side and with the

hands cushioned under his head. The head was pointing north-west, and originally it must have faced south-west, but the skull was found tilted in an unnatural angle looking north-west (see foreground of figure 1 and furthest skull in figure 2). The frontal bone of the skull had become detached at the coronal suture and it had slipped forward and downwards leaving the lower jaw behind. This most certainly was the result of pressure applied from above. As cattle graze on this property and seem to fancy this sand-hill to rest upon, I suggest that they are the responsible party, possibly walking over or resting upon the skull when this latter was within a few inches of the surface of the sand. This individual had perfect teeth and none was missing.

CONCLUSIONS

Upon examining the skeletons and the burial mode the following conclusions were reached:

The aborigines of this district had definite burial places, in which their dead, of all ages and both sexes, were interred. These burial places were on sand-hills chosen for their shape, viz. they had to be "shield shaped". The use of these burial places must have continued for some time after the occupation of the country by white colonists and the discontinuation of initiation ceremonies, as only one of the six skeletons examined, and this is a doubtful case, showed any traces of tooth evulsion. This was a practice these people indulged in, as witnessed by the writings of Mr. J. T. Hinkins. In his diary he states, "About this time my child shed two of her front teeth and the blacks, having a custom of knocking out the two front teeth of some of their children, thought that I had purposely done so to my little girl so that she might not eat emu, which was the only reason I could find for their doing so to their own children. . . . But they were quite delighted, exclaiming 'merri jig dat, pickaninni Jenny: now 'em like it black lubra.'" (Very good, little Jenny is now like a black woman.)

By "some of their children" Hinkins must have meant the male children, as it is only with the males that the two incisors of the upper jaw were knocked out at the age of puberty, during the initiation ceremony which was called *Narra-mang* by the Murray tribes. When this ordeal was over, and not before, they were permitted to eat of the flesh of the black swan, musk duck and the emu.

The undisturbed skeletons were all found to be lying in the flexed position and on the right side, but they pointed, and faced, in various directions, so apparently this was not deemed important. The one exception was the male skeleton which was found by Mr. Ferris. He was lying on his left side and in the extended position, although his legs were bent at the knees. This denoted that a little more trouble was taken in digging his grave, as it had to be made longer. Also he was interred with a number of implements and ornaments,

such as befits an important person. Moreover, one of his upper incisors was missing, suggesting that he had perhaps been initiated. Of course this latter characteristic could have been accidental, as one of the premolars was also missing from the same jaw. As a rule during initiation both incisors were knocked out at the same time, not at different periods. It is true that in some tribes only one of the incisors was removed, but Hinkins's account specifically mentions the removal of two by this tribe. Other accounts of nearby tribes agree with this.

As no caries were found in any of the teeth of the skeletons examined, one concludes that these people were not in permanent contact with white man, or at least with his food. As Blandowski stated, they were "resisting civilization well".

ACKNOWLEDGMENTS

But for the co-operation of Mr. E. Ferris, his two sons, and Jack and Jeff Rowlands, all of Gumbower, my attention would not have been directed to this burial ground. I am much indebted to them. I am also indebted to Professor Sunderland and Professor Ray of the Anatomy Department, University of Melbourne, for examining the skeletons and determining their age and sex.

NATURALISTS' NOTEBOOK

(Reserved for your Notes, Observations and Queries)

NARDOO NEAR MELBOURNE

In days gone by members of the Club with an inclination towards botany used to journey to Killy's Lagoon near the Yarra River beyond Kew to see Nardoo (*Marsilia drummondii*) growing naturally. Possibly the plant survives there still. There are probably a few other places within easy reach of the city where this interesting plant may still occur, but most of the spots known to naturalists of an earlier generation have passed into cultivation or some other form of occupation; consequently its presence anywhere near Melbourne's settled places is a matter worthy of note.

During his trip to Kiata last September the writer noted the plant in abundance along the roadside between Minyip and Dimboola, especially in the flat Murra Warra district, where it formed dense patches measurable in acres. It is not uncommon in pools and channels beside the Western Highway just beyond the Wimmera River crossing near Dimboola. However, it was a surprise to find the species flourishing as a luxuriant colony beside the bitumen of the Geelong Road near Laverton.

One scarcely looks for naturally occurring native vegetation on the Geelong Road, where, for miles on end, introduced grasses and weeds grow to perfection, yet, in this spot, quite near to the R.A.A.F. station with its cluster of houses and other buildings, it still survives in the company of a few other hardy (and rather uncommon) natives. A large number of Pussy-tails (*Philotus sphulatus*) and several robust Feather-heads (*P. macrocephalus*) were among the interesting native plants intermingled in the association. The last is now rare enough on the Plains to prompt the Native Plants Preservation Society to examine the possibility of having the small area enclosed as a protective measure. Whether this can be done will depend on its situation in relation to the Country Roads Board's plan for the re-modelling of this part of the Highway. It is a survival worth maintaining.

—J. R. GARNET

FAMOUS RED FLOWERING GUM

Some information about the famous Red Flowering Gum, *Eucalyptus trifolia*, which grows near the Club House of the Metropolitan Golf Club at Oakleigh, has been kindly supplied to me by the manager, and is included in the following notes for the benefit of the many readers who are likely to be interested.

Although this tree is showing signs of age, it did not die a few years ago as reported in some quarters and still blooms well. A report of an excursion to Oakleigh which appeared in the *Victorian Naturalist* for March 1933 (Vol. XLIX, No. 11) gave its age as 43 years, making its present age 67 years. The seed from which the late Mr. St John propagated the tree was originally collected by him from a well-known tree growing at Government House.

The Oakleigh tree is considered to be the largest and finest and must certainly be the most famous member of its species. Its height is given as approximately forty feet and its spread is about the same. Coloured photographs of the tree are sent all over the world, they have been used extensively for Australian publicity overseas, and several of them are in the ward-rooms of ships of the Australian, British, and American Navies. The colour of the flowers is a beautiful rich red.

The report referred to above states that records kept for a period of more than ten years showed that the tree always had its peak flowering period between February 11 and February 20. My information does not indicate whether this has continued to be so during the variable seasons of recent years.

Seeds from the tree have been propagated and grown in greenhouses in England. One plant which is reported to have paler blossom than the parent tree is so healthy that it has to be pruned to keep it within the limits of the greenhouse.

It is fortunate that this splendid tree is both appreciated and cared for by the management of the Metropolitan Golf Links. This tree is manured under instructions from experts of the Burnley School of Primary Horticulture.

—A. E. BROOKS.

WHAT, WHERE AND WHEN

F.N.C.V. Meetings:

Monday, July 14—Members' Night

Monday, August 11—"Looking at Birds", by Mr. Ralph Kenyon.

F.N.C.V. Excursions:

Sunday, June 29—Lyrebird excursion to Sherbrooke. Leader: Mr. K Halafoff. Take 8.55 a.m. train to Upper Ferntree Gully, then bus to Ferny Creek. Bring one meal and a snack.

Saturday, July 5—Geology Group excursion. Mineral Gallery at National Museum. Leader: Dr. Beasley. Details at Group Meeting.

Group Meetings:

(8 p.m. at National Herbarium unless otherwise stated.)

Friday, June 13—A special film night will be held by the Botany Group, with films from the State Film Centre. There will be somebody at the corner of Domain and St. Kilda Roads, to accompany those who wish it to the National Herbarium.

Wednesday, June 16—Microscopical Group. Subject: "The Use of the Microscope in Forestry Research", by Mr. H. B. Ingles, of C.S.I.R.O. Forest Products Division.

Wednesday, July 2—Geology Group. Subject: Minerals (native elements). Speaker: Mr. Cobbett.

Monday, July 7—Entomology and Marine Biology Group. Speakers: Miss Baalam, "Galls"; Miss Macfie "The Octopus". The meeting will be held in Mr. Strong's rooms in Parliament House, commencing at 8 p.m. Enter through private entrance at south end of House.

Note: Members of the Club are welcome to attend Group Meetings.

—MARIE ALLENDER, Excursion Secretary,
19 Hawthorn Avenue, Caulfield, S.E.7

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PROCEEDINGS

The Club's Annual General Meeting was held at the National Herbarium on Monday evening, June 9. The President, Mr. J. R. Garnet, occupied the chair.

The Secretary announced the death on May 29 last of Sir Frederick Mann, who had been a member of the Club since 1919. Members stood for a minute in silent tribute.

Minutes

The minutes of the last Annual Meeting of June 10, 1957, were confirmed on the motion of Mr. W. L. Williams, seconded by Mr. E. S. Hanks.

Announcements

Wildflowers of Victoria: The remaining stocks of Miss Galbraith's book had been purchased on the author's behalf and were being sold through the Club at 15/- per copy.

Nature Show: It was proposed to hold the Club's next show in spring 1959, at the Lower Melbourne Town Hall.

The President conveyed to members of the Club a general invitation to visit our Country Member, Mr. R. N. Auchterlonie, at his home at Narracan.

Annual Reports*

The Annual Report was read by the Secretary. It was adopted on the motion of Mr. E. H. Coghill, seconded by Mr. A. B. Court.

The Treasurer intimated that the Annual Accounts and Balance Sheet, as approved by the Finance Sub-committee and certified to by the Auditors, would be published in the July issue of the *Naturalist* and tabled for adoption at the following General Meeting.

Auditors' Report: Mr. W. P. J. Evans reported that the books were kept in excellent condition and the accounts had been found correct.

Election of Members

The following were admitted to membership of the Club:

As Ordinary Members—Mr. Konstantyn Himmelreich and Mrs. Laura Lowe.

As Country Member—Mr. Arthur R. Tinckam.

As Junior Member—Miss Nina M. Netherway.

* These are published in detail on pages 37-44.

Office-bearers and Council

The following were elected for the year 1958-9:

- President—Mr. J. R. Garnet.
 Vice-Presidents: Dr. W. Geroc, Mr. D. E. McInnes.
 Hon. Secretary—Mr. E. H. Coghill.
 Hon. Treasurer—Mr. A. G. Hooke.
 Hon. Asst. Treasurer—Miss M. Butchart.
 Hon. Editor—Mr. N. A. Wakefield.
 Hon. Asst. Editor—Mr. A. B. Court.
 Hon. Librarian—Miss M. Argo.
 Hon. Asst. Librarian—Mr. A. Burke.
 Hon. Excursion Secretary—Miss M. Allender.
 Council Members—Messrs. D. Lewis, A. J. H. Fairhall, Mrs. A. Osborne and Misses K. Thomas and F. Phillips.
 Hon. Auditors—Messrs. W. P. J. Evans and R. Davidson were reappointed.

General Business

Mr. A. J. Swaby tabled three motions seeking to have Council directed in the matter of its negotiations with Miss Galbraith in connection with the stocks of *Wildflowers of Victoria*. The President stated that Council was carrying out these negotiations in a satisfactory manner. The three motions were put to the meeting in turn and each was lost. However, the Secretary stated that he would give Miss Galbraith a detailed report of all discussion that had taken place at Council and General Meetings on the subject of the book.

Mr. Swaby moved that the General Meeting appoint a committee to examine and report on the Club's Articles of Association. Mr. W. L. Williams suggested that such a matter should be dealt with by Council. The motion was put and lost. The President intimated that Council would be happy to consider specific suggestions by any member for improvements to the Club's rules.

President's Address

In a brief address, Mr. Garnet drew attention to the five objects of the Club as set out in the Memorandum. He then itemized many matters that could be considered by members. This was followed by a set of excellent colour slides of Victorian beauty spots and some of the flora to be seen in them—an illustration of the necessity for preservation schemes.

Exhibits

Mrs. Baillie tabled an imposing display of gilled fungi, collected from round her home at Kalorama. Other exhibits included a flowering example of *Hakea lehmanniana*, which Mr. Swaby reported to be a novelty in cultivation.

SEVENTY-EIGHTH ANNUAL REPORT, 1957-8

The Club has had a year of quiet development. Membership on April 30 was 298 Metropolitan, 148 Country, 19 Junior, 22 Honorary and 4 Life Members—a total of 491. Also, there are 45 Subscribers to the *Victorian Naturalist*. The Lorne League of Bush Lovers has affiliated with this Club during the past year, bringing the number of bodies affiliated with us to sixteen. During the year Honorary Membership was conferred on the Rev. A. J. Maher and Mr. D. J. Dickison, both for long service.

Reference must be made to the passing of Mr. George Coghill, after a continuous membership of 75 years. Other losses suffered included those of Mr. P. Crosbie Morrison, Dr. W. J. Harris and Mr. J. J. Freame.

Dr. Wishart found it necessary to resign as Vice-President because of ill health. As this occurred in May, Council did not fill the vacancy, leaving it for the Annual Meeting to do so.

During the spring, the Club held a Nature Show in the Prahran Town Hall; this made a small profit, thanks to the generosity of the Prahran Council and, better still, evoked much interest. We also participated with many other kindred bodies in a Nature Show during the Moomba Festival in March. It was at first intended to hold another Club Show this spring, but it was decided that more time for preparation was required. Then there arose the question of clashing with the Moomba Show, which we hope will develop into an important annual function, and our next show, it is now announced, will be held in the spring of 1959.

A pilgrimage was held to the grave of Baron von Mueller to commemorate the centenary of his appointment in 1857 as Director of the Botanic Gardens.

Many projects for National Parks have been put forward. As recently reported to a General Meeting, Council has decided that, as a general rule, questions concerning Parks should be referred to the Victorian National Parks Association, and this Club should only move in such a case if some special need were to arise.

The Club took part in the agitation last year to have Sherbrooke made a National Park, and has also written to the National Parks Authority advocating the creation of Parks about the Snowy River Gorge, the Lower Glenelg and the Howe Ranges, and supporting a proposal, originating with the Bendigo Field Naturalists Club, for two parks in that area. We referred the proposal for a Park on the Campaspe and a question raised by the Wimmera F.N.C. with regard to Wyperfeld, to the National Parks Association. Another suggestion for a Park came from the Lorne League of Bush Lovers. We have asked for particulars. We also supported the request of the R.A.O.U. to the M.M.B.W. that the Upper Yarra Dam site should be planted with Australian flora.

Two other important projects, which, at the close of the year, were only in the embryonic stage, should also be mentioned.

Mrs. Nowlan, of Prestou, has offered the Club an area of about 12 acres at Maryborough, as a Wildflower Sanctuary in memory of her parents, the late Mr. and Mrs. Cosstick, of that town. Council is, of course, very interested. The Secretary has inspected the land and reported favourably on it, and a sub-committee has been appointed to go further into the matter.

The publishers of Miss Jean Galbraith's book, *Wildflowers of Victoria*, decided to retire from that business, and offered her their remaining stocks for about £150. Your Council, after consulting a General Meeting, bought this stock on Miss Galbraith's behalf. Details in this connection have yet to be arranged.

Efforts were made, without success, to get some worth-while research under way among Club members. Finally, your Council realized that an awakening of such interest must be spontaneous. It hopes that this will manifest itself in due course.

Finance is always a matter requiring careful thought. A proposal was put forward early in the year that subscriptions should be substantially increased. This move would obviously have been unpopular with many members, and on your Council's recommendation it was dropped. However, while our financial position is by no means precarious, there is obvious need for more money, and Council decided to urge members to increase revenue by a drive to increase membership and by the introduction of a "supporting membership" scheme. In addition, the need for capital expenditure in various directions, especially on the Library, is obvious and Council has appealed to members for donations to a "Club Improvements Fund", and that fund has been successfully launched. The late Mr. F. Cudmore left the Club a legacy of £100, which has been added to this fund.

Club publications continue to sell steadily. No major publication, apart from the regular issue of the *Naturalist*, was undertaken this year, but an article by Mr. K. Halasoff on Lyrebirds was reprinted as a pamphlet and is selling freely.

The Club must thank those who have maintained such a high standard of lectures throughout the year. Perhaps the most memorable were those by Mr. Halasoff which, as already mentioned, has been reprinted—by Mr. John Landy, on life with his schoolboys at Timbertop, illustrated not only with school photographs, but with some magnificent nature studies—and by Dr. M. Chattaway on "Those Odd Eucalypts" at a combined meeting with the Bendigo F.N.C.

Excursions:

During the year 1957-8, about twenty-eight Club or Group excursions have been held with an average attendance of about eighteen members. Many interesting places were visited and various subjects

studied, but the highlights of the year were the visit of the Bendigo F.N.C. in November, when combined excursions were made to the Altona Saltworks, Yellingho and the Healesville Sanctuary, and the week spent at Genoa, from December 26 to January 1, with trips to places of interest in the surrounding districts.

Botany Group:

During the last half of 1957, meetings were held at 514 Little Collins Street, to see if the more central position would suit members better, but it was decided that the Herbarium offered better facilities and the group returned there in 1958. Subjects discussed during the year were varied and included higher fungi, ferns, unwanted plants, native plants in cultivation, pea flowers, heathlands, etc. Mr. Swaby undertook a series of talks for beginners to precede each meeting, starting at the first meeting in 1958. These were much appreciated and several new members attended.

Geology Discussion Group:

Throughout the year the Geology Group has maintained a steady interest for those members of the Club who are concerned with this phase of natural history. Fossils, gemstones, ice-ages, igneous rocks, fossil plants, and recent literature, were subjects discussed at the meetings, and colour photography assisted greatly in the interpretation of excursions. Interest is increasing in the preparation of specimens in this section for identification under the microscope. Excursions to unknown areas (mystery excursions) are proving a valuable method for all to take part in observing the geology of the areas travelled over. The Group extends a cordial welcome to others in the Club to enjoy the interest in geology by attending the meetings and excursions.

Marine Biology and Entomology Group:

This combined group is now in its second year, and members are still showing a keen interest, the average attendance at meetings being twelve.

The first excursion during the current year was to the National Museum on Friday evening, July 12, 1957. This was an entomological night, and Mr. Burns, Curator of Insects, gave a very interesting talk, amply illustrated by cases of specimens. On Sunday, January 19, there was an excursion to Point Lonsdale under the leadership of Mr. Coghill. Members brought back many marine specimens of interest, and these were discussed at the February Group meeting. An entomological excursion was held at Wonga Park on Saturday, March 29; specimens of insect life were collected, and these were discussed by members at the subsequent group meeting. Unfortunately, by virtue of its nature, this group is

limited in the number of excursions it can undertake, as these are mainly confined to the warmer months.

As far as meetings are concerned, the Group is a little unfortunate in not having among those who attend regularly, any experts in either the field of entomology or of marine biology. However, it feels that this group has had quite an interesting year nevertheless

Microscopical Group:

This is probably as lively a Group as any. Its regular monthly meetings are well attended, the number present varying from twenty to thirty. In the Group, the traditions of the Microscopical Society survive, and discussions of techniques and practices in the use of optical systems and microscopy have been a feature of meetings.

Several meetings have enjoyed the benefit of talks by guest speakers who are recognized authorities in their professions. They are held under the Chairmanship of Mr. D. McInnes, with Mr. J. Walsh as Secretary—the latter in succession to Dr. R. M. Wishart.

A cordial invitation is extended to all members of the Club to join the Group at any of its meetings at the Herbarium on the third Wednesday of each month.

On behalf of the Council,

E. H. COGHILL, Hon. Secretary.

F.N.C.V. LIBRARY: Overdue Loans

Members who have borrowed publications from the Librarian during and prior to April of this year, are reminded that these loans are now due for renewal or return. A further list of overdue loans is published below to remind members who may have overlooked their obligations with regard to prompt renewal or return after two months:

- The Ocean*, by Gosse.
- Geology for Beginners*, by Watts.
- Australian Fossils*, by Chapman
- Rocks and their Origin*, by Cole
- Weather and Science*, by R. G. K. Lemfert.
- Victorian Hill and Dale*, by T. S. Hall.
- Palaentology*, by Woods.
- Coral Atolls*, by F. Wood Jones.
- Textbook of Petrology*, by F. H. Hatch.
- Geology of Australia*, by T. W. Edgeworth David.
- Textbook of Entomology*, by Imms.
- Peripatus, Myriapodus and Insects*, by Sedgwick, Sinclair and Sharp.
- Household Insect Pests and their Control*, by French and Pescott.
- Australian Insects*, by K. McKeown.
- Destructive Insects (Part 2)*, by French.
- Insects (Part 1)*, by Sharpe.
- A Cluster of Bees*, by T. Rayment.

ANNUAL ACCOUNTS, 1957-8

The General Account, which records the ordinary income and payments relating to the Club's own affairs, has resulted in a small surplus of £9, compared with a deficit of £38 the previous year.

On the receipts side—Subscriptions produced £50 more than in the previous year, and advertisements in the *Naturalist* yielded an increase of £62. Donations received were £113 less, mainly because of the gift of £100 from the Gibson Trust last year which is not an annual item. Total receipts of £1,023 compare with £1,012.

On the payments side £100 less was spent on the *Naturalist*, a decrease related to the gift from the Gibson Trust. The present year's revenue bore an increase of £28 in Working Expenses, as well as an amount of £34 transferred to the Building Fund as a final payment under the rearrangement of 12 months ago.

Special Funds: The *Building Fund* has increased by the normal income of £45 from interest on investments, plus the £34 paid over from the General Account. The *Publications Fund* has built up by £134, consisting of surpluses of £148 from the sale of the Club's various publications, less £14 of costs. The income of this Fund was sufficient to enable the whole of the cost of the Toadstool Book to be paid for during the year.

The new sources of income were established late in the financial year:

(1) *Supporting membership contributions*, which yielded £4 during the last few weeks of the year, shown in the General Account.

(2) *The Club Improvements Fund*. This appears in the Balance Sheet at £170, built up in the following way:

Donations from members in March and April	£27	13	6
Legacy from the Estate of Mr. F. Cudmore	100	0	0
Surplus from the Nature Show held last			
October at Prahan	22	2	0
An amount contributed several years ago by			
members towards purchase of a screen, not			
now required	19	14	9
	<hr/>		
	£169	10	3
	<hr/>		

The Finance Committee has met quarterly during the year, giving careful consideration to the Budget and to the financial progress in relation thereto, and to a considerable number of financial matters which have arisen, reporting their recommendations each time to the Council.

On behalf of the Council,

A. G. HOOKE, Hon. Treasurer.

FIELD NATURALISTS CLUB OF VICTORIA
STATEMENT OF RECEIPTS AND PAYMENTS FOR 12 MONTHS ENDED APRIL 30, 1958
(Figures adjusted to nearest £)

GENERAL ACCOUNT

RECEIPTS		EXPENDITURE	
Subscriptions received—		<i>Victorian Naturalist</i> —	
Arrears	£51	Printing	£683
Current	846	Illustrating	98
Life Members	6	Dispatching	42
Supporting Members	4		— £823
	£907	Working Expenses—	
Sales of <i>Victorian Naturalist</i>	20	Postage and Telephone	34
Advertisements in <i>Victorian Naturalist</i>	74	Printing and Stationery	33
Interest Received—		Duplicating	20
Library Fund	£2	General Expenses	33
Bank Account	9	Library—	
	11	Printing List	23
Donations Received—General	7	Expenses	5
Sale of Badges	4	Subscriptions, Donations and Affiliation Fees	9
			— 157
		Transfer to Building Fund	34
			— 1,014
		Total Payments for the Year	9
		Surplus for the Year	— £1,023
			— 9
Total Receipts for the Year	£1023		

BALANCE SHEET AT APRIL 30, 1958

LIABILITIES		ASSETS	
Current Liabilities—		Bank Current Accounts and Cash—	
Sundry Creditors	£20	E.S. & A. Bank—General A/c.	£354
Subscriptions Paid in Advance—		State Savings Bank—Life Members	6
Ordinary	£113	Petty Cash	3
Life Members	6		£363
	119	Current Assets—	
	£139	Sundry Debtors	16
Special Funds—		Arrears of Subscriptions, estimated to realize	10
Building Fund	£1,477	Badges in hand—at cost	37
Publications Fund	770		63
Library Fund	50	Library, Furniture and Equipment	1,549
Club Improvement Fund	170	Investment of Funds—	
Excursions Account	128	Building Fund—	
	2,595	Commonwealth Bonds, face value	£950
Surplus of Assets over Liabilities	1,538	Inscribed Stock, at cost—	
		S.E.C., £500, 3½ per cent, 1965	420
		M.M.B.W., £100, 3½ per cent, 1963	90
		E.S. & A. Bank, No. 2 A/c.	17
			1,477
		Publications Fund—	
		Stocks, valued at cost—	
		Victorian Ferns	£497
		Victorian Toadstools	262
		Other Publications	23
		E. S. & A. Bank, No. 3 A/c.	1
			783
		Less amount owing, Lyrebird Reprints	13
			770
		Library Fund:	
		Commonwealth Bonds, face value	50
	£4,272		£4,272

July 1958

Annual Accounts, 1957-8

BUILDING FUND

Amount of Fund at 30/4/57	£1,398	8	8
Interest on Commonwealth Bonds	41	3	9
Interest on Bank Current Account	3	16	1
Amount transferred from General Account	33	13	9
Amount of Fund at 30/4/58	£1,477	2	3

PUBLICATIONS FUND

Amount of Fund at 30/4/57	£635	13	9
Surplus for year from—			
Fern Book A/c.	18	9	6
Toadstool Book A/c.	73	15	6
Other publications sold	7	17	6
Sales of back numbers of <i>Naturalist</i>	47	9	0
Interest on Bank Current Account	10	2	
	£783	15	5
Less Payments—			
Special Envelope Wrappers	£7	17	6
Postage, etc.	5	0	0
Bank Charges	17	6	
	13	15	0
Amount of Fund at 30/4/58	£770	0	5

FERN BOOK ACCOUNT

Stock at 30/4/57—		Sales, 190 copies	£54	2	0
2,841 copies @ 3/9	£532	13	9		
Surplus for Year	18	9	6		
	£551	3	3		
		Stock at 30/4/58—			
		2,651 copies @ 3/9	497	1	3
			£551	3	3

TOADSTOOL BOOK ACCOUNT

Cost of Printing—		Sales, 1,201 copies	£313	19	6
2,510 copies @ 4/-	£502	0	0		
Surplus for Year	73	15	6		
	£575	15	6		
		Stock at 30/4/58—			
		1,309 @ 4/-	261	16	0
			£575	15	6

A. G. HOOKE, Hon. Treasurer.

Audited and found correct,

W. P. J. EVANS, }
R. DAVIDSON } Hon. Auditors.

THE REGENERATIVE POWERS OF CERTAIN EUCALYPTS

By M. M. CHATTAWAY

The great regenerative capacity of many eucalypt species after a forest fire, and the rapidity of their height growth at the sapling stage, are among the first peculiarities of these trees to catch the attention of overseas visitors, especially those used to the deciduous forests of the Northern Hemisphere.

The part played by the concealed bud in bringing about the former and that of the naked bud in bringing about the latter is not as well known as it should be by naturalists, to whom the different species of eucalypt appear mainly as an intriguing taxonomic puzzle. It is not always recognized how distinctive and unique the eucalypts are, and how particularly well they are adapted to the, often very harsh, environments in which they grow.

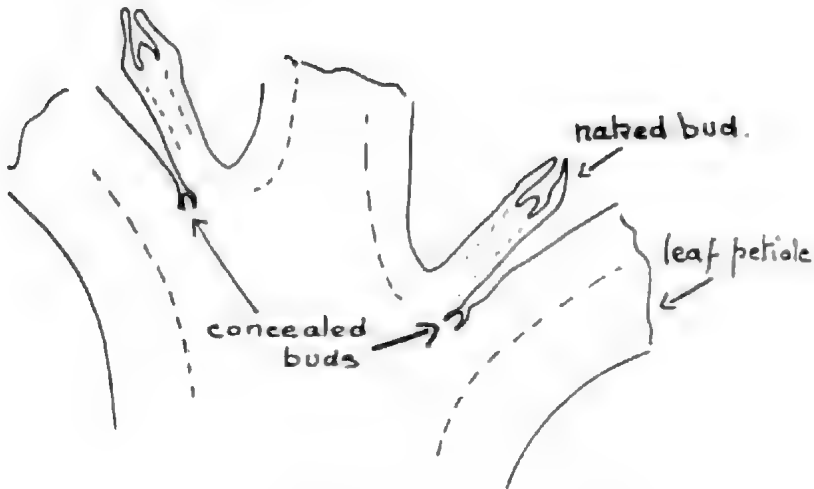


Figure 1. *E. bicostata* Maiden, Blakely and Simmonds.
Leaf node showing naked buds and concealed buds. x 17.

The young nodes of *Eucalyptus* species produce buds in each leaf axil. These are the naked buds which Jacobs (*Growth Habits of the Eucalypts*, 1955) has shown to be an admirable mechanism for quick replacement of shoots after defoliation by fire, drought, or animal attack. The naked buds are ready to grow out quickly into lateral shoots which maintain the density of the crown. If they do not grow out into shoots these buds are quickly shed, the line of dehiscence leaving a conspicuous scar in the leaf axil. If a sapling is completely defoliated and the naked buds as well as the leaves removed, new shoots appear under this scar from buds which were present but invisible when the naked buds were alive. These have been called *concealed buds* by Jacobs and, if they in their turn are removed, new ones will be formed between them and the leaf petiole,

or the leaf scar (Figure 1). In time, if defoliation is continued, a miniature *epicormic knob* is formed which may ultimately completely surround the original shoot scar. Jacobs (*loc. cit.*) states in this connection:

Eucalypt buds do not need a resting period. In one of numerous experiments to test this point the author destroyed the growing tip of a main stem of a young sapling of *E. sieberiana* seven times in nine months.

In the present study, young saplings of several species were subjected to a much more drastic treatment. Saplings of about 1-1½ years old were defoliated at approximately weekly intervals until they showed no further growth. The new buds had thus barely unfolded before they were removed and they had no chance to carry on much photosynthesis, so that the new growth formed after each defoliation must have come almost entirely from reserves within the stem or lignotubers.

E. melliodora A. Cunn. still produced a few shoots after 21 defoliations, and one specimen of *E. hemiphloia* F. Muell. after 26. Some of the saplings were cut down to a couple of nodes above the lignotubers. As far as could be seen this had little effect on regeneration, which suggests that the food for the new shoots is in the lignotubers themselves.

A small sapling of *E. hemiphloia* which had been cut down to an inch above ground (Figure 2) was defoliated 17 times in all, and before the experiment started one lignotuber and one leaf node were removed for routine sectioning. After it had been defoliated four times the shoots were counted as they were removed. Between February 21st and June 12th the stump of this sapling produced 216 shoots. Towards the end of this burst of activity the periods between defoliations were increased from about a week to ten days, and finally to two weeks as winter approached and the buds took longer to appear. In no case did more than a few small leaves expand before the shoot was removed and these were probably contributing very little through photosynthesis to the growth of the plant. Assuming that the plant produced an average number of shoots (15) for the four uncounted periods that preceded the counted ones, this small portion of the sapling produced over 270 new shoots in 119 days.

At the end of the experiment the lignotubers were shrivelled and depleted of starch, and the sapling was dead.

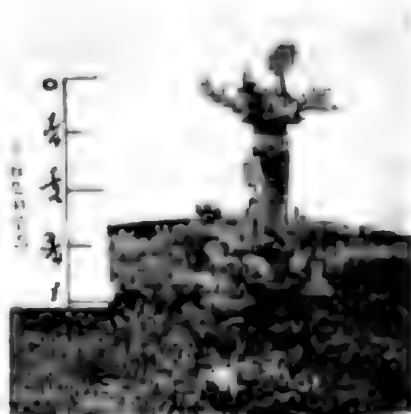


Figure 2. *E. hemiphloia* F. Muell. Mutilated sapling which produced over 250 shoots during successive defoliations.

THE KIATA NATURE SHOWS

By J. ROS. GARNET

In spring, 1955, the writer was invited to attend the opening of the first Kiata Nature Show and this was done with a deal of pleasure, partly to learn what sort of a show could be arranged by the people of a small township like Kiata and partly to renew friendships formed with a number of people up that way some years earlier, when it had been a privilege to lead a F.N.C.V. excursion to Dimboola for the opening of the 32-acre mallee-flora reserve.

It transpired that the writer was scheduled to perform the ceremony of officially opening this function at Kiata and although, by some mischance, he was not made aware of that until a few hours before the event, it was duly opened for public inspection for what proved to be a highly successful week. The stay at that time was, unfortunately, much too brief for one to gain a proper appreciation of the hard work, organization and management that had gone into its preparation and presentation. The prime objective was very apparent though, to nurture enthusiasm in the people of the Wimmera for a project for the preservation and protection of the mound-building Mallee Fowl, the Lowan, a bird rare enough in this State to deserve all the protection that can be afforded it.

Mr R. T. M. Percott, at that time Director of the National Museum, also visited the show and, in an address there, expressed the opinion that it was one of the best nature shows that he had seen, a view with which the writer heartily concurred.

Its impact upon the people of the area was remarkable. Visitors from outlying districts more than a hundred miles away were attracted to it and it awakened so much interest that natural history specimens poured into the building in almost embarrassing quantity. One find was Mitchell's Hopping Mouse, a small rodent of a kind considered to be almost extinct in Victoria but now, as a consequence of the show, known to survive in several places in the western Wimmera.

The organizers succeeded in their primary aim, for the municipalities concerned very soon arranged for the permanent reservation of about 1,000 acres of the Little Desert area as a Sanctuary for the Lowan, and, incidentally, for the plant and animal life associated with its preferred environment.

An excuse, if one were needed for another and similar show in 1956, was the ceremonial opening of the Lowan Sanctuary by the well-known ornithologist Mr. Claude Austin. Pressure of work prevented the writer from going there that year, but service as a show-opener was not forgotten for it earned an invitation to the 1957 show, with the additional treat of several days' freedom of the Little Desert and bush rambling.

With a little more time on hand and with family for company, we arrived in good time to hand over some special exhibits from Melbourne members of the F.N.C.V. and, later to act as "show opener".

One can write about this show for a number of reasons, most of which have some bearing on our attitude to the F.N.C.V. shows.

The Kiata show was held under the auspices of the Kiata Progress Association and organized by a team of naturalists who are as keen as mustard and who recently banded together as the Wimmera Field Naturalists' Club, an organization since affiliated with the F.N.C.V. The gathering at the opening of the Dimboola Mallee Flora Reserve in November 1946 sowed the seeds of the idea, and the first Kiata show of 1955 brought it to fruition. There is now a team which can be depended upon to make the study of natural history something pleasurable, educational and lively, and they appear to be doing it very well.

That the principals among them are members of the F.N.C.V. too may not be without significance. Men like Keith Hateley, Ken Jordan, Eric Muir (and their respective wives) and Alec Hicks have played a very conspicuous part in this development. The Club is now part of the community life from Hor-

claim to Kaniva and from Warracknabeal to Edenhope. Through the medium of its activities and the Kiata show, people over this wide area are able to share a keen and growing interest in nature and the need for some measure of nature protection and conservation. As the late Cr. Howland (the then President of the Shire of Dimboola) said, in effect, at the opening of the Dimboola reserve, "There was a time when most of us, farming in this region, considered mallee scrub a mere nuisance and an obstruction to progress—something to be destroyed as fast as possible. Now, after fifty years of that kind of progress we are beginning to understand that more than mere samples of it are worth preserving. What little is left should be guarded jealously even if only to protect the cultivated lands nearby. The rare wildflowers it nurtures are, in themselves, now seen as a joy to the beholder and a treasure for posterity."

Each year the Kiata show demonstrates what the beholder can treasure and enjoy. The abundance and variety of wildflowers from the Little Desert must be seen to be properly appreciated. One thousand acres of it are now reserved, but those acres include only a limited selection of the flora of the whole region. They afford sanctuary to only those species which form an association in the kind of terrain favoured by the Lowan, which is a bird with very decided preferences in the way of habitat. There are other parts of the "Desert" where one will see, for example, Blue Tinsel Lily, Hairy Boronia and Blue Boronia. If action to secure their protection and preservation is delayed we may awaken to find bulldozers clearing it all in preparation for land settlement. I think the Wimmera F.N.C. and the Kiata show people are well aware of this, but before any more can be done to seek further reservations they wish to carefully examine the area so that the choice of site or sites will be the best possible for the purpose.

The show, and the contacts made possible through it, have been amazingly valuable for gaining new knowledge of where rare species and unique ecological associations are to be found. Through the kindness and hospitality of our Wimmera friends we were enabled to see much of the wealth of the "Desert" wildflowers in their natural habitat, but we know quite well that only a lifetime of patient study and exploration could yield the information one would like to have about their frequency and distribution.

Miss Allison Jordan, who kept a record of plant species on display, had noted more than 300, and most of these had been cut (not pulled or torn out by the roots) from plants growing on private property either "wild" or in deliberate cultivation.

One of the minor revelations of our visit was a plant of the Fairy Waxflower, *Eriostemon verticosa* (formerly known as *E. obovatis*). Most of us have seen it as a somewhat sprawling and even a straggly shrub but, in the Little Desert, it is a particularly large-flowered plant which, in response to deliberate and careful pruning (with secateurs) each year, has assumed an erect and compact form which would surely delight the eye of any horticulturist. In the experience of the Kiata folk the myrtaceous and rutaceous shrubs mostly respond well to judicious pruning and wildflowers, in general, survive better when specimen pieces are cut than when they are pulled or torn.

As regards the Kiata show itself, a few concluding words might well be devoted to it.

From the National Museum had come a representative collection of birds likely to be seen in the district, with pride of place given to the Lowan standing beside an excellent replica of a small egg-filled mound. These were supplemented by museum specimens of birds and mammals from the private collections of naturalists from Portland, Ballarat, Melbourne and the Wimmera itself. The Fisheries and Game Department displayed a collection of game birds with notes to indicate whether or not they were protected and with comments on their edibility.

There was an assortment of reptiles, alive and dead, some brought in just for the show. A couple of big Brown Snakes attracted considerable attention. Nature photographs, line drawings and water-colours decorated the

walls, side benches were filled, even overcrowded, with exhibits of all sorts: shells, butterflies and other entomological specimens (even including two Funnel-web Spiders which had survived a journey from Mallacoota to Melbourne and then from Melbourne to Kiata), items of ethnological interest—aboriginal artefacts from both local and distant sources, craft work with Australian nature motifs, and a number of publications including the F.N.C.V. booklets.

Wildflowers, rising in tiers on the island benches, provided one of the highlights. Visitors entering the hall stepped straight into a garden of uncommon beauty arranged so as to display the gleanings from the gardens and plantations of men expert in the growing of plants native to their own country: collections from the Forests Commission nursery at Wail, from the gardens of Messrs. A. Lindner and G. Hately, more from Mr. K. Jordan's Little Desert property at Kiata itself, and smaller collections from other parts of the Wimmera. In contrast there was a collection of rain-forest flora from South Gippsland. Protected wildflowers were displayed in moderation and, obviously, care had been taken to collect them with discrimination. The day is past when flower exhibitors jam a crowd of fifty or a hundred blooms in a vase of water. Here, an uncommon species might be represented by one spray or a single stem; others by two or three sprays neatly arranged and appropriately labelled. Although there might sometimes be more glass and water than specimen the overall impression was pleasing and informative.

We of the generation are fortunate that Australia's indigenous plants (and fauna) have come into their own and that the flora is now being grown by amateur and professional alike in increasing numbers. By such means their future existence may be assured. Displays and exhibitions of this kind serve a very useful purpose in showing people what can be grown and what is worth growing in their gardens. Also, through such displays, they may learn to know the kinds that do not respond favourably to dissociation from their natural environment. These are the species which need the protection of a wildflower sanctuary or a national park.

BENDIGO FIELD NATURALISTS CLUB*

Syllabus of Meetings and Excursions

Meetings held at School of Mines, 7.45 p.m. (2nd Wednesday in month):
July 9—Botany and Geology of Mornington Peninsula (F. Robbins/R. Allen).

August 13—Specimens and General (Members).

September 10—Annual Meeting, Election of Officers.

October 8—Travel Talk, Illustrated (H. Henkel).

November 12—Nature Talk (R. Eddy).

December 10—Discussion Night (Members).

Excursions start from Gold Jubilee Statue (half-day at 2 p.m., full-day at 10 a.m.):

Saturday, July 26 (half-day)—Fosterville Area: Botany (A. Ebdon).

Sunday, August 17 (full-day)—Lyal: Birds (J. Ipsen).

Saturday, August 30 (half-day)—Whipstick: Hakea/wattle (Miss E. Flanagan).

Saturday, September 13 (half-day)—Lightning Hill: Boronia (J. Ipsen).

Sunday, September 28 (full-day)—Mt. Korong: Botany (H. Henkel).

Sunday, October 12 (full-day)—Whipstick: General (J. Kellans).

Sunday, November 2 (full-day)—Taradale: General (W. Perry).

Sunday, November 23 (half-day)—Diamond Hill: Birds and General (R. Eddy).

Saturday, December 6 (half-day)—Mandurang: Prostanthera (F. Robbins).

A. C. EBDON, Hon. Sec., 45 Lucas Street, Bendigo

* Members of the F.N.C.V. who visit Bendigo are invited to participate in the activities of the Bendigo Club

MICROSCOPICAL GROUP

At a well-attended meeting on Wednesday, June 18, members heard Mr. H. B. Ingles of the Forestry Division of the C.S.I.R.O. give a very interesting lecture on "The Use of the Microscope in Forestry Research". In accordance with the Club's usual procedure, about twelve microscopes on the bench displayed beautifully prepared mounts pertaining to the subject.

At the meeting to be held on July 16, the subject will be "Diatoms". Mr. H. Barrett, an authority in this field, will direct proceedings, and the microscopes will depict numerous slides from the Club's cabinets, including those known as "Type Slides", "Group Slides", "Locality Slides", etc.

WHAT, WHERE AND WHEN**F.N.C.V. Meetings:**

Monday, August 11—"Looking at Birds", by Ralph Kenyon.

F.N.C.V. Excursions:

Saturday, July 19—Beaumaris to Black Rock. Leader: Mr. A. E. Brookes. Subject: Geology, Birds and General. Take 1.15 p.m. train to Sandringham then bus to Beaumaris. Leader will meet party at bus terminus at 2.15 p.m.

Saturday, August 2—Excursion to the Natural Resources Conservation League Nursery, Springvale South. Take 1.35 p.m. train from Melbourne or meet 2.15 p.m. at Springvale Station. The nursery is about 1½ miles from the station, but if members who intend going will let the excursion secretary know it may be possible to arrange transport.

Group Meetings:

(8 p.m. at National Herbarium unless otherwise stated.)

Wednesday, July 16—Microscopical Group.

Friday, July 18—Botany Group. The meeting will commence at 7.45 p.m. with a "Beginners' Talk" by Mr. A. J. Swaby, to be followed by the subject for the evening, a talk on the Plant Kingdom, by Miss M. Lester.

Monday, August 4—Entomology and Marine Biology Group. The meeting will be held in Mr. Strong's rooms in Parliament House at 8 p.m. Enter through private entrance at south end of House.

Wednesday, August 6—Geology Group. Speaker: Mr. Fisch. Subject, Coast-line of Victoria.

Preliminary Notices:

Sunday, September 21—Combined excursion with the Ballarat Field Naturalist Club to Campbelltown. Parlour-coach will leave Batman Avenue at 9 a.m. Fare 24/-. Bookings with Excursion Secretary. Bring two meals.

December 26 to January 4—Ten-day excursion to Bogong High Plains. Transport will be by parlour-coach from Melbourne, and the coach will remain with the party for use in day trips. Bus fare £7/10/-. Accommodation is available at Falls Creek at a cost per week of fourteen to sixteen guineas, for which a deposit of £5 should be paid to the Excursion Secretary by October 15. The proprietor states he is accustomed to packing attractive lunches! Further details will be given in later issues of the *Naturalist*.

MARIE ALLENDER, Excursion Secretary

19 Hawthorn Avenue, Caulfield, S.E.7

The Victorian Naturalist

Vol. 75—No. 4

AUGUST 7, 1958

No. 896

PROCEEDINGS

Extraordinary General Meeting, July 14, 1958

On the motion of Mr. Coghill, seconded by Mr. Sarovich, the application by the Portland Field Naturalists Club for affiliation with the F.N.C.V. was approved.

General Meeting, July 14, 1958

In opening the meeting, Mr. Garnet referred to the passing of three members of the Club, Mr. A. D. Hardy, member of the F.N.C.V. since 1901 and one-time President, Mr. J. K. Moir, founder and donor of the Australian Natural History Medallion, and Mr. W. J. O'Neal. Members stood for a minute in silent tribute.

The Treasurer's Annual Report, as published in the July issue of the *Victorian Naturalist*, was adopted on the motion of Mr. Lewis, seconded by Mr. Coghill.

A "Members' Night" followed, with these items:

- Mr. Haase—"West Australian Flora".
- Mr. Pinchen—"Mallee Birds".
- Mr. Brooks—"Regelia grandiflora".
- Mr. Baker—"Mount Wingen, the Burning Mountain".
- Mr. Curtis—"Blue Mountains".
- Miss Elder—"Howqua River".
- Mr. Williams—"Canyon Country".
- Mr. Allan—"Aboriginal Caves".
- Mr. Harwood—"Spiders and Wasps".
- Miss Blackburn—"Tasmanian Lakes and Mountains".
- Mr. Quick—"Native Plants".
- Mr. Gabriel—"Tube Shells".

It was announced that Mrs. Freame was relinquishing secretaryship of the Hawthorn Junior Naturalists Club, and members of the F.N.C.V. are requested to take an active interest in the Junior Club.

The following were elected to membership of the F.N.C.V.: Mrs. E. E. Ware, Mrs. E. V. Faragher, Mrs. K. Hough, Mr. J. Hyett, Miss M. H. Coghill, Miss E. H. Coghill and Miss M. R. Milton.

Mr. Coghill conveyed to the Club greetings from Mr. David Fleay of West Burleigh; and the meeting concluded with several nature notes and comments on exhibits.

GEOLOGY DISCUSSION GROUP

A good attendance of members, with Mr. Blackburn as Chairman, took part in the proceedings of the July meeting of the Geology Group. After general business was dealt with, Mr. Cobbett gave a talk on the "Native Elements of the Mineral Kingdom".

Native elements form a small group of minerals which show considerable variation in individual appearance. Although in nature these elements are not entirely pure, they are generally regarded as not being combined with other substances.

First, the metallic group—gold, silver, copper and lead—were described according to their crystallographic form, physical characters and occurrence. The size of gold nuggets and the unusual black gold (maldonite) from Maldon, Victoria, were given special attention. The semi-metals—mercury, platinum, tantalum and zinc—together with native iron in basaltic rocks and nickel iron in meteorites, were next described. Droplets of liquid mercury in a rock from Jameson, Victoria, were of unusual interest.

In the non-metallic group were arsenic, antimony, bismuth, selenium, tellurium and sulphur. On account of its economic importance the speaker dealt at greater length with methods of mining and manufacture of sulphur. Finally, the carbon group—diamond and graphite—were described, and the use of diamonds as gems and for industrial purposes were enlarged upon.

The lecture provoked a considerable amount of discussion, after which the meeting diverted its thoughts to suitable geological exhibits for the proposed Nature Show in 1959. A number of exhibits described by the exhibitors completed the business of the evening. At the next meeting on August 6, Mr. Paul Fisch will present a colour film entitled "The Coastline of Victoria".

BOOKS FOR SALE

The following botanical works from the library of the late P. R. H. St. John are being offered for sale. Prospective purchasers should communicate with Mr. J. R. Garnet, 23 Camdon Street, Pascoe Vale (FL 4951, after 6 p.m.).

Eucalypts and their Essential Oils—Baker & Smith, 2nd ed., bound, autographed presentation copy.

Eucalypts of Australia and the Adjoining Islands—F. von Mueller, bound, 1/2 leather.

Icon Acacius of Australia and Allied Genera—F. von Mueller, 1887-88, 13 parts.

Icon Myoporinus Plants of Australia—F. von Mueller, bound, autographed presentation copy.

Hardwoods of Australia and their Economic Use—R. T. Baker, 1919, bound, autographed presentation copy.

Reprints of papers on Eucalypts—R. T. Baker, 1899/1906, bound.

Key to the Eucalypts of Western Australia—Kessel & Gardner, 1924.

Genus of the Plants of N.S.W.—Maiden & Betche, 1916.

Forage Plants of Australia (Dept. Agric., N.S.W.)—Turner, 1891.

Anthography of the Eucalypts—Grimwade.

Forest Flora of N.S.W.—Maiden, unbound, vols. 1-8 (77 parts), page missing in part 10, part 70 damaged.

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A VISIT TO CENTRAL AUSTRALIA

By C. E. CHADWICK

A visit to Central Australia was first contemplated by the author many years ago, but for various reasons it had not eventuated. However, it was finally resolved to make the trip in June 1957.

As time was limited, passage was made by air from Sydney to Adelaide, on Friday, June 7. Next morning the plane left West Beach aerodrome at 6.45 on the way north. There was little of interest in the early part of the flight, but about 8 o'clock (South Australian time) when we were in the region of Port Augusta, the oblique early morning sun emphasized the hills and valleys in the landscape and resulted in some striking effects. One patch was strongly reminiscent of the headland made in ploughing; and another range when observed from above was not unlike the back of the moloch lizard. Lake Eyre was seen as salt-encrusted land stretching for miles, although in one place there was blue water. (However, on the return trip, after rain had fallen, it contained a great deal of water.)

Further north dry watercourses, outlined by trees, were seen from the air, also reddish ridges in some cases running parallel for considerable distances. During the latter part of the plane trip the train line was in view for some time. We eventually landed at 10.50 a.m. and travelled through Heavitree Gap to the Mount Gillen Hotel for lunch. Although we stayed in Alice Springs for only a few hours before departing for Palm Valley, it might not be out of place to gather together in one place the information gleaned about the town during three subsequent visits of a few days each.

ALICE SPRINGS

Alice Springs ("The Alice") is situated at an elevation of about 1,900 feet, in the Macdonnell Ranges, not a great distance south of the Tropic of Capricorn. In summer it is very hot and many of its residents depart for more congenial climates for the season. In winter the days are warm and mostly cloudless, but at times the nights can be very cold. Rainfall is only about ten inches per year, but the water supply is obtained by sinking bores to tap underground water below the town. From reservoirs on Billygoat and Anzac Hills, water is reticulated to the town. Alice Springs has grown greatly since the war and now has a population in excess of 3,500.

The most striking building is the John Flynn Memorial Church in Todd Street. This was completed at a cost of £35,000 and opened on May 5, 1956. It commemorates the famous "Flynn of the Inland" (1880-1951), founder of the Australian Inland Mission and the Royal Flying Doctor Service. When seen from directly in front the two concrete slabs suggest the wings of an aeroplane, and the cross high up on the wall is a conspicuous feature. The sides of the church

contain a large amount of glass so that the building is exceptionally light inside. On the back wall within the church there is a mural symbolic of Flynn's work. Objects represented are the steering wheel of his car, a stretcher, a nurse's cap, a Bible, a pedal wireless transceiver and an aeroplane. In a room at the back of the church are some Flynn relics. The body of Rev. Flynn reposes under a great boulder four miles west of the town, with Mt. Gillen in the background. The boulder came from the Devil's Marbles, 249 miles north of Alice Springs, and it is said to weigh approximately seven tons.

The Royal Flying Doctor Service transmitting and receiving station is located close to the hospital at the northern end of the town. It carries out a very fine service for the people of the Inland, not only in medical matters but in the general daily needs of life, and it provides social contacts as well for people in those lonely areas.

A School of the Air was officially opened in 1951 and is run in conjunction with the Royal Flying Doctor Service. It permits daily contact between teachers and their distant pupils whose schooling otherwise is by correspondence.

There are primary schools in the town, and a fine new High School, first occupied in 1954, caters for adolescents, not only of Alice Springs, but for outback children, who board in hostels in the town.

John McDouall Stuart was the first explorer in the district, when in 1860 he penetrated about 35 miles north of the present site of Flynn's grave. The springs from which the town derived its name were discovered in 1871 by a survey party searching for a route for the Overland Telegraph from Adelaide to Darwin. Sir Charles Todd, the South Australian Postmaster General of the period, was in charge of the construction of the line. There are many reminders of Todd and his family in the district. The original Alice Springs,



Casemoth Larva ($\times 1\frac{1}{2}$)
Hyalarcta hubneri Westw.

named after his wife, are four miles north of Heavitree Gap, a conspicuous feature in most photographs of the town. The Gap is the only pass southward through the Macdonnell Ranges for rail and road traffic. The main street of the town and the river to the east of the main business area bear Todd's name. The Charles River is probably named after the same gentleman, whilst Emily and Jessie Gaps to the south-east of the town commemorate his daughters.

Mount Gillen (3,124 ft.) is a conspicuous peak to the south-west, on the Heavitree Range which stretches west from Heavitree Gap. Within the town itself are three small hills: Billygoat Hill in the south, Anzac Hill in the north and Myers Hill (only called Namygoat Hill by popular usage) north-east of Anzac Hill and over the Todd River in East Side, a suburb which has come into being in recent years.

Trees are a noticeable feature, especially when the town is viewed from any of the hills. Oranges and mandarins grow well in the household blocks, and white cedar, eucalypts and purple-flowered *Duranta repens* are common. Tamarisks, *Duranta*, oleander and boobyalla (*Myoporum montanum*) are frequently used as hedges, and occasional date palms are to be seen in house allotments.

Gum trees are a prominent feature of the landscape, for instance, the river red gum, *Eucalyptus camaldulensis*, is common about the town, the coolibah (*E. microtheca*) occurs also, and the yellow box* (*E. intertexta*) is seen at Mt. Gillen and East Side; the desert mallee (*E. gamophylla*) also occurs.

The numerous plant species which grow on the flat area in the vicinity of the town include saltbushes, which provide good fodder for sheep and cattle. Those included the giant or old man saltbush (*Atriplex nummularium*), a broad-leaved shrub up to 8 or 9 feet high, and two smaller herbaceous species (*A. limbatum* and *A. elachophyllum*) which grow only a few inches above the ground. One of the burrs (*Bassia bicornis*) was notable for its light stems covered by dense white hairs; its fruits were likewise white and bore two sharp spines or horns. The roly poly (*Salsola kali*), which derives its name from the fact that when mature it breaks off and is blown along by wind, is scattered over the area. Rosy Dock (*Rumex vesicarius*), an introduced plant which in the appropriate season is bright red and a very striking feature of the landscape, is in the town area only. The ruby saltbush (*Enchylaena tomentosa*) is appropriately named, in allusion to its small red berries. The Victoria wattle (*Acacia victoriae*) also grows in this habitat. It was interesting to observe a species of moss growing in one moist area in this low-rainfall environment. Larvae, pupae and adults of the migratory white butterfly (*Anaphaeis java teutonia*) frequented a spiny caper

* Popular names for plants mentioned in this article are often an indication of the lack of standardization that exists in this respect.—Editor.

PLATE III



Butterflies from Central Australia.

Upper: *Papilio demoleus sthenelus* Macl. ($\times 1\frac{1}{2}$).

Lower: *Anaphacis java teutonia* Fab. ($\times 1\frac{1}{2}$).

bush (*Capparis spinosa*). A small herbaceous plant with yellow flowers (*Zygophyllum apiculatum*) was another frequenter of the flat areas about the town.

On the hills in the town were the caltrop (*Tribulus terrestris*), a creeping plant with yellow flowers and very spiny fruits; the purplish-flowered *Solanum ellipticum*; the appropriately-named pussy-tail (*Trichinium alopecuroideum*) and its less-striking ally *Trichinium obovatum*. The spiny-leaved dead finish (*Acacia tetragonophylla*) had its scattered yellow flowers on display in several places. Red Natal grass (*Rhynchosytrum repens*) had become established on Billygoat Hill, and the blue daisy (*Brochoycome ciliaris* var. *lanuginosa*) and *Euphorbia australis* grew there too. Several species of the mallow family (*Malvaceae*), such as *Sida corrugata* and *Abutilon otocarpum*, were growing on these small hills. A plant with bell-shaped flowers with purplish colouring inside (*Pandorea pandorina oxleyi*) was noted on Myers ("Nannygoat") Hill and later near Standley Chasin.

Two everlastings occur in the area, one white (*Helipterum floribundum*) and the other yellow (*Helichrysum apiculatum*). Two legumes, the Indigo plant (*Indigofera breviflora*) and a species of *Tephrosia*, a type of saltbush (*Kochia tomentosa*), kangaroo grass (*Themeda australis*) and another grass (*Enneapogon polyphyllus*) were also in evidence close to the town.

Two wattles may be added to the list. The witjuti bush (*Acacia kempeana*) is the host plant of the true "witjuti grub". Recently N. B. Tindale has shown that this insect is the caterpillar of a large moth (*Xyleutes leucomochlo*). Ironwood or desert willow (*Acacia estrophiolata*) proved unexpectedly useful when the bus became bogged down a few miles from the town when on the return trip from Ayers Rock. Large limbs were placed under the rear wheels to assist in moving the vehicle.

The most conspicuous animals around Alice Springs were the pink and grey galahs. They were often seen feeding in flocks on the ground, but were always ready to take flight when approached. Crows were never far away.

Several species of ants were seen. A small black species (*Iridomyrmex sucheri*) was found near the railway line, and a larger species (*Iridomyrmex detectus viridimenus*), which is a variety of the common mound or neat ant, had a nest in Gregory Terrace. Three other blackish ants (*Rhytidoponera fuliginosa*, *R. mayri* and *R. taurus*) and a brownish species (*Meranoplus mars*), were also collected near the town.

Some ghost moths came to light at night, and these were subsequently identified by N. B. Tindale as *Trictena argentalata*. He said that to his knowledge this was the most northerly record of the species. A small mantid (*Paraoxyphilus laficollis*) came to light, and

two species of cockroach: the common American cockroach (*Periplaneta americana*), so well known in most big cities, and a smaller yellowish species (*Supella supellectilium*) were collected. A case of the common case moth (*Hyalarcta hubneri*) was found in a tamarisk tree.

Three species of butterflies were observed one afternoon, haunting the flowers of *Duranta*. There were numbers of the migratory white and the checkered swallowtail (*Papilio demoleus sthenelus*) and one badly battered specimen of the meadow argus (*Precis villida calybe*).

Two insect pests of mulga were observed in the area. A species of thrips (*Onychothrips tepperi*) causes rounded galls, up to half an inch in diameter, on the phyllodes of the plants. The gall is hollow, and large numbers of thrips, up to several hundred, are found inside. A lac insect (*Austrotachardia acaciae*), related to the scales and mealy bugs, occurs on the branches as small rounded yellowish globules.

PALM VALLEY

We were scheduled to depart for Palm Valley at 1 p.m. on June 8, but did not get away till 6.30 p.m. After a moonlight journey, including many miles through the Finke River sands, we arrived at our destination at 10.35 p.m. A four-wheel-drive vehicle is essential in such country. After supper we set ourselves up, two to each tent, and settled down to sleep.

Next morning those who arose in time (about 6 o'clock) saw a beautiful sunrise in the direction of the Finke River. The camp was near a creek, with a ridge behind upon which grew porcupine grass (*Triodia* sp.), acacias and eucalypts. Species of *Triodia* are usually called "spinifex" in the Centre; but the grass which grows on beaches in coastal areas is correctly called *Spinifex hirsutus*; hence the above use of the name "porcupine grass" for *Triodia*. Although its sharp spines make this a very appropriate name, the term spinifex seems to be too firmly established for a change to be practicable now. The inland "spinifex" is very combustible, burning with much light and heat, as was demonstrated during the night trip to Palm Valley when an isolated clump was set alight. There are several species of *Triodia*, and a plant very occasionally grows in a complete circle with bare ground in the centre.

In front of the Palm Valley camp there arose great sandstone rocks. To the ESE. the Red Sentinel provided an excellent look-out over the vast "Amphitheatre", an area of about a mile across, flanked by the Sundial and rocks behind it to the SSE. and the Cathedral Rock to the south. Out of sight from the camp in a southerly direction was Battleship Rock, within the amphitheatre was the Arena Rock and to the south-east of the camp, below the Red Sentinel, was the Initiation Rock. The vast size of the arena

and the rocks can be realized only by actually seeing them. During the afternoon a trip was made to the Hermannsburg Lutheran Mission by a bus drawing a 250-gallon "water joey" for supplies, but tourists are not now allowed to go inside the actual mission station.

The next morning we visited Battleship Rock, a very good lookout from which we obtained our first view of the much publicized palm *Livistona mariae*, not known to occur anywhere else in the world but Palm Valley—hence the name of the valley, which was discovered by Ernest Giles in 1872. In the afternoon we drove to Corroboree Rock, where another tourist firm had set up a permanent camp not far from a lone palm tree. Long ago this area had been frequented by aborigines of the emu totem and the rocks still bore faint traces of their ceremonial rites. A team of five camels in charge of aborigines had spent the night there and camel rides were advertised as a tourist attraction. A truckload of aborigines from Hermannsburg had preceded us to the area and the children were busily scrambling over the rocks when we arrived.

The following day was spent in the Palm Valley gorge where numerous specimens of palms were inspected and photographed. On the way the cycad *Macrozamia macdonnellii* was observed in Cycad Gorge. This plant is confined to the Macdonnell and George Gill Ranges of Central Australia. There too were found the white shells of a species of snail (*Baccalena squamulosa*), which was originally collected in this locality by the Horn Exploring Expedition in 1894 and described by Professor Ralph Tate. The golden-rumped ant (*Polyrachis guerini*) was found on the rocks in Palm Valley. Flies were the most noticeable insect life in the valley. The bush fly (*Musca sorbens*) was a pest whenever one went outside, being particularly fond of crawling on the face, whilst inside, the house-fly (*Musca domestica*) and a smaller species (possibly *Fannia cancellularis*) carried on a non-stop offensive. A white butterfly (*Anaphois java tentonia*) was often seen in the area and large numbers were observed on a tree in the dry bed of the Finke River. The bug *Serinettha lurida* and its small reddish nymphs were frequently seen on the ground. The mound or meat ant *Iridomyrmex detectus* was there, also a small species of ant; and a Brentid beetle (*Cordus hospes*) was collected. Crows were common in the area and their nests were plentiful in the low-growing eucalypts in the valley.

Geologically the area is basically Ordovician sandstone and conglomerate. On one occasion an interesting example of exfoliation of rock was observed. Each night a camp-fire was lit on a large rock. After several small explosive reports which sent small pieces of rock flying, a much larger explosion resulted in a piece of rock an inch or more thick and several square feet in area being lifted upwards.

Plant life in the area included eucalypts and acacias, for instance, dead finish (*Acacia tetragonophylla*) and a few mulgas were ob-

served. A good specimen of the corkwood (*Hakea larca*), bearing buds, yellowish flowers and fruits was growing in the vicinity of the camp. A species of boobyalla (*Myoporum montanum*) and the papery-leaved native currant or orange bush (*Canthium latifolium*) with light yellow withered and brittle leaves was found in the general vicinity.

On the return trip to Alice Springs we passed near the Lutheran Mission at Hermannsburg. The area of this station is 1524 square miles and it is inhabited by about 30 whites and 300-400 aborigines. It is run as a cattle station. Near the mission, mulgas were common and the crater-shaped openings to the nests of the mulga ant (*Polyrachis macropus*) were observed. This ant gathers the phyllodes ("leaves") of mulga when they fall on the ground and heaps them up around the opening of the nest. Mulgas were common in the direction of Alice Springs; and after seeing highly-priced mulga wood ornaments in shop windows in the cities it was something of an anti-climax to see it used as fence posts in this area. Still, cedar was put to the same use on the east coast many years ago.

After a late departure from Palm Valley and a puncture near Hermannsburg, we were several hours too late to see the colourful sandstone gorge in the Standley Chasm, 33 miles west of Alice Springs. At the turnoff from the main road to Standley Chasm numerous pits of an ant lion (a member of the *Myrmeleon uniseriatus* complex) were found in the sand. On the way into the chasm it was interesting to note a few water-beetles in a small stream of water. The chasm itself is best seen between 11.30 a.m. and 1.30 p.m. when the sun shines down into an opening a few feet wide in the rocks, giving them a bright red colour. On the way into the Chasm aborigines of the Jay Creek reserve were assiduous in trying to sell boomerangs and other examples of their handiwork. We noticed particularly one patriarch with a long beard, spectacles and full European dress.

The morning of 13th was spent on a tour of the town, visiting the aerodrome of Connellan's Airways Ltd. which covers the whole of the Northern Territory not served by road—conveying mails, goods and passengers, in that order of priority. A visit to "Pitchi Richi", south of Heavitree Gap, enabled an inspection to be made of a small mineral collection and of some of the work of the Victorian sculptor William Ricketts. Next the transmitting and receiving station of the Royal Flying Doctor Service was observed in action. A visit to Rex Battarbee, the artist who put Albert Namatjira on the map, completed the morning. In the afternoon visits were paid to Emily and Jessie Gaps.

The next day was occupied in visiting Trafina Gorge, fifty miles on the eastern side of Alice Springs—a long and dusty trip, well repaid by the impressive scenery, although a dull day did not favour photography.

AYERS ROCK

On Saturday, 15th, we were due to leave Alice Springs for Ayers Rock at 1 p.m., but did not start till 5 p.m. A fine sunset was observed on the way, but at 9 p.m. a minor disaster occurred. As the vehicle was crossing a creek bed about 80 miles from Alice Springs and 30 miles from our destination—the Mount Quin station, the front wheel crashed into the bank and portion of the steering gear broke. Contact was made with the Alice Springs radio base by portable transmitter SBE (called "Sugar Baker Easy" in the standard code) and arrangements made to send mechanics and appropriate spare parts to the damaged vehicle. As there were two buses it was possible to send most of the women and the older men forward in the second vehicle to spend the night in the tents at Mount Quin. The remainder slept on mattresses spread on the ground literally among the mulga.

A wait of some hours next morning enabled a reconnaissance to be made in the area, but about the only thing of interest in the form of animal life was a nest of a black ant (*Camponotus denticulatus*). However, plant life showed more variety. At noon a start was made for Mt. Quin, an abandoned station now consisting of three crude sheds around which a number of two-bed tents and a marquee (for meals) had been pitched. Lack of transport prevented a continuation of the journey that day and it was resolved to make an early start next morning. Mulgas and other acacias were in the area, and a small yellow-flowered daisy (*Senecio gregorii*) grew in the reddish sand. A small Lycaenid butterfly frequented this flower. Some ant lions, the larvae of lacewings, were found in the bright red sand and proved to be the same species as those recorded earlier.

Next day we arose at 4 a.m. officially (although some members of the party arose at 1.30 to brew some tea) and left at 6.16. After travelling 44 miles, we reached Angas Downs station at 8.15. At that station it has been found that in winter meat can be kept quite well for a month in the meat house, an open shed enclosed only by fine mesh gauze. Tamarisk ("athel") trees grow well close to the homestead.

About an hour after leaving Angas Downs, Mount Conner was sighted in the distance. This is the first of three remarkable rocky structures rising from the vast plain we were crossing. The Three Tors, as they are sometimes called, extend from east to west and consist of Mt. Conner, Ayers Rock and Mt. Olga. Mt. Conner in the distance appeared as a pale purplish flat-topped tableland. It is about 2,805 feet above sea level and approximately 1,087 feet above the surrounding plain; it measures about three miles from east to west and about a mile from north to south; in shape it is oval. Like the other two tors it is the subject of many aboriginal legends.

In due course we arrived at Curtin Springs station homestead,

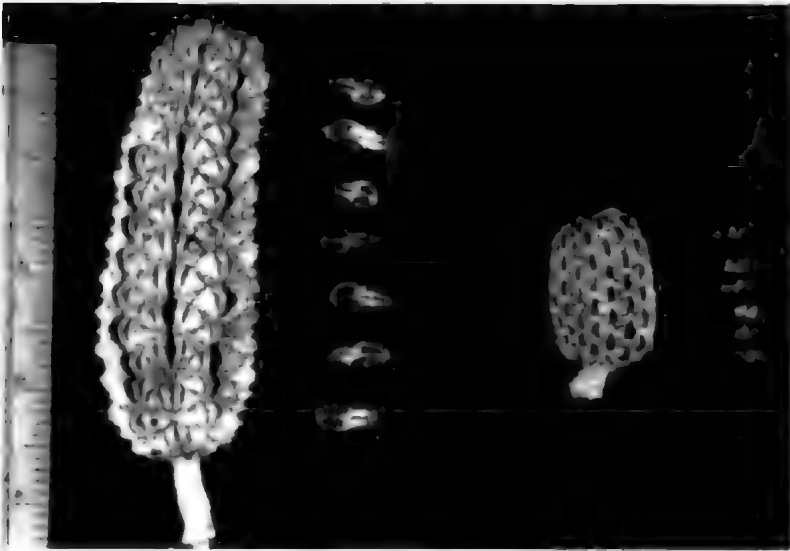
which is 67 miles from Ayers Rock. There we encountered a few aborigines, some of whom were employed as stockmen on the station. The residence is built entirely of galvanized iron, but a much more pretentious residence was in course of erection not far away. Three seagulls (*Larus novaehollandiae*) were in the water tank, although the place is about four hundred miles in a straight line from the head of the Great Australian Bight. The station owner said he believed the birds gradually made their way from the sea by following the watercourses and lakes.

As the journey proceeded we became aware of an interesting tree intruding into the flora, the desert oak (*Casuarina decaisneana*). A remarkable feature of this tree is the large cone (up to three inches long) and the correspondingly large seeds it produces. While this tree occurs all over the landscape, the desert poplar (*Codonocarpus cotinifolius*) is less frequent, clumps being noticed only twice along the roadside.

Ayers Rock and Mt. Olga came into view simultaneously when, according to the driver, we were about 32 miles from the former; but the rock is said to be visible from the air at a distance of 140 miles. Ayers Rock, the closer of the two, is an impressive sight as it projects upwards from the plain. It has made a striking impact on all visitors since the first time it was seen—by W. C. Gosse in 1873. In his book, *The Red Centre*, H. H. Finlayson says: "Everything about it is huge; but it is not this alone which makes it so impressive, nor even this added to its utter unexpectedness, its isolation, and its brilliant uniform colouration. Underlying and reinforcing all these impressions is a sense of the oneness of the Rock—its truly monolithic character. It is without seam or cleavage; a great pebble, as truly integral as the smallest that one might pluck from the river-bed."

Ayers Rock and Mt. Conner were discovered and named in July 1873. The Rock, named after Sir Henry Ayers, then Premier of South Australia, is 276 miles from Alice Springs in a south-westerly direction. It was first sighted by Gosse on July 19, and he and an Afghan named Kamran climbed it the next day. Gosse thereby becoming the first white man to perform the feat. It is said to be the largest rock in the world and measures a mile and three-fifths from west to east and is seven-eighths of a mile wide. The highest point is 2,820 feet above sea level and it stands 1,125 feet above the surrounding plain; thus it is two and a half times as high as Sydney Harbour Bridge. The distance around the base of the Rock is five miles, and a road six and a quarter miles long encircles it. Geologically it is composed of arkose (a type of sandstone) and belongs to the Proterozoic Age, five hundred million years ago. The Rock is within the boundaries of a vast aboriginal reserve situated in the south-western corner of Central Australia and extending to the West Australian border.

Aborigines called the Rock "Oolra" or "Uluru" and believed it to be the home of the Great Serpent. Numerous aboriginal myths relate to the Rock, which is associated with their sacred rites and ceremonies. Numerous caves, many containing drawings, are around the base of the Rock. One area was sacred to the initiated men of the tribe; any others entered it under penalty of death. Another portion was set aside for the women. The Old Woman's Cave is three hundred yards long and a hundred feet high and is situated on the northern face. The aborigines used to call it "Itjaritjaringura".



Cones and Seeds of She-oaks.

Left: *Casuarina decasneana*. Right: *C. distyla*.

(Scale in inches)

In many places black stains down the side of the Rock show the downward course of water after rain.

Apart from its size Ayers Rock is remarkable for the colour changes it undergoes under different conditions. At sunrise it is light red, at other times dull red, and at sunset when seen from the west it is a rich red, appearing almost luminous. On one occasion, after a light shower (and for a tourist to see rain is unusual) it appeared as if a light fall of snow had covered it.

Ayers Rock was reached about 2 p.m. After lunch we drove around the Rock as a preliminary survey, noting various features—the Brain, the Kangaroo Tail, the slope which forms the easiest of four known places where the Rock may be ascended, Mutigulana Cave, and Maggie Springs. The Brain is a remarkable structure on

the north side of the Rock, and it could be distinguished when the party first sighted the Rock. It is a good representation, due to weathering, of a vertical section of the human head from the point of the jaw to the back of the head. The Kangaroo Tail, situated on the north-western corner, is a huge slab of rock about 200 feet long and twenty feet thick attached to the main rock at the top and bottom, but curving outwards in the centre until it is about 4 feet from the parent rock. When viewed at a certain angle the sky is readily seen between the Kangaroo Tail and the main rock. Further to the west is a slope less steep than elsewhere, up which the able-bodied may climb to the top of the Rock. Mutigulana Cave, associated with aboriginal mythology, is on the southern side of the Rock and Maggie's Springs, further to the east, are in a deep recess to which the emus come to drink.

W. E. (Bill) Harney, a noted bushman, who has spent nearly all his life with the blacks, had been appointed ranger to the area about fourteen weeks before our visit and he acted as guide to the tourists. His enthusiastic description of legends of the Rock and his explanations of figures in the caves added life to the otherwise meaningless art of a bygone age, for the aborigines have long since abandoned Ooltra.

On Tuesday, 18th, those who were willing and able climbed the Rock. The least difficult of the four possible ascents is on the western side and was called "Tjinteritjinteringura" (or "Willy Wagtail") by the aborigines. But even there one cannot make the climb without rubber-soled footwear. However, many members of the party did not attempt it, some gave up part of the way up and had to be helped down by the drivers, and only a small fraction did reach the top of the rock. The oldest successful climber owned to 72 years. Some people have the idea that Ayers Rock is flat on top and destitute of vegetation. This is not correct, however, as a number of trees, mainly mulgas, grow in two of the many parallel shallow valleys which extend across the rock from north-west to south-east. Smaller species of plants such as grasses occur also, and on my second visit to the top Pipits were seen.

Little animal life was seen near Ayers Rock, and that was mostly insect life. Droppings containing seeds (possibly quandong seeds) indicated that emus visited the area at times, and numerous patches of light soil seen from the top of the Rock indicated rabbit warrens. An unusual sight was a number of wingless web-spinners (probably *Oligotoma gurneyi centralis*) running about on a dirt road, with their abdomens held over their backs. A large, hairy, blackish ant (*Bothroponera denticulata*) inflicted an unpleasant sting when picked up. Inconspicuous rounded mounds projecting above the surface of the soil proved to be the nests of a species of termite or "white ant" (*Termititermes hastilis*). The termites had gathered

short pieces of grass which were to be found in the upper part of the next. Nests of the same species were found at Mt. Olga.

So far as plants were concerned, mulgas grew for miles around, but other interesting plants occurred. On the sandhills *Grevillea stenobotrys*, a small shrub closely related to the silky oak, was noticeable by reason of its prominent oval pods. A similar species, *Grevillea eriostachys*, grew east of the Rock. *Micromyrtus flaviflora*, having yellowish leaves with a noticeable odour when crushed, is common around the Rock but otherwise is a fairly rare species. The "dead finish" grew in the area also. The bloodwood (*Eucalyptus terminalis*) grew in closer to the Rock and was frequently infested with galls. These were caused by a mealy bug (*Cystococcus ?pomiformis*) and were sometimes smooth and about 1½ inches in diameter. Many galls were up to three inches in diameter and irregular in shape as if diseased; but when these irregularly shaped specimens were examined by a plant pathologist no evidence of fungus was found. Sandalwood (*Santalum lanceolatum*) grew on the north-eastern side of the Rock. Spinifex was common, and Bill Harney stated that resin extracted from it was used by the aborigines to attach stone weapons to their handles. Another grass, a species of *Themeda* related to the Kangaroo Grass, was pounded down and used as a source of the white fluffy material to decorate the body in corroborees. Bill Harney pointed out that many other plants growing in the area had been used by the aborigines. One native had told him of well over twenty species which were useful.

Maggie's Springs was an interesting spot. Water originated in a very steep area to which nobody had been able to climb for many years, although aboriginal tracks across the rock could be seen. The springs are in a deep recess in the Rock and are said by some to be permanent. The area formed an excellent ambush for emus when water was scarce, as the aborigines were able to hide behind rocks and close in behind the birds.

The view from Ayers Rock is well worth the climb. Mulga trees, like innumerable dots, surround the Rock in all directions. To the south are the Musgrave Ranges and to the west the Petermann Ranges, named by Giles after Professor Petermann of Gotha. To the west also is Mount Olga, which like Ayers Rock itself, is notable for its changes in colour. H. H. Finlayson, in his book, *The Red Centre*, describes Mount Olga when he had his first view of it when approaching Ayers Rock from the east:

"When we topped the last sand-hill the sun had just set, and the Rock was suddenly before us. But the crowning impression of that long day of approach was not to be of the Rock itself, amazing as that feature now revealed itself to be.

"Away beyond it in the west, clear against the evening sky, but with its outlines softened by twenty miles of distance, was Mount

Olga. In the finished symmetry of its domes it is beautiful at all times; but now the sunset works upon it in a miracle of colour, and it glows a luminous blue against an orange field, like some great mosque lit up from within. Five times I saw the sun set beyond Mount Olga, but in five hundred times it would not pall. It is the most delicate sight in all the land."

On the 19th at 10 a.m. we set off for Mt. Olga, and after a few stops to take photographs and look at kangaroos and emus, arrived at our destination about 12.30 p.m., after travelling about 31 miles, although the distance in a straight line is about 22 miles. The road is not direct, but goes first in a northerly direction, passing the old camp of an expedition which attempted to find the legendary Lasseter's Reef. It should be stated in passing that competent authorities consider the story of Lasseter's Reef a pure myth as no gold has ever been produced from this part of Australia. Lasseter perished in Winters Glen, in the Petermann Ranges on January 30, 1931. The road takes some extraordinarily (and unnecessarily) acute bends as it winds its way through the outga.

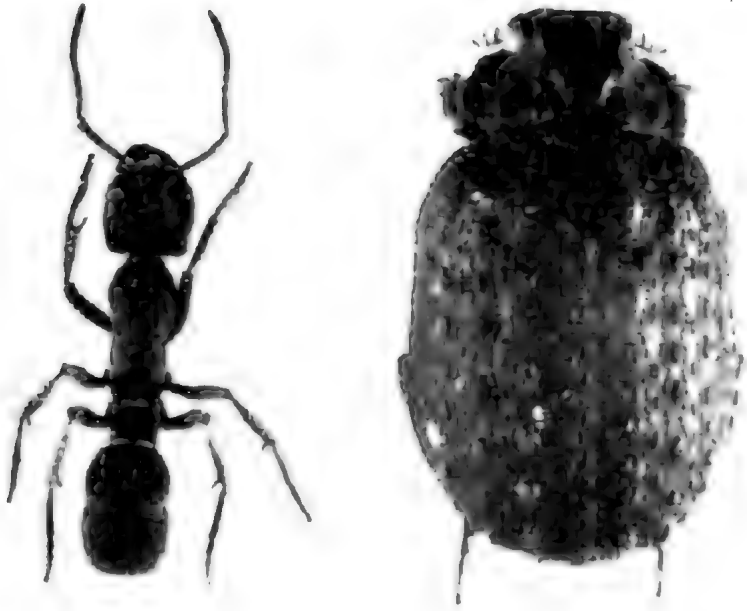
Mount Olga consists of twenty-eight peaks and locally is spoken of as "The Olgas". The aborigines used the term "Katatjuta" or "Kuttatuta" ("many heads") for the whole group of rocks. Ernest Giles, who discovered Mt. Olga in October 1872 and named it after the Queen of Spain, wrote of it the following year.

"The appearance of Mt. Olga from the camp is truly wonderful; it displayed to our astonished eyes rounded minarets, giant cupolas, and monstrous domes. There they have stood as huge memorials from the ancient times of earth, for ages, countless eons of ages, since its creation first had birth. Time, the old, the dim magician, has ineffectively laboured here, although all the powers of oceans at his command; Mt. Olga remained as it was born."

The highest peak, correctly called Mt. Olga, is 1,441 feet above the plain and 3,419 feet above sea level. The rocks are composed of very coarse conglomerate, some portions of the latter being perfect textbook examples. The peaks making up Mt. Olga are grouped around a fairly level central plain and altogether occupy an area about four miles long and two miles wide. Between the various individual monoliths are deep gorges, many with sheer sides and interesting vegetation.

As we approached this group of huge rocks, striking colour changes occurred. The morning started off dull and overcast, but as we neared the monoliths some of the peaks which received no sun were a sombre blackish, but others in sunlight were a striking light purple colour. By the time we reached the usual stopping place at Mt. Olga all the rocks were bathed in sunlight. On alighting near the bloodwoods (*Eucalyptus terminalis*), we encountered a nest of yellow and black bulldog ants (*Myrmecia desertorum*). Both at Mt.

Olga and Ayers Rock there were large Coccid galls. The golden-rumped ant (*Polyrachis guerini*) was observed on the rocks at Walpanya Gorge and there was a Trogid beetle (*Trox litigious*) on the path leading to the Gorge. Corkwood and native fig (*Ficus platypoda*) grew in the gully. A small fern (*Cheilanthes lasiophylla*), observed among the rocks at Mt. Olga, had been seen previously at Alice Springs. Water was found in the gorges at Mt. Olga, but how extensive it was could not be determined in the short time spent in the area. Several days could well have been used exploring the rather extensive area covered by the designation "Mt. Olga", or perhaps more correctly "Katatjuta".



Insects from Central Australia.

Left: *Bathroponera denticulata* Kirby ($\times 3$).
Right: *Trox litigious* Harold ($\times 5$).

As our mishap on the way to Ayers Rock had robbed us of a day, we returned to Alice Springs (276 miles) in a single day instead of two, departing from the Rock at 7.25 a.m. on June 21. It was interesting to have to drive through muddy, boggy roads which a few days before had been very dusty. Just a few miles out of the town we became bogged for an hour with the front wheels on good solid road and the hind wheels in mud. We finally arrived in Alice Springs at 7.50 p.m.

The following afternoon we visited Simpson's Gap. Two striking ghost gums (*Eucalyptus papuana*) always attract tourists on the way to the Gap, but a very fine tree grows by itself a few hundred yards away.

On 23rd a further visit was paid to Standley Chasm (named after Mrs. Standley the first teacher in the town). In this area grew three interesting plants, the rare flannel flower *Actinotus swartzii*, the yellow-flowered *Hibbertia glaberrima* and the cycad *Macrozamia macdonnellii*. Whilst photographing the chasm I stood on the nest of a species of mound ant (*Iridomyrmex detectus*), which fortunately did not sting though some did bite. Some water beetles were swimming around in the stream on the way to the chasm. Here also we encountered a small specimen of the curious moloch lizard (*Moloch horridus*) sometimes called the Thorny or Mountain Devil. This harmless animal inhabits the arid areas of Central, South and Western Australia. When mature it is eight or nine inches long. Its head, body and limbs are protected by a series of protruberances each terminating in a spine. The body colour is yellowish to brown with various markings. It is very sluggish and can vary the intensity of its colours (although it cannot change them) to fit in with its surroundings, as it lies "doggo". The aborigines called the lizard "Entarkuma".

Monday and Tuesday were spent about the town and the Jenkins opal collection was visited.

At 3.30 p.m. on Wednesday, 26th, we commenced a four-hour flight to Adelaide. It was interesting to see water in Lake Eyre instead of the salt-encrusted land we saw on the way north. A striking sunset closed the day. The whole western horizon was surmounted by a deep red band which gradually faded into the blue of the sky. Then the whole vista became darker and eventually faded into black as night closed in upon us, and terminated the visit to Central Australia.

ACKNOWLEDGEMENTS

The thanks of the author are accorded to Rev. J. J. McAreavey for identifying the ants and, to Mr. G. Chippendale for assistance in botanical and general matters.

F.N.C.V. EXCURSION TO GENOA DISTRICT—DECEMBER 1957

Errata

- Page 8, line 44—The name "Star Thistle" is mis-applied; the species was actually the Spotted Thistle, *Carduus marianus*.
- Page 13, line 20—"Bearded Glasswort" should read "Beaded Glasswort".
- Page 17, line 12—"Yellow-winged Sittellas" should read "Orange-winged Sittellas".
- Page 17, line 33—"where" should read "were".
- Page 17, line 42—"leaches" should read "leeches".

NATURALISTS' NOTEBOOK

(Reserved for your Notes, Observations and Queries)

DO VISITORS KILL MARSUPIALS AT WILSON'S PROMONTORY?

About a year ago, one of our Country Members Mrs. Ellen Lyndon of Leongatha, visited the Wilson's Promontory National Park, and, in the tea-tree about the Tidal River camp area, picked up the remains of two little animals. The description of one of these was forwarded to Mr. Brazenor of the National Museum, and he replied that he had "little doubt that the animal was a Short-nosed Bandicoot, *Isaodon obesulus*". Mrs. Lyndon's description of the second animal suggests that it was a Yellow-footed Phascogale (Marsupial-mouse).

Now the fatalities at the Tidal River camping area are almost an exact replica of something that happened in January last at Tamboon Inlet, at the mouth of the Cam River in East Gippsland. The victims were little phascogales, which were found by holiday-makers in their week-end cottages. They mistook them for introduced pest mice and disposed of seven of the unfortunates in a single massacre.

It is very probable that the bandicoot and phascogale found at Tidal River had been killed by holiday-makers, too, in ignorance of the nature of these creatures. If this sort of thing is at all general, then it seems that numbers of our little marsupials must come to grief in the beach areas each summer.

It is disturbing to think that protected native animals may die at the hands of campers in one of our National Parks. Could a method of instruction be inaugurated, perhaps in the form of an illustrated pamphlet, for the enlightenment of visitors in Wilson's Promontory?

—N. A. WAKEFIELD

MORE ANCIENT THAN THE COELACANTH

The discovery, in recent times, of living specimens of the fossil fish Coelacanth was sensational enough to receive some publicity in the daily newspapers both here and abroad. However, the sea still yields its treasures to those who seek them, and a few months ago came news that in May 1952 living specimens of an even more ancient form of marine life has been dredged from a depth of more than two miles beneath the surface, off the coast of Mexico.

Hemming Lemche, one of the Danish marine zoologists working on this material gathered by the Galathea research expedition, has described a fragile-shelled mollusc somewhat resembling a limpet. The haul included ten living specimens of the inch-long animal, and three shells. It has been named *Neoptina gelathone*.

The body is especially interesting in that it is divided into five segments each with a pair of gills, excretory organs and related structures. The modern mollusc is unsegmented, but some fossil relatives of *Neoptina* appear to have had six or more segments, suggesting an evolutionary link between arthropods and the segmented worms. Lemche believes it possible that this antique animal, which existed probably 280 million years ago, may have represented a transition from single-footed shellfish and such molluscs as squid.

The stomach contained mainly minute one-celled radiolarians and, in speculating on its feeding habits, the zoologist suggests that it probably lies on its back and uses its weak foot and feathery appendages to obtain its food from the water. Specialists consider *Neoptina* to be an even more amazing find than the Coelacanth, since it represents a much more ancient class of animal which was on the road to extinction when the Coelacanth was just beginning to branch off as a special side-group of the other lobe-finned fishes.

—J. R. GARNET

MICROSCOPICAL GROUP

"Diatoms" proved to be a successful topic for discussion at the July group meeting. There were about a dozen microscopes on the bench, displaying a number of the Club's slides. Mr. H. Barrett explained many interesting points regarding the localities where the various species are to be found; and Mr. W. Black described methods used for making permanent mounts of diatoms.

The group meeting on August 20 will be devoted to "Photo-micrography on 35-mm. films", a practical demonstration by Mr. W. Evans.

WHAT, WHERE AND WHEN

Future F.N.C.V. Meetings:

Monday, September 8—"Field Botany Techniques", by Mr. A. B. Court (with demonstrations and illustrations).

F.N.C.V. Excursions:

Saturday, August 16—Botany Group excursion to Mount Waverley. Take 1.6 p.m. train from Melbourne, or meet at 1.45 p.m. at Mount Waverley station.

Saturday, August 30—Boronia Farm, Kilsyth. Take Ferntree Gully train to Boronia station, then 1.35 p.m. bus to The Basin. There will be a walk of about one mile to the Boronia Farm.

Sunday, September 7—Geology Group Mystery Excursion. Leader: Mr. Hemmy. Travel details at group meeting.

Group Meetings:

(8 p.m. at National Herbarium unless otherwise stated.)

Friday, August 15—Botany Group. Speaker: Mr. A. B. Court. Subject: "Is Australia's Flora Unique?" This will be preceded by a beginners' talk by Mr. A. J. Swaby, commencing at 7.45 p.m.

Wednesday, August 20—Microscopical Group (see above).

Monday, September 1—Entomology and Marine Biology Group. The meeting will be held in Mr. Strong's rooms in Parliament House, at 8 p.m. Enter through private entrance at south end of House.

Wednesday, September 3—Geology Group. Speaker: Mr. Jeffreys. Subject: "What is a Fossil?"

Preliminary Notices:

Sunday, September 21—Combined excursion with Ballarat F.N.C. to Campbelltown. Parlour-coach will leave Batman Avenue at 9 a.m. Fare 24/-. Bookings with Excursion Secretary.

December 26 to January 4—Parlour-coach excursion to Bogong High Plains. See last month's *Naturalist*.

[On Saturday, November 8, the Victorian National Parks Association will hold an excursion to Kinglake. Parlour-coaches will leave Whight's Tourist Bureau at 9.30 a.m. Bookings may be made with Excursion Secretary. Fare 11. Further details later.]

—MARIE ALLENDER, Excursion Secretary,
19 Hawthorn Avenue, Caulfield, S.E.7

The Victorian Naturalist

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PROCEEDINGS

The lecture hall of the National Herbarium was filled to capacity for the General Meeting of August 11. The President reported having sent congratulations to Mr. A. H. Chisholm, both for his award of the O.B.E. and on the publication of the Australian Encyclopaedia.

It was resolved that the congratulations of the Club should be conveyed to the Director and Staff of the Royal Melbourne Botanic Gardens, following the addition of "Royal" to the name of the Gardens.

The President mentioned the appointment of Dr. L. H. Smith as Director of the National Parks Authority, and he invited Club members to attend the V.N.P.A. excursion on November 8.

The speaker for the evening, Mr. Ralph Kenyon, showed a series of colour slides of birds from Yarraville, Coode Island, Hattah Lakes and elsewhere. He strongly advocated the reservation of the Kulkyn Forest, both for its scenic value and to protect its fauna.

It was announced that the question of a memorial to the late Mr. P. C. Morrison was being considered by the National Museum Trustees, and that Council had expressed the Club's willingness to assist.

Mrs. Freame was warmly thanked for fifteen years' work as Secretary of the Hawthorn Junior Naturalists Club. Both she and Mr. Dickins, the President, are retiring. Although Mr. Fisch has agreed to act as Secretary, the help of the Senior Club is urgently needed, especially in the matter of speakers.

Mr. Fisch gave a short, illustrated talk on the Fly Agaric, a poisonous toadstool, which has appeared at Doncester apparently for the first time.

On the recommendation of Council, the meeting elected Miss R. S. Chisholm as an Honorary Life Member. Messrs. Vernon S. Marshall, Byron Young and S. Penny were elected as Ordinary Members, and Christopher Bunnett as a Junior Member.

The meeting adjourned at 10.15 p.m. for the usual conversazione.

GEOLOGY DISCUSSION GROUP

Nineteen members attended the meeting of August 6, with Mr. Blackburn occupying the chair. Mr. Henmy reported on the excursion to the Mineral Gallery at the National Museum, led by the Curator of Minerals, Dr. Beasley, on Saturday, July 5.

After formal business was completed, Mr. Paul Fisch presented his films entitled *The Coastline of Victoria*. As an introduction, Mr. Fisch outlined the occurrence of the Palaeozoic, Mesozoic and Cainzoic eras of the geological time-scale along the coastline of Victoria; the origins of coasts, mountain ranges, bays and inlets by tectonic and eustatic movements; and the work of waves and wind currents in the forming of sand-bars, and sand-dunes. The colour films showed the results of these processes, representing (1) Geological Horizons, (2) Waves, (3) Erosion, (4) Marine Life; and they covered the coastline from Wilson's Promontory, via Western Port and Port Phillip Bays, to Cape Bridgewater west of Portland.

Specimens exhibited by members included silicified wood from Berwick, phosphate rock from Christmas Island, sulphur from India, a collection of uncut gemstones, and structural, mineral and petrological specimens from coastlines of Victoria.

DAVID GEORGE STEAD MEMORIAL FUND

A call is being made by a committee under the auspices of the Wild Life Preservation Society of Australia for donations to a fund for the establishment of a memorial to the late D. G. Stead. It is proposed to establish a scholarship, an annual grant for works that would assist Nature Preservation, an annual essay competition, or some such suitable memorial.

Contributions to the fund should be made payable to "The Wild Life Preservation Society of Australia", and may be sent to Miss K. E. Elger, 15 Gale Street, Ryde, New South Wales.

F.N.C.V. LIBRARY—OVERDUE LOANS

The Librarian once again appeals to members to return overdue loans promptly; the response to date has been very disappointing. It is pointed out that failure to return publications within a reasonable time results in other members being denied access to much valuable knowledge; the Club is also involved in unnecessary expense and waste of time in sending notices to dilatory borrowers. It is hoped that regular lists of overdue loans—the latest of which is published below—will serve to remind the members concerned that their loans are overdue for return:

- What Butterfly is That?* (2 volumes), by Waterhouse.
- Life Stories of Australian Insects*, by Brewster.
- The Life of the Bee*, by Meaterlink.
- The Insect Book*, by Froggatt.
- Insect Wonders of Australia*, by K. McKeown.
- Australian Thrips*, by Kelly.
- A Year on the Great Barrier Reef*.
- Some Useful Australian Birds*, by Froggatt.
- Our Feathered Friends* (Gould League).
- Tasmanian Birds*, by Sharland.
- Birds of East and North America*.
- Parrots of Victoria*, by Leach.
- Birds of Jamaica*, by Gosse.
- Australian Finches in Bush and Aviary*, by Cayley.
- British Birds' Eggs*, by Atkinson.
- Bird Study in Australia*, by Holmes.

NEW ABORIGINAL ROCK PAINTINGS IN THE VICTORIA RANGE

By A. MASSOLA

The Victoria Range, the western formation of the Grampians, is, possibly on account of its remoteness, the least-known part of that magnificent system. It was first seen, and named, by Major Mitchell, in 1836, as he stood on Mt. Arapiles, whilst on his epic journey to the coast. He wrote: "From this summit I had a good view of the Grampians of the south, and, discovering that a lofty range extended from them southward, I named it the Victoria Range."

The district was first occupied by H. N. Simson, who, in June 1843, took up the station known as Glen Isla. Five miles east of the station, following the Forest Track through a vast area of swamps and forests of heaths, banksias, hakeas and other sand-loving vegetation intersected by numerous creeks, one reaches the spurs of the range. Huge rocky outcrops of weird and fantastic shapes are piled in indescribable disorder, giving the traveller that feeling of puniness experienced when confronted by the grandeur and majesty of Nature. The vegetation changes, too, and assumes that characteristic "Grampian" beauty and quality which makes those ranges a tourist's paradise.

Some three hundred yards from the north bank of Billimimah Creek, close to where it leaves the spur of the range, stands the huge rock known as the Painted, or Red Rock, which was the first rock shelter bearing aboriginal paintings reported for Victoria. According to a manuscript note by R. E. Johns, P.M.* (dated 1894 and now in the National Museum), it was discovered in or about the year 1859 by Mr. Samuel Carter, the then owner of Glen Isla. Although at the time there were many blacks in the neighbourhood, none of them knew of the drawings nor could they explain their significance. This spot is so extremely rugged and covered with dense vegetation, that the Rev. John Mathew, who first published a description of this shelter and of a smaller one close by, in 1897, stated that although the oldest blacks amongst his guides professed to have seen it in their boyhood, they still could not find this rock in spite of a day's deliberate searching. The authorship and date of execution were alike unknown to them. Mathew also states that this shelter was discovered by Messrs. Muirhead and Carter in 1866, so we have here a discrepancy in the reports of its discovery.

The rock is a magnificent sight, and many subjects, including human figures and kangaroo hunts, are depicted on it. Paintings of lizards are numerous also.

* For details of R. E. Johns, see under "The Challicum Bunyip", *Vict. Nat.* 14: 52 (1957).

Years later, in March 1929, another shelter bearing paintings was described by A. S. Kenyon. This one, also in wild and lonely country, is some miles to the south-west of the Red Rock, near where the Billywing Creek issues from the range, almost at the base of that remarkable and mighty pile known as the Fortress, or Castle Rock. This rock shelter is situated about a mile from, and on the north side of the creek. Because of the prevalence of stencilled hands it was named the "Cave of the Red Hands". Other paintings on its wall include human figures and lizards.

Later again, in April 1943, a fourth rock shelter was located in this vicinity. This one is about three miles west of the Red Rock, in such wild country that in 1956 the present writer and his companion and guide, Mr. I. R. McCann of the Stawell Field Naturalists Club—a competent bushman, had the utmost difficulty in even following the "blazed" trail that led to it. This shelter has been christened the Bringower Cave, after the name of the homestead of its discoverer, Arthur Matthews. It is also known as the Cave of Fishes, because the lizards painted on the wall of this shelter were believed to be fishes by Charles Barrett, who first described it. He even pronounced them to be a "small freshwater fish, probably a hardyhead, which occurs in the Glenelg River". In the same account he stated that in the deep and rugged gorge, as yet unexplored in which this shelter is situated, "may be hidden the mystery cave whose existence was made known to settlers by the last men of the Billiwing or Balmoral tribe. They knew its location, but they would not guide a whitefellow to the secret burial place of their chiefs or headmen. The cave, they said, was sealed by great rocks. It contained not only the skull and bones of their 'kings' but also a treasure of ceremonial stones and other sacred objects". It is a great pity that Barrett did not give us his reference.

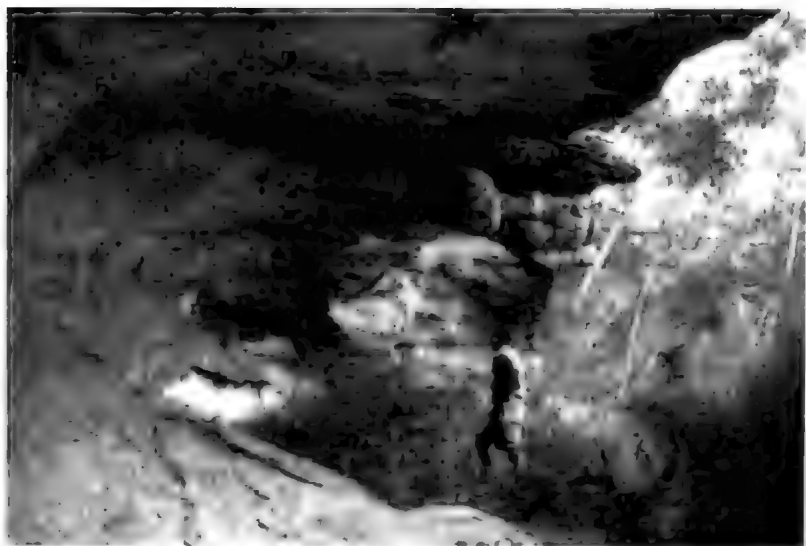
In February of this year (1958) an expedition* was formed to search the vicinity of the Cave of Hands for a further shelter. There were persistent rumours that one had been seen in that locality, although its exact position could not be ascertained. Later on, however, J. H. Clarke, Forest Officer of Whoolpoor, gave the writer more precise information:

About half a mile upstream from the Billywing camp the creek bubbles merrily through a natural tunnel, a beautiful, cool spot, the home of ferns and mosses. On the wall of this tunnel the expedition found two stencilled hands. Upon closer examination, however, it was decided that they were the work of white men. They just did not look right, especially as they appeared to have been made with red paint.

* Members of the Expedition were I. R. McCann of Stawell, C. O. Krocker of Harsham, and D. Littlewood, P. Cummings, M. Richmond, C. Toban and the writer, all of Melbourne.

But the next day Dame Fortune smiled upon us. Not one, but two shelters were discovered.

The first one, about 250 yards from the camp, and which Mr. McCann named the Billywing Shelter, because of its proximity to Billywing camp, is about 31 feet wide and approximately 9 feet deep. Part of the back wall has a smooth surface on which a number of lizards have been painted in red ochre. Eight are clearly distinguishable. Possibly there were others which have now faded. These lizards are about 7 inches long and half an inch wide. They are the only paintings in this particular shelter.



"Drual" Rock Shelter.

Photo: C. O. Kroker

On the other side of the creek, about two-thirds of a mile from its northern bank, there is a rock mass which is visible from the camp. Upon examination it proved to be the crest of a huge tor, on the southern base of which there is a large shelter, 55 feet long and 18 feet deep. The floor there is sandy, but as the shelter faces south and the ceiling is very high, it affords but little protection from the weather. On the west end of this shelter a human figure 12 inches high has been painted in red ochre.

Beside it are several "bird tracks" in white pipeclay. Other figures and drawings were there, too, but now are badly stained by the dampness and are unrecognizable. The situation of this shelter is not conducive to the preservation of paintings executed in earth

pigments. There can be little doubt, however, that at one time this part of the wall must have been richly decorated. For this shelter I suggest the name "Druul" which in the language of the local tribe means "Blackfellow". This refers to the human figure painted on the wall.

The natural thought that comes to the mind at this point, remembering the plurality of painted shelters in this wild and desolate though beautiful spot, is that they no doubt served an important purpose in the life of these people. Chapter 4 of Spencer and Gillen's classic work, *The Native Tribes of Central Australia*, is devoted to the Totems of the Aranda tribe, and in it one finds the answer to our present problem :

"Though differing from one another in many points, there is a fundamental unity in customs, sufficient to indicate the origin of all Australian tribes from ancestors who practised certain customs which have been developed along different lines in different localities.

"The wanderings of certain groups of Alcheringa (that is, Dream time, or in the Long Ago) ancestors, each of whom carried one or more sacred Churinga (that is sacred cult objects) with each of which is associated the spirit part of an individual. Where Churinga are deposited, their local totem centres are formed, the native name of which is Oknanikilla (in Aranda). Each Oknanikilla is associated with one totem, and when a child is born it is one of the spirit individuals resident at a particular spot which goes inside a woman, and therefore its totem is the totem of the spirit associated with that spot."

In chapter 5 of *The Arunta*, the same authors state that :

"Every prominent feature in the landscape of the Arunta country, whether it be a solitary mulga tree on a stony plain, a water-hole, a low ridge or a high mountain peak, is associated in tradition with some Knanja or totem group."

These authors make it clear that, in fact, the features of the landscape are but landmarks closely connected with the activities of the Ancestral Being, progenitor of the totem, while he was on earth. Here he sprang from the ground; there he hurled his boomerang, which made a fissure on the face of the cliff; there is the depression where he laid down to rest; here is the gap he made as he walked from one valley to the other. Finally, he felt very old, and turned into this rock, or went underground in that cave. Other Beings associated with him figure in the mythologies. Sooner or later these too are turned into huge rocks, or any other unusual topographical feature. The sacred objects that all these beings are carrying also turn into stones and rocks in caves. When a woman feels she is with child, it is because the spirit of the ancestor, lurking in the rock or water-hole which has become his home, and which the woman has unwittingly approached, has entered her, seeking rebirth. When born, the child takes the totem of this ancestor, of whom he is supposed to be the reincarnation. Later, when initiation time comes, the youth will be told who this ancestor was, and will be taken over

the actual route the ancestor is supposed to have trod. At this time every feature of the landscape which is connected with the tradition will be pointed out to him. The paintings in the shelters will be refreshed in readiness for this occasion. These, veritable pictographs, will help to impress in the youth's mind the mythologies of his totem.

In the Victoria Range, the same thing has happened. We don't know anything about the group who owned it, other than that it was a section of the Buandik, a South Australian tribe, which ranged from Mt. Gambier to Hamilton and along the Glenelg and Wannon Rivers. At the time of the first European contacts the Buandik were being pushed southwards, towards Casterton, by the Jardwa, a Wimmera tribe. This may explain why the natives who were with



Copy of Paintings in "Billywing" Shelter.
($\frac{1}{4}$ actual size).

Mathew, and who possibly were members of this latter tribe, disclaimed any knowledge of the meaning of the paintings on Red Rock.

This may also account for the "mystery cave" of Barrett. In any case, the natives would not be anxious for the white strangers to desecrate their initiation grounds and the spiritual homes of their ancestors. No aboriginal tribe ever had a special burial cave reserved for their "kings". But there could be caves into which the mythical ancestors of the various totems disappeared. Their skulls and bones, and the "treasure of ceremonial stones", would in this case, simply be represented by natural rocks.

Because of the prevalence of lizard paintings in all the shelters in this vicinity, I would be inclined to regard this locality as sacred to the lizard totem (in Buandik, "Burti Ngun-ap"), and I would suggest that it was chosen as the spiritual home of the lizard or Ngun-ap, because of the towering and distinguishing pile of Castle Rock, which no doubt was prominent in the legends about this Burti.

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(The Red Rock.)

WATER BIRDS IN GIPPSLAND, JANUARY 1958

By N. A. WAKEFIELD

With drought conditions prevalent in the Murray-Darling basin, last summer brought a remarkable influx of water birds to less parched southern localities, and Gippsland had its share of these. The notes which are presented here comprise some of the more interesting observations, made over a period of three weeks, during excursions into East Gippsland, and they deal mainly with the country from about Sale to the Orbost area. Some of the birds commented upon are either residents or regular summer visitors in the region, but at least two of the observations constitute new records for Gippsland.

On January 7, about an hour was spent moving from point to point round the small sanctuary, known as Lake Guthridge, in the township of Sale. On the shores were many hundreds of Silver Gulls, some scores of Eastern Swamp-hens and a few Spur-winged Plovers and White-faced Herons. On the water were great numbers of Coots, many Black Swans and Dusky Moor hens, a dozen or so Hoary-headed Grebes, two or three Little Grebes and several Black Cormorants.

But it was the wild duck population of this place that was outstanding. Grey Teal were numerous; Chestnut Teal, Black Duck,

Hardhead and Blue-billed Duck were all quite well represented, there were a few Musk Ducks, a single Pink-eared Duck and a solitary female Blue-winged Shoveler.

The same spot was visited again on January 16, and on that occasion there were twenty-one Pink-eared Ducks on the water, and also what appeared to be a solitary Freckled Duck. The latter was not observed sufficiently however, and this must be regarded as an unconfirmed record.

On this second occasion there was a single Great Crested Grebe on the lake. The invasion of southern Victoria by this species was a feature of the past summer season. It was seen also on estuaries and lagoons at Mallacoota, Tamboon Inlet, Orbost and Lakes Entrance, and there was a group of eight on a swamp near Providence Ponds.

On January 12, a short time was spent by the LaTrobe River at Longford, and members of the heron order were the focus of interest. Straw-necked Ibis and White Ibis were intermingled there in a large flock of several hundred, but this was only a small fraction of the aggregate of ibis scattered in Gippsland last summer. Spur-winged Plovers numbered about a hundred in a single flock, but again this was not exceptional, for similar large groups of these birds were seen within a week or so at both Buchan and Bairnsdale.

The highlight of this day was the observation there at Longford of four species of egrets. There were two at a small lagoon, one White Egret and one Plummed Egret; and on the bank of the river was a third bird, whose two nape plumes and black beak identified it as a Little Egret. With the last there were three individuals with white body, flesh-pink beak, dark legs, and the whole of the head, neck, mantle and upper breast a light orange-chestnut colour. These were Cattle Egrets, a species which has been seen in Victoria on very few occasions and which has not previously been recorded for Gippsland. (See appended note.)

On one of the properties on the Wulgulmerang plateau, about thirty miles north of Buchan and over 3,000 feet above sea level, there is a tiny lake, locally known as "the sanctuary" or "Emu Lake". In the early morning of January 17, a count was made of the water birds at this spot. There were 6 Black Swans, 124 Grey Teal, 10 Black Duck, 18 Blue-winged Shovelers, about 30 Manded Geese (Wood Duck), 3 Hardheads, 24 Coots, 11 Hoary-headed Grebes, 2 Little Grebes, 2 Spur-winged Plovers and a White-faced Heron. In a marsh nearby was a pair of Yellow-billed Spoonbills and two White-necked Herons; and somewhat further afield there were single individuals of both the Little Pied and the Little Black Cormorants.

Numbers of cormorants invaded the Gippsland streams this year, systematically "working" them from the coastal districts to the sub-alps, and cleaning out trout and other fish almost completely. A

few Pelicans appeared in the Wulgulmerang area too, earlier last summer.

The greatest concentration of water birds seen was in the vicinity of the mouth of the Snowy River, on January 22. On the Backwater, just east of the township of Marlo, the Black Swans, Grey Teal and Coots were so numerous that no attempt was made to estimate numbers, and there was a strong representation too of both Black Duck and Hardhead.

North-west of Marlo, on a swamp near the Brodribb River, there were vast flocks of Grey Teal, Chestnut Teal and Coots; and about the margins a hundred or so each of Straw-necked and White Ibis, and a solitary White Egret.

Interesting observations are often to be made at Bosses Swamp near Nicholson River, several miles east of Bairnsdale. On January 25, drying mud-flats had replaced the sheets of water which are normally there, and amongst the several species of water birds there were some Red-kneed Dotterels. This species has not been recorded previously for Gippsland. Three of these beautiful little birds were feeding in company with about fifty Sharp-tailed Sandpipers. Of interest too were the few White-headed Stilts, though a few weeks earlier (January 6) there was a flock of twenty-one of these lanky individuals at the same spot.

On the following day, January 26, excursion was made down-river from Bairnsdale, towards Eagle Point. To the right of the road is an extensive marsh, and that too was alive with water birds. There were the usual large numbers of Black Swans, Black Duck, Grey Teal and Coots: White Ibis and both the Yellow-billed and the Royal Spoonbills were numerous; and about a score of White Egrets, a similar number of White-headed Stilts and a single White-necked Heron were feeding in the shallows.

Flock after flock of small waders were seen flying from the direction of Bairnsdale, and later these were found to be congregated in a vast flock of some thousands at the end of the marsh. They were approached and scanned carefully in the hope that there might be some unusual species present, but, except for a solitary Little Stint, they were all Sharp-tailed Sandpipers.

Note. The Cattle Egret is a native of southern Asia (India, etc.), and it was introduced into the Kimberley district of Western Australia in 1931, to combat cattle ticks, this being its natural diet. The species became acclimatized and spread gradually across the Commonwealth. On January 18, 1949, it was recognized for the first time in Victoria, when a single bird was observed by Dr. A. G. Brown at Cororooke near Lake Colac. (Ref. *Emu* 49: 25.) The other published records for Victoria are:

Albury—One bird seen on January 16, 1955, by J. Watson. (Ref. *B.O.C. Notes*, Melb., February 1955.)

Laverton Salt Works—One seen on January 22, 1955, by F. Smith. (*B.O.C. Notes*, July 1955.)

Mystic Park—At least twenty observed on January 13, 1957, by P. A. Bourke and others. (*Emu* 57: 301.)

LIGNOTUBERS

By M. M. CHATTAWAY

Almost everyone is familiar with *lignotubers* in their most extreme form of development, as mallee roots burning on a fire or stacked in the wood-heap against the onset of winter, but not everyone is aware that this is only the end form of a series of swellings such as occur at the base of the main stem in the majority of eucalypts and which vary in different species from the size of a pea to a considerable lump of hard woody tissue. In most species the lignotubers are overtaken by the normal growth of the stem and are no longer visible by the time the tree has reached the pole stage; in some they are easily overlooked unless very young material is examined.

The question of lignotubers is quite important from a practical angle as they are one of the main regenerative regions of the species in which they occur. They are woody masses of storage tissue: fibres, tracheids and parenchyma cells are all packed full of starch, and the ray cells contain protein also. Concealed and dormant buds occur, often in considerable numbers, and, like the "eyes" on a potato, they grow out into new shoots when the need occurs. Though most species of *Eucalyptus* have lignotubers, there are some, and among them are important commercial timbers such as Mountain Ash, Karri and Alpine Ash, in which they do not develop.

The results of anatomical research show that the important spots for this development in the young seedling are the lowest leaf nodes and the nodes of the *cotyledons* or seed leaves. It is here that the lignotubers arise, and here that one would expect to find any differences between the tubering and non-tubering species.

The normal leaf node of a eucalypt stem has a naked bud between the main axis and the leaf stalk or *petiole*. This bud may grow out into a side shoot, or it may shrivel or be discarded. In the latter case it is cut off by an *abscission layer* just as an old leaf drops away from the stem. But there is another bud at this spot on the stem, the *concealed bud*, hidden away under a flap of protective tissue, but ready to grow out if defoliation of the crown is severe, as after a fire or insect attack (Figure 1). The protective flap can be seen with the naked eye in some species. If they are not called into action these buds persist throughout the life of the tree and the strands that connect them with the woody tissue of the trunk keep pace with the increasing diameter of the tree. As the tree gets older they proliferate and form the clusters of epicormic shoots that re-foliate many eucalypt species after a forest fire (Jacobs: *Growth Habits of the Eucalypts*, 1955).

If we now look at the lowermost leaf nodes and the cotyledonary nodes we find that there are, in most eucalypt species, *two* concealed buds (Figure 2), one above the naked bud and one below it. The

young lignotuber forms above the naked bud, appearing first as a swelling on the stem and later incorporating the concealed bud (Figure 3). This downward growth appears to continue during the life of the lignotuber, for Jacobs (*loc. cit.*) states that, "if lignotubers are exposed by excavation, they tend to develop shoots from the lower part only. The lower part is really the younger, because the structures grow and bury themselves by enfolding down the root".

Out of the 46 species examined the majority have the double set of buds in the cotyledonary nodes, but *E. floektoniae* Maiden, *E. fraainoides* Deane and Maiden, *E. ichmanni* Preiss, *E. nitens* Maiden, *E. oreades* R. T. Bak. and *E. regnans* F. Muell. have only a single concealed bud below the naked bud, so that the cotyledonary and lower leaf nodes are indistinguishable from the other leaf nodes. It is significant that these are all non-tubering species and is additional evidence as to the importance of the upper buds in lignotuber formation.

But there are other species which do not seem to make lignotubers although they have the double set of buds, and these present a real puzzle. Among the species which are consistently non-tubering are *E. ustringens* Maiden, *E. camaldulensis* Dehn., *E. diversicolor* F. Muell., and *E. pitularis* Sm., all of which have the normal double bud complex of the commonly tubering species. Clearly in these there must be some other factor involved which prevents lignotuber formation. Early workers suggested that site conditions were responsible, but more recently it has been shown that neither maltreatment of the severest kind nor growing in the most variable sites could cause lignotubers in pure strains of *E. camaldulensis*, nor does this

species produce tubers when it grows far from its natural habitat in the Middle East or in Italy. Therefore, some other factor than either

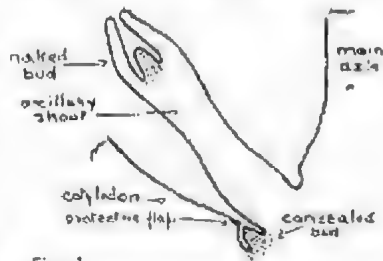


Fig. 1

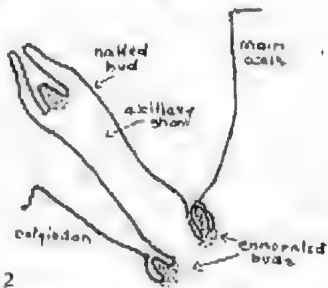


Fig. 2



Fig. 3

FIG. 1.—Diagram of leaf node.

FIG. 2.—Diagram of cotyledonary node.

FIG. 3.—Development of young lignotuber.

the anatomical structure or environmental conditions must be looked for to explain the non-tubering of such species as *E. astringens*, *E. camaldulensis*, *E. pilularis* and other species in which the presence of the double set of buds in the cotyledonary and lower stem nodes provides the necessary anatomical mechanism for lignotuber formation.

A NEW HELICHRYSUM FROM TASMANIA

By R. V. SMITH*

HELICHRYSUM COSTATIFRUCTUM R. V. Smith sp. nov.

Frutex erectus 1-2 m. altus, foliis perpendicularibus, crescentibus, reflexis ciliatis. *Tomentum* in partibus superioribus et inflorescentiis densum, in partibus veterioribus sparsius, e laxo nexu maxime irregulariter undatorum toriorum diffusorum pilorum constructum. *Folia* linearia oblonga 0.5-2.8 cm. longa, 1.5-3 mm. lata, apice obtusa, marginibus revolutis, crassa, coriacea, super glabrescentia, mediana costata profunde impressa; subter excepta costa mediana in foliis veterioribus glabrescentia dense pilosa. *Inflorescentiae* in laxe ramosis terminalibus paniculis. *Capitulae* floribus juvenibus urceolatae, floribus maturis hemisphaericae vel campanulatae. *Bractae exteriores* involucrales pallidae fulvae sparse lanatae. *Bractae interiores* ungue angusto crasso, lamina conspicua erecta vel plus minusve diffusa cremoricolori oblonga marginibus crenulatis laciniatis limbriatis praedita. *Flores* plurimi hermaphroditi tubulares, perpauci autem ioeninei. *Achenia* alba paene glabrata conspicue costata. *Setae* pappi per maiorem partem longitudinis minute barbellatae, sed in apicibus conspicue crassatae. Affinis et *H. reticulato* et *H. gunzii*, ab utroque tomento, bracteis involucralibus, acheniis et aliis rebus differt.

HOLOTYPE in Herb. MEL—Flowerpot, near Woodbridge, S.E. Tasmania, Dr. W. M. Curtis, March 1958.

Erect shrub 1-2 metres high. When growing leaves held at right angles to stem but becoming reflexed on drying. *Tomentum* dense on upper parts of stems and on the inflorescences, but becoming sparser on the older parts, and consisting of a loose tangle of very irregularly waved and twisted spreading hairs. Leaves linear oblong 0.5-2.8 cm. long, 1.5-3 mm. broad, blunt pointed and with revolute margins, thick, coriaceous, glabrescent above and with the midrib deeply impressed. Lower surface densely hairy on either side of the midrib which is glabrescent in the older leaves. Inflorescences in loosely branched terminal panicles. Capitulae vary from urceolate in the young flowering stage to hemispherical or campanulate at maturity. Outer involucral bracts pale tawny in colour, sparsely woolly. Inner bracts with a narrow thickened claw, and conspicuous erect or slightly spreading creamy-white oblong lamina with crenulate lacinate fimbriate margins. Florets in most cases over 30 in each head, and vast majority hermaphrodite tubular, but with occasional female florets present. Achenes white, almost glabrous, and prominently ribbed. Pappus bristles minutely barbellate for most of length, but conspicuously thickened at tips. Affinities with both *H. reticulatum* and *H. gunzii*, but differing from both in tomentum, involucral bracts, achenes, and other characters.

Distribution.—Southern Tasmania: D'Entrecasteaux Channel, Rev. John Bufton, 1895 (MEL); Tasman Highway about 70 m. S. St. Mary's, L. E. Burchell, 22/1/1954 (MEL); 1 mile N. of Middleton, Dr. R. Melville, n.2417, 16/11/1952 (K).

I am indebted to Dr. W. M. Curtis for type material of this species, and to Mr. C. H. Gellie of the University of Melbourne for help in preparing the above Latin diagnosis.

* National Herbarium of Victoria.

THREE MONTHS WITH AN ORCHARD SPIDER

(*Celaenia excavata*)

By J. H. WILLIS

One of the most gripping wildlife episodes ever written in Australia came from the nocturnal observations of our Past President and distinguished entomologist, Mr. Tarlton Rayment, 16 years ago. In *Walkabout* 8^o: 10-15 (June 1942) he told a story—"The Omon-net of a Spider"—accompanied by ten dramatic illustrations. The whole thing made such an impression that I was driven to repeat his experience in my own back yard, following it up with observations extending over twelve weeks. And, if any other nature-lover craves a spectacle of profound wonder close at hand (or is suffering from boredom!), I confidently recommend him to sit up half the night with a torch, as my wife and I did, watching *Celaenia* construct her amazing egg-cocoon and lay her myriad eggs therein. Following is a diary of events as I recorded them at Durrant Street, Brighton, in the autumn of 1943:

- Feb. 25—Spider first observed, squatting on two woven leaves of Mexican Orange (*Choisya ternata*): one egg-cocoon hanging down beneath.
- Feb. 26—8 a.m. Spider noted sucking juices from a large grey moth held "end-on".
10.15 p.m. Spider hanging like a pendulum by one leg and commencing to weave a new egg bag.
- Feb. 27—12.15 a.m. The second egg-cocoon filled with eggs (2 hours after it was begun).
2.15 a.m. Spider still busy (after 4 hours' work), putting dark camouflage streaks on completed second cocoon by some heavy secretion from spinnerets.
- Mar. 3—8 a.m. Sucking juices of another large moth.
- Mar. 8—12 (midnight). Just commencing third egg-cocoon, which was completed by dawn and smaller than other two.
- Mar. 15—10 p.m. Sucking another moth.
- Mar. 18—7.30 a.m. Ditto.
- Mar. 23—2.30 a.m. Fourth egg-cocoon commenced and completed by 7.30 a.m. (almost 5 hours' work).
- Mar. 28—8 a.m. Sucking a moth.
- Mar. 29—8 a.m. Ditto.
- Mar. 29—11 p.m. Ditto.
- Mar. 31—8 a.m. Ditto.
- Apr. 5—8 a.m. Ditto.
- Apr. 6—10 p.m. Fifth egg-cocoon just completed; spider noted resting under leaf with a pad of silk held over her distended spinnerets by last pair of legs.
- Apr. 12—8 a.m. Sucking a moth.
- Apr. 18—8 a.m. Ditto.
- Apr. 21—8 a.m. Ditto.
- Apr. 22—8 a.m. Ditto.
- May 2—1 a.m. Ditto.
- May 7—8 a.m. Sixth egg-cocoon completed.
- May 20—8 a.m. Sucking a moth.
- May 21—10 p.m. Sucking 3 moths, one after the other.

Thereafter the spider made no more egg-bags and observations were discontinued. It will be noted that the periods between cocoon constructions were 10, 15, 14 and 30 days, variations for which the writer can advance no explanation. The definite count of moths for this 3-month period was 18; but many more must have fallen victims while the observer was otherwise engaged—

Rayment recorded 34 moths (at least) for his 3-month vigil between Nov 1941 and Feb. 1942, and that spider took just 3 hours to complete an egg-bag.

Note: During the summer of 1957/58, an Orchard Spider in the garden of Miss Gwen Neighbour (at Brighton) made a cluster of *trilobed* egg-coconans—possibly a record for this amazing little architect.

BOOK REVIEW

Triggerplants, by Rica Erickson—229 pages, 62 plates. Price, £2/5/-.

From Western Australia, appropriately has come another botanical work of great importance not only to the naturalists of that State but to naturalists generally in Australia.

In 1951, Rica Erickson brought to the public and for the public a most delightful publication, *Orchids of the West*, a manual which was welcomed by all naturalists at that time, and which set a standard for all such botanical works. Now she has come along with an equally interesting and valuable companion volume—*Triggerplants*, a botanical study of an Australia-wide group of plants.

In this work, Mrs. Erickson has presented to her readers not only an interesting account of these remarkable plants, but has demonstrated that it is possible to produce in one and the same volume, a treatise of considerable botanical merit. She rightly states at the commencement of her book, that this group of plants has had, in the past, scant treatment in Australia, two major works only—one now completely out-dated and the other in a foreign language—being available for systematic and other workers. She deserves very great credit for the painstaking and accurate observations she has made, the nine delightful colour plates of her own artistry, and the easy manner in which she has presented her facts for the reader to understand and absorb.

The type of key to the Identification of Species of Triggerplants in Chapter 2 is however a most unusual one and one that could shock many serious workers in botany. The use of such arbitrary terms as "ephemerals", "creeping", "stick-like", and "rosetted" as major groupings, followed later in the same key by true botanical characters for separation of species, is at first sight somewhat confusing and likely to create false impressions. The main point, however, as Mrs. Erickson is careful to point out, is that, on the present state of knowledge of this group, the key works, and can be of the greatest value to the naturalist trying to identify for himself any of these interesting plants.

While one is loath to criticize this excellent more-than-popular work, there are several matters in its set-up which react adversely to its value. The inclusion, so early in the first chapter, of the Pollen Studies of Tarlton Rayment draws attention away from the main purpose of this chapter. In my opinion, these studies should be more correctly placed as an Appendix at the end of the work. Similarly in Chapter 7 the section entitled "Tripping the Trigger" is surely out of place. It is fundamental material of the whole group, and is worthy of a much more prominent place. I would suggest Chapter 1.

The use of distribution maps is always an important part of such a publication as this, and can frequently give leads to further fields of study. It is a matter for regret that 29 different maps representing more than 100 species should be crowded on to two pages.

Mrs. Erickson, following her *Orchids of the West*, is to be congratulated on producing a much wanted guide to this fascinating group of plants. It can be recommended both to the field naturalist in his amateur studies and to the serious student, as a stepping stone towards more detailed and wider studies.

The work is carefully and well produced by Paterson Brokensha Pty. Ltd., the well known publishers of a number of natural history publications in Western Australia.

—R. T. M. PESCOTT

THE MICROSCOPICAL GROUP

At a well attended meeting on Wednesday, 20th August, Mr. W. Evans delivered an interesting lecture on "Practical Photo-micrography on 35 mm. film". Mr. Evans has a thorough knowledge of this branch of his hobby, and his lavish display of gadgets in connection therewith were the envy of those present.

At the September meeting of Wednesday, 17th, Mr. E. Snell will demonstrate the "Preparation, sectioning, and mounting of Sea-Urchin spines". Please bring your "mikes" and appropriate slides.

WHAT, WHERE AND WHEN

F.N.C.V. Meetings:

Monday, October 13—"Caves and Bats", by E. Hamilton-Smith.

F.N.C.V. Excursions:

Sunday, September 14—Cheltenham Park. Leader: Mr. Brooks. Meet at 2.30 p.m. at Park gate (just beside station).

Sunday, September 21—Campbelltown. Leaders, Ballarat F.N.C. Parlour-coach will leave Batman Avenue at 9 a.m. sharp. Bring two meals.

Sunday, October 5—Entomology and Marine Biology Group excursion to Burke Road Bridge. Meet at bridge at 2.30 p.m.

Sunday, October 12—Heathmont to Bayswater. Leader: Mr. Haase. Take 9.48 a.m. train to Heathmont. Bring one meal.

Group Meetings:

(8 p.m. at National Herbarium unless otherwise stated.)

Friday, September 12—Botany Group. To commence at 7.45 p.m. with a "Beginners' Talk" by Mr. Swaby, followed by the subject for the evening, "Eucalypts", by Mr. E. S. Hanks.

Wednesday, September 17—Microscopical Group. "Preparing and Mounting Sections of *Echinus* spines", by Mr. E. Snell.

Wednesday, October 1—Geology Group. Speaker: Mr. Blackburn. Subject: "Further Studies on Volcanism".

Monday, October 6—Entomology and Marine Biology Group. The meeting will be held in Mr. Strong's rooms in Parliament House. Enter through private entrance at south end of House.

Friday, October 10—Botany Group. Members' Night. The meeting will commence with a "Beginners' Talk" by Mr. Swaby.

Preliminary Notices:

Friday, October 17—Sunday, October 19—Botany Group camp-out at the Granpians. Transport by private cars, leaving Friday evening.

December 26-January 4—Bogong High Plains. Transport by parlour-coach from Melbourne and for day trips. Bus fare, £7/10/-. Accommodation available at Falls Creek—14 to 16 guineas per week. The whole Chalet will be reserved for the party if it numbers 25 or more. Deposit of £5 should be paid to Excursion Secretary by October 15. Further details to be published later.

[V.N.P.A. excursion to Kinglake, Saturday, November 8: Parlour-coaches to leave Whight's Tourist Bureau at 9.30 a.m. A naturalist is needed to lead each coach party; those prepared to act in this capacity should contact the Club President. F.N.C.V. members should pay fare (£1) to Excursion Secretary.]

—MARIE ALLENDER, Excursion Secretary
19 Hawthorn Avenue, Caulfield, S.E.7

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PROCEEDINGS

About one hundred members attended the General Meeting of the Club in the National Herbarium on September 8. In the absence of Mr. Garnet, the Chair was taken by a Vice-President, Mr. D. E. McInnes.

At the invitation of the Chairman, Mr. H. Stewart spoke of the passing of two former members, Mr. G. N. Hyam, a former President, and Mr. H. F. Clinton. Those present stood for a minute in silence, in tribute to their memory.

Mr. A. B. Court gave a lecture in which he explained generally the correct method of collecting and preserving plants, and he discussed the procedure used in plotting the distribution of plants, illustrating this with maps of a current survey of the Dandenongs and explaining some of the difficulties encountered in evolving a satisfactory system. Mr. Court was thanked warmly by the Chairman.

Mrs. Pauline Glenie, Mr. and Mrs. R. K. Morrison and Mr. William Hosmer were elected as Ordinary Members, and Misses Robyn and Cheryl Morrison became Junior Members.

Mr. C. J. Gabriel showed two common marine shells, *Cymatillesta spengleri* and *C. waterhousei*, and explained the difference between them. Among other exhibits was a legless lizard from Deer Park, and the exhibitor, Mr. R. L. Jenz, asked for help in its identification.

GEOLOGY DISCUSSION GROUP

With Mr. Blackburn in the Chair, eighteen members attended the September meeting. Most of the evening was devoted to a Specimen Night, to which the following members contributed:

Mr. McInnes described, with hand specimens and thin sections under the microscope, the appearance of olivine and the altered form, iddingsite, one of the common minerals in the basalt and limbergite rocks of Victoria. He also dealt with a large specimen of flint from Port MacDonnell, South Australia, which occurs in the Tertiary (Miocene) bryozoa limestone of the Mount Gambier district and is washed out by wave action along the coastline.

Master Ian Disney presented his collection of fossil corals from the Silurian of Yass, New South Wales, and a shark's tooth embedded in Tertiary marl, which he recently collected from Beaumaris, Victoria.

Miss Carolan exhibited an aboriginal axe head which she had found at Howqua, Victoria. Roughly fashioned from diabase, it had a ground cutting

edge, typical of Victorian axe heads. The question arose as to whether the diabase was local stone or "traded" from the Mount William quarries.

Mr. Blackburn described from geological maps, the Permian glacial beds of Hallett's Cove and Victor Harbour, South Australia. Specimens showed polished samples, scratched rocks and erratics of granite. Pre-Cambrian rocks from near Adelaide were also described, the specimens showing shearing and slickensides.

Mr. Fisch exhibited specimens of pegmatite, breccia and conglomerate from the Glen Helen Gorge, and siliceous rocks from the Talypitna Ranges in Central Australia.

Mr. Baker described a collection of naturally polished rocks. The origins of the various glossy surfaces were due to the work of water (river or marine), wind, glacial action, animals, rock movements and mineral solutions, as well as desert varnish.

BOTANY GROUP

The monthly meeting of the Botany Group was held at the National Herbarium on Friday, September 12. Seventeen members were present, including Mr. J. R. Garnet, the Club President.

A most informative talk was given by Mr. E. S. Hanks on "Eucalypts". The subject was dealt with from the point of view of the field naturalist rather than that of the botanist. The speaker showed many of his fine colour slides, illustrating differences and various peculiarities to be looked for in order to identify various species. There were other slides depicting many beautiful individual trees. It was interesting to learn from Mr. Hanks that the Western Australian "flowering gum" grew better when introduced into Victoria than it does in its native State. He commented too on the habit of particular species of birds to frequent particular kinds of trees.

Mr. A. J. Swaby continued his "Botany for Beginners", on this occasion following the main speaker. The talk was devoted principally to the identification of monocotyledons and dicotyledons, the features being illustrated with samples of suitable plants.

Arrangements were discussed for the Group's "camp out" at the Grampians on the week-end of October 18-19. Members are making their own arrangements for transport and other details. It is hoped that a good number will make the trip, as the wildflowers should be particularly good this year.

Mr. Garnet informed the meeting that Mr. Pitt, a South Australian naturalist, would be guest of honour at the next Botany Group meeting on Friday, October 10, when he would deliver a talk, illustrated with slides, on his recent travels.

Club members in general are invited to attend the meetings of the Botany Group.

MICROSCOPICAL GROUP

At the Group Meeting on September 17, Mr. E. Snell demonstrated the method of preparing and sectioning sea-urchin spines. There was the usual number of microscopes on the benches, and a selection of these interesting objects was displayed. In some respects they resemble some plant sections, but they have their own colouring and do not need to be stained to demonstrate their beautiful structure.

The meeting on October 15 will take the form of a micro-projection demonstration, and members are asked to bring along a selection of suitable slides in the range of $\frac{1}{2}$ inch, $\frac{2}{3}$ inch, 1 inch and $1\frac{1}{2}$ inch objectives.

IN MEMORIAM: F.E.B.

Those who were members of the F.N.C.P. in the 'twenties and 'thirties have often cause for sorrow as the "giants" of those days go from us. F. Piteher . . . Dr. Sutton . . . H. B. Williamson . . . E. E. Prescott . . . George Coghill . . . Edith Coleman . . . "Effie" Barrett (her friends liked to adapt her initials thus) ; these are some names that come to mind. Each passing has been a loss to the Club, but it was felt more keenly in the case of members, like George Coghill, who were in touch with their fellow members to the last. Those who have been unable to take part in recent Club activities are missed chiefly by older members. Of the latter is our Life Member, Mrs. Charles Barrett, who passed away last October, after a long and painful illness.

Mr. and Mrs. Barrett had been unable to attend Club meetings for some time. Happy exceptions were the Jubilee gathering on May 13, 1940, and the meeting on April 12, 1954, when Mr. Barrett was presented with the Australian Natural History Medallion.

When they were active in affairs of the Club, Mrs. Barrett was one of its most vital members. Older members know how much the wildflower shows of those days owed to her. She was the organizer and mainstay of the Ladies' Committee that worked so hard behind the scenes. Under her direction vases were arranged, washed and filled, interstate exhibits were unpacked, staged and sprayed regularly with water. The most diffident members were drawn into the circle of enthusiastic workers.

Matters that she felt called for criticism were criticized frankly in the interests of the Club. Above all, Mrs. Barrett had the capacity for seeing the best in those she met. It was always the flower, however small and inconspicuous, that she noticed, not the weed or shrivelled leaf.

—JEAN GALBRAITH, Tyers.

F.N.C.V. LIBRARY—OVERDUE LOANS

Members are reminded that books and other publications borrowed from the Library during or previous to July this year are now due for return; they can be renewed if not required for re-issue to other members. The following books are among those overdue:

- Woodward, *The Book of Shells.*
- Boyd and Lanier, *Pearl Divers.*
- Stead, *Giants and Pigmies.*
- Protozoa, Coelenterates and Rhinoderms.*
- Fishes, Accidians, etc.*
- Fitzsimmons, *Snakes.*
- Cadaw, *Amphibia and Reptiles.*
- Land Shells.*
- Kinghorn, *Snakes of Australia.*
- Waite, *Reptiles and Amphibians of South Australia.*
- Popular Science Review, Volume 1.*
- David, *Funafuti.*
- Smiles, *Life of a Scotch Naturalist.*
- Chambers' Scientific Reader.*
- Whyte, *The Wanderworld.*
- Leach, *Australian Nature Studies.*
- Finlayson, *The Red Centre (Vols. 1 and 2).*
- Ellis, *Ocean Island and Nauru.*
- Backhouse, *A Narrative of a Visit to the Australian Colonies.*
- Hogben, *Mathematics for the Millions.*
- Roughley, *Wonders of the Great Barrier Reef.*

GEORGE COGHILL

By J. R. GARNETT

On August 19, 1957, died Mr. George Coghill at the age of ninety-three. By his death the Field Naturalists Club of Victoria suffered the grievous loss of one who was, in fact, a part of its very history. He joined the Club in July 1882, two years after its foundation, and continued as a member for seventy-five years, to the time of his death.

Only two members of the present day can link the two centuries and share with him the claim to such long association with the Club. They are Mr. Thomas Hart who joined in 1887 and Mr. Charles Barrett who joined in 1899.

Although a fitting tribute to the memory of George Coghill was paid at the General Meeting of the Club in September 1957, it is proper that an appreciation of his services to the Club should be recorded in this Journal, as an inspiration to naturalists young and old and as a gesture of gratitude by a Club which has benefited so much by his active membership.

Mr. Coghill's early interest was in Coleoptera. His first exhibit in February 1884 was a collection of them from the Plenty River area. At the Club's fourth conversazione in the following April (and the F.N.C.V. conversaciones were then big events in the social life of Melbourne) his beetles were again exhibited and, no doubt, much admired by the public who flocked to see the wondrous objects gathered together by the exponents of the natural history of the wide-open spaces that were, in those days, Melbourne. Soon after followed the fourth Annual Meeting, at which he was elected Asst. Secretary and Librarian, at the youthful age of twenty. The close association with a band of naturalists renowned in field botany soon caused him to turn his attention to the wealth of plants which thrived in the colony for, in the spring of that year, he was exhibiting "10 species of orchid in bloom".

In early November of 1884 he took part in the Club's first Camp-out, in the Olinda Creek valley near Lilydale. The camp was established in surroundings as attractively primitive as any field naturalist could wish for.

At the Annual Meeting of 1885 he relinquished the office of Librarian but continued as Assistant Secretary, an office he held until 1890. In October of that year the Club held its first Wildflower Exhibition at which he displayed collections of wildflowers from Donald, Box Hill and the Dandenong Ranges. Thus commenced a practice which endured through the years that followed, the exhibition of wildflowers from the lesser known parts of the State, plants collected either by or for George Coghill.

In 1897, after an interval of seven years, he resumed office in the

Club, this time as Secretary. He continued in that capacity for four years, as a member of the Committee for a further three years and then, in 1904, he was elected Treasurer. As Treasurer he continued for fifteen years until 1919.

During this long period several notable events took place. First came the great Buffalo Camp-out during the Christmas holidays of 1903. Its outstanding success was due in no small measure to the organization for which George Coghill was largely responsible. In October 1905 Master Eustace Coghill (the present Secretary of the



George Coghill.

After 70 years' membership.

Club) was admitted at a very tender age as a junior member of the Club. It is not hard to understand how proud the old man was when he learned in the closing years of his life, that the tradition of service to the Club which he himself had established so soundly was to be carried on by a son whom he had, so many years earlier, introduced to the Club. It is, perhaps, merely of passing interest to recall that it was in this era that two other young people whose names today are familiar to most of us became junior members on his nomination—Wilfrid Thomas whose voice is to be heard regularly in his broadcasts from the BBC, and Lucy Bryce, now recognized in the medical world as an authority on blood and transfusion techniques.

Although he withdrew from office as Treasurer in 1919 he remained on the Committee for a further three years. Then at the age of 58, he doubtless felt that the past 40 years of active participation in the management of the affairs of his beloved Club had earned him the right to withdraw into the role of an onlooker. His fellow members apparently thought otherwise, for, in 1924, he once more took his place on the Committee as Vice-President. In 1925 he was elected President, and thereafter remained on the Committee as a member until 1929 when he again assumed office as Vice-President. For two years he served in that capacity, continued as a member of the Committee for a further three years and then, once again, accepted office as Vice-President, an office he then held continuously

from 1934 to 1942. In that year (and you will remember that he was, by then, seventy-eight) he withdrew altogether from active management of Club affairs after what was collectively a truly magnificent record of forty-two years of honorary service to his Club, a record excelled only by the great F. G. A. Barnard, one of the founders of the Club.

Although this is a mere chronological account of the offices held by him, it helps one to understand how much George Coghill loved his Field Naturalists Club. He had grown up with it, he had, for so long, helped in the shaping of its destiny and, during its life, many have been the benefactions large and small for which it is indebted to him, not the least of which is in the bequeathing of a son to carry on the Coghill tradition.

He was among its leaders during its formative years. He was with those who established its reputation as one of Melbourne's foremost scientific institutions. The Club has survived the lean times of two nation-wide depressions and the disasters of two world wars. It has grown in numerical strength and, one may hope, not diminished in prestige, and for this satisfying circumstance present members have to thank men of the calibre of George Coghill, men who have given more than they ever sought to receive, men who have served the community for the enjoyment of it, whose relaxation was the wide world of nature and the unending story that it can unfold.

George Coghill, as well as a prominent field naturalist, was active in the business world. Those of us who know their Melbourne city will remember 79 Swanston Street, where the offices of Coghill and Haughton were established, where many a member of the Club was enrolled, and where the Club's Committee met regularly for so many years. The office is still there, although the nameplate now reads Coghill and Son.

He was a personality in municipal and civic affairs, too, prominent as a churchman and a one-time Mayor of Camberwell. With the few of an earlier generation he was watchful of the garden amenities of his city, watchful with knowledgeable interest. He had much to do with the establishment of Maranoa Gardens as a municipal trust and, through him, the Club's link with Maranoa was firmly forged. He was among those naturalists who worked for the establishment of Spermwhale Head as a National Park and, when it was gazetted in 1929, he became chairman of its Committee of Management, a team comprising the stalwart naturalists Charles Barrett, A. D. Hardy, T. S. Hart and Fred Lewis. He held this position for twenty years, to the time the Committee was re-organized by the appointment of younger field naturalists.

The Field Naturalists Club of Victoria has attracted to itself many notable men and women. Those who have remained to serve

its interests (and they are many indeed) have an honoured place in the memory of their fellow members. There can be few, though, who will be remembered so kindly and by so many as George Coghill, the man who, in later years, would almost without fail take his seat at the front of the gathering to listen intently to what was said from the front of the hall. (And woebetide the member who was discourteous enough to the Chair to attempt to speak from the body of the meeting! The old man would interrupt proceedings and invite the speaker to come to the front so that those seated there might hear.)

Many an anecdote could be told of him and who, indeed, could spend seventy-five years among naturalists without gathering around himself an aura of anecdote. He, in his turn, could tell many a story of those who were his colleagues and companions. Some of them we can glean from the *Victorian Naturalist* where the history of the F.N.C.V. is recorded as it has unfolded. Others, perhaps, are lost forever or lie waiting to be recalled to the memory of one of those who knew, admired or revered George Coghill.

GEORGE COGHILL—A FOOTNOTE

By E. H. COGHILL

These are a few desultory thoughts provoked by Mr. Garnet's article. It will be realized, I am sure, that it would not be proper for me either to agree or disagree with his appreciations of my father and myself, but there are a few comments I can properly make.

First, it is extraordinary that over such a long period of close association with keen scientific workers, George Coghill made no scientific discoveries nor did he undertake any research whatever. At first he was a keen collector, and his (unpublished) Presidential Address on "Wildflower Shows" reveals that he was very proud of the number of different species he was able to display at the early meetings and shows of the Club. But beyond that he did not seek to go.

It seems to me that there is a tendency at present to belittle those who do not themselves undertake research, but I am not ashamed to put him forward as an example of one who derived great satisfaction for himself, and gave great assistance to others, by administration and executive work, and by giving encouragement and, indeed, admiration to those who were advancing the frontiers of knowledge. The Club has use for those who will help and work as well as for those whose only desire is to study, and who can say which class will reap the greater satisfaction?

As a keen collector and lover of wildflowers, father was not quite happy about the Native Plants Preservation campaign. As he said

in the Club on more than one occasion, it was not because he had collected specimens there that orchids can no longer be picked in Camberwell, or that cleared and ploughed land near Taradale no longer produces the lovely wax-flowers. However, he appreciated the idea that such a campaign might turn the scale and preserve plants in danger of extinction, and he accepted the necessity for, at least, restraint in picking flowers. This was the less difficult for him as, towards the last, he found so many following his example and growing their "natives" instead of despoiling the countryside to get them.

It seems reasonable to suppose that father was first brought to the Club by his older sister, Miss Kate Coghill, afterwards Mrs. Dann, who was a close friend of the family of one of our first two Vice-Presidents, the Rev. J. J. Halley. Indeed, in the year that George Coghill first took office, J. J. Halley became President. In course of time, this association became something more, for Mrs. Coghill, my mother, was the eldest daughter of Mr. Halley.

Mr. Garnet points out that father was out of office from 1890 till 1897. There was a reason for this. He lost his position in Melbourne when the "boom" burst and the banks failed, and he became a farmer at Toombullup, a wild district, even now hardly opened up, in the hills east of Benalla. By this time he was engaged to be married. Miss Halley was a governess in the family of the late Mr. T. R. B. Morton of Blackburn, and found that he wished to contact a young and energetic man to join him as a partner in an estate agency. She stressed the desirability of her fiancé and as a result the firm of Morton and Coghill (afterwards Coghill and Haughton, and finally Coghill & Son) was formed. They were married, with lots of hope and very little money, in 1895. He had never relinquished membership, and indeed continued his association with the Club's shows, displaying a hundred species of plants in October 1893, and in 1897 he was back in office.

Later incidents of his association with the Club are covered by Mr. Garnet. I may add that Mr. Gustav Weindorfer, for whom father had great respect as a naturalist, was associated with him in the Buffalo expedition, and a few years later in, I think, 1913, we all paid a visit to Tasmania and spent some time with Mrs. Weindorfer while father and Mr. Weindorfer camped on Cradle Mountain. (I think I am right in assuming "Waldheim" had not then been built.)

In 1953 father had a private celebration of the jubilee of the Buffalo expedition, spending a week at the Chalet. To us this trip was a hopeless failure. He was almost completely blind, went for a walk by himself, got lost, fell down a gully and finished up in Bright Hospital a mass of bruises and cuts. He, however, thought otherwise. He had identified several spots he had visited exactly

fifty years before, and was quite happy to put up with some discomfort in doing what he had set out to do.

Towards the end, it might almost be said that he lived for his monthly visit to the Herbarium. He was very deaf, and as already stated almost blind, but instinctively he felt the warmth, respect and appreciation with which he was surrounded. If he had done much for the Club, the Club repaid him in a way which he appreciated.

NOTE ON A NEW SPECIES OF IXODIA R. BR. (COMPOSITAE)

By NANCY T. BURRIDGE*

During the preparation of a paper on the species belonging to the section *Ozothamnus* of the genus *Helichrysum*, the type specimen of *H. angustum* N. A. Wakefield (*Vict. Nat.* 68: 49, July 1951) was examined and proved to have been generically misplaced.

The plants have the outer characters and habit of one of the *Ozothamnus* but the small conical receptacle bears long scales between the florets and no pappus bristles could be discerned†. From these features the most likely affinity is with either *Ammobium* R. Br. or *Ixodia* R. Br. but from the former *H. angustum* differs in the shrubby habit, clustered narrow capitula and non-cupular apex to the achene (though a minute rim is present). On the other hand there is a much more satisfactory agreement with the general characters of *Ixodia*, previously represented by the single species *I. achilleoides* R. Br.

The type of *H. angustum* was collected at Swanport, Tasmania, by Dr. G. F. Story. On dissection of a capitulum (from a fragment kindly forwarded by Mr. J. H. Willis of the Melbourne Herbarium) it was found that there are narrow bract-like scales subtending the florets, and at least those of the outer ones have broader bases which clasp their florets, while all have apices that, though very much narrower, show a similarity to the white laminae of the inner involucrel bracts.

The corolla is distinctly angular below (and between) the lobes and is slightly bulbous above a distinct constriction at the point of attachment to the achene. The latter has not been observed in a very mature state but it is distinctly angular. Apart from the lack of achene papillae, this description of the corolla and achene would also apply to those of *Ixodia achilleoides*; and, though the receptacle scales are not so broad and enveloping, transfer to Brown's genus seems unavoidable despite the presence of a minute ring on the top of the achene, which is not characteristic. An expanded description is given below.

IXODIA ANGUSTA (N. A. Wakefield) comb. nov.

Helichrysum angustum N. A. Wakefield in *Vict. Nat.* 68: 49 (July 1951).

Holotype Swanport, Tasmania, ca. 1880. *Dr. G. F. Story* (MEL.—fragment at CANB).

Shrub to 3.5 metres high with yellowish tomentum on branches, undersurfaces of leaves and on inflorescences. Leaves obovate, 3-9 mm. long, apiculate-obtuse, glabrous and shining above, pale below with flat tomentum in which the midrib is darker and slightly prominent, margins flat or slightly recurved. Capitula numerous and clustered in subglobose corymbs terminal to upper branchlets, very shortly pedunculate, the peduncles subtended by acumi-

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† As author of this species, I deem it appropriate to place on record here that the reference to thickened pappus-bristles in the type description of *Helichrysum angustum* was completely erroneous. The circumstances giving rise to this error are irrelevant, but it is certain that no pappus-bristles occur in any of the several specimens extant.—Editor.

nate woolly bracts on which the hairs may be slightly resinous. Involucres 4.4-5 mm. long, cylindrical to narrow-turbinate; outer bracts brown or reddish, thinly woolly especially along the margins; inner with conspicuous radiating milky-white laminae about half as long as their narrow claws which are centrally thickened and sparsely woolly (but without the "globule" hairs seen in many *Ozothamn*). Receptacle conical, with narrow bracts subtending and partially enveloping the florets. Florets 5-7. Corolla angular below and between the lobes, minutely bulbous at the base above a constriction at the point of attachment to the glabrous, angular achene. Anthers tailed, style branches truncate with minute tufts of apical hairs. Pappus represented only by a minute ring.

According to Wakefield this is a coastal shrub and it is known, so far, only from the east coast of Tasmania. The specimens seen include: Coles Bay, *L. Rodway*, 20. iv. 1930 (CANB); Bream Creek, *H. M. Curtis*, Dec. 1945 (HO); Eagle Hawk Neck, *L. Rodway*, 2. x. 1929 (CANB).



Ixodia angusta (N. A. Wakefield) comb. nov.

- 1, Small branch (slightly reduced). 2, Leaf detail ($\times 4$). 3, Capitulum ($\times 8$).
4, Floret ($\times 8$). 5, Inner involucreal bract ($\times 8$).

NOTE ON A BANDED GULL

On April 30, 1958, en route to Melbourne, we stopped by the bridge at Tooradin for a cup of coffee. The car was at once surrounded by solemn sea-gulls, to whom we dispensed broken biscuits at intervals. Shortly one landed on the bonnet, and although it would not actually accept food from the hand it greedily gobbled all that was thrown at its feet. It was joined by others and we drove back on to the highway with three gulls balancing precariously on the bonnet. One of these, in immature plumage, wore a broad silver band on the left leg, with, as far as could be made out, the letters "F.U." as well as figures.

—ELLEN LYNDON, Leongatha

MOLLUSCAN FIELD NOTES—Part 1

By ROBERT BURN

This is the first of a series of short articles in which the writer hopes to present notes and sketches of what are considered interesting or unusual molluscs. Particular reference is made to the animals of the molluscs, especially to the gasteropods. Many little insights into the lives of molluscs are gained whilst out on field trips, whether it be to some out-of-the-way reef or the closest bathing beach, to the bush for a picnic or a hike, to a dam to catch yabbies, or to a river swimming-hole. It is proposed to pass on some of these observations for the benefit and enjoyment of others.

Although the accompanying sketches of the molluscan animals are correct in detail, the shells are not so unless some particular shell is being discussed. The name of each species has been carefully checked in every case; and by reference to literature, illustrations can be easily found. References containing a description or illustration of one or more of the species mentioned will be included at the end of each article.

Siniginella pygmaoides (Singleton) 1937

Two specimens, larger 5 mm in length, collected at Blunders, 10/3/1958; under stones in muddy positions among short green seaweed, low tide

Field-notes—"Mantle edged black, then whitish patches and then black again. Mantle covers shoulder of body whorl, and, diagonally opposite encroaches a little on the spire; apex of shell covered. Tentacles alternately black and white, siphon dull cream. Tail is mainly white with black radiating streaks on it. Sole of foot whitish. Mantle smooth."

The bare dorsal patch, while irregular in shape, was very similar in both specimens; and would, in my opinion, be a specific character should the animal be considered in the identification of living shells. The siphon was long and slender, and moved rapidly about. The foot was a little narrower than the shell and is apparently of the form consistent with rock-dwellers. The animal was twice as long as the shell.

This species and the next are placed in genera described by Laceron in 1957; in each case falling into a natural group. They are the first marginellas to be observed alive in Victoria; and this brings the total number for which the living animal has been described to 7, of the 200 known Australian species of the family Marginellidae.

Austroginella tasmanica (T-Woods) 1875

About 15 specimens, largest shell 8 mm. in length, collected at Leonard Bay, Wilson's Promontory, 10/2/1958; in colony in sand on open beach, low tide.

Field-notes—"Colour of animal pale fawn, semi-transparent, with darker brown patches all over. These on closer examination proved to be groups of minute red and green dots, so arranged as to seem brown from a short distance. Tentacles clear white; siphon brownish. Foot extremely large and expanded. Animal very active."

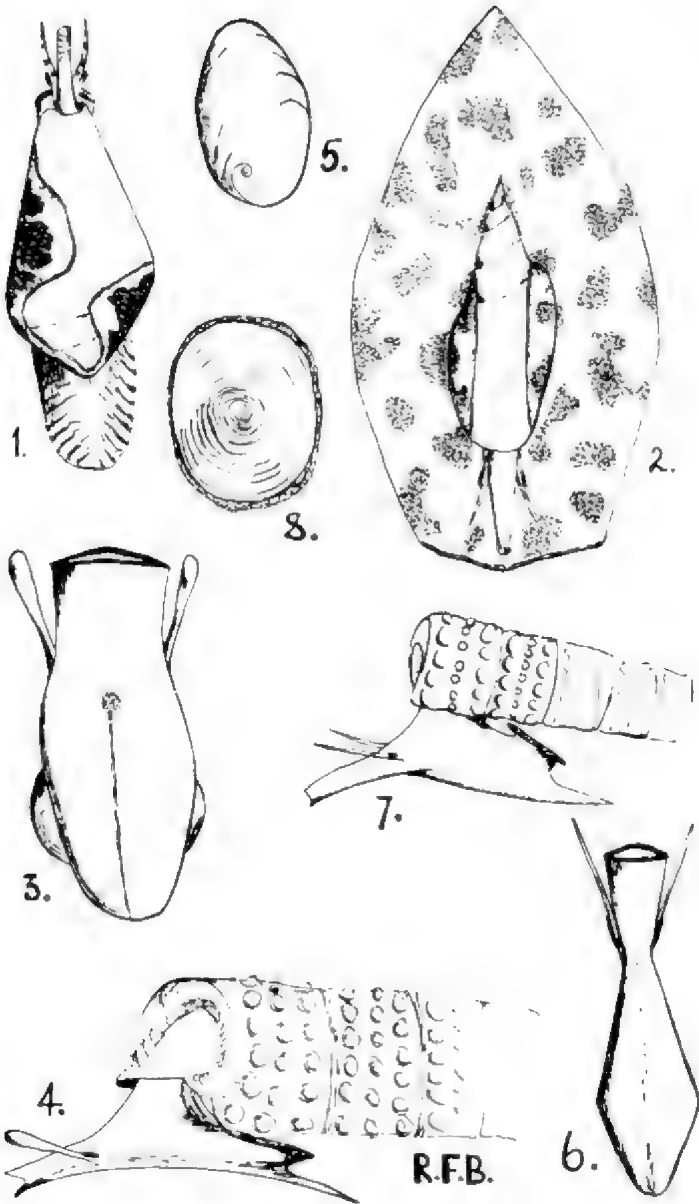
The mantle encroached evenly on either side of the shell, leaving a large regular bare patch. The apex of the shell is not covered. The foot is over twice as long as the shell and nearly three times as broad. This largeness of the foot is definitely typical of sand-dwelling gasteropods and probably provides excellent traction.

This species lives among the small sand ridges at extreme low tide. On-coming waves roll the shell over and over, but the foot is not retracted. Then, when the waves recede, the foot comes into action and digs into the sand; and so the animal moves actively about till the next wave disturbs it.

Cerithiopsis sepiapilia Laceron 1951

One specimen, shell length 4 mm., collected at Torquay, 30/3/1958, under stone at mid-tide.

PLATE IV



For Key, see page 99.

Field-notes—"Animal dimensions 1 mm. long and 0.5 mm. broad. Animal white. Tentacle tips rounded; Operculum very pale, slightly convex, paucispiral, with the nucleus near the left-anterior margin. The ventral side of the shell is carried flat on the plane of the foot, with the protoconch not touching. Protoconch 7-whorled, very long and slender, smooth and glassy, pale horn colour."

The siphon is short, quite broad and rather flattened; tentacles as long as siphon. Foot narrow at base of tentacles but broadens posteriorly to form a very thin tail. A minute pedal gland appears just behind the tentacle bases on the sole of the foot and the sole is grooved behind this. The operculum is carried on a flat shell just behind the body itself.

This is the first record of this species, *C. septaplia* Laseron, from the Victorian coastline. The distinctive 7-whorled protoconch makes the species readily recognizable. Records of the Victorian members of the family Cerithiopsidae are very few, but because of their minute size they are quite easily overlooked by the average collector.

Isotriphora tasmanica nivea (Verco) 1909

One specimen, shell length 4 mm., collected at Torquay 30/3/1958; crawling on a grit-and-sand worm tube under a stone near low tide.

Field-notes—"Animal dimensions 1.25 mm. long and 0.5 mm. broad. Animal white. Tentacles pointed, eyes black. Operculum yellowish, horny, thin, slightly convex, nearly circular—the vertical diameter is the shorter; multispiral with the nucleus subcentre. Shell carried clear of the substratum except for the protoconch which is dragged along."

The siphon is long, narrow, and nearly circular in section; tentacles longer than siphon. Foot broadens considerably behind base of tentacles, grooved for most of its length. The operculum is carried on a raised shelf about half-way between body and tail.

The protoconch is typical of *I. tasmanica* (T-Woods) 1875, the specific characteristic being the infolded nucleus. Verco 1909 described a pure white variety, *var. nivea*, which Cotton and Godfrey 1932 later raised to full specific rank. This is hardly acceptable as there is no apparent external difference between the typical *I. tasmanica* and the variety *I. l. nivea* except in the basic colouring. Therefore Verco's varietal name is used here in preference to the specific name adopted by Cotton and Godfrey. The typical *I. tasmanica* (T-Woods) is somewhat common among the Triphoridae collected along our coastline.

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EXPLANATION OF PLATE

- Fig. 1. *Sinuigrella pygmaea* (Singleton)—dorsal view.
Fig. 2. *Austraginella tasmanica* (T-Woods)—dorsal view.
Figs. 3, 4, 5. *Cerithiopsis septaplia* Laseron—lateral view, ventral view and operculum, respectively.
Figs. 6, 7, 8. *Isotriphora tasmanica nivea* (Verco)—lateral view, ventral view and operculum, respectively.

BOOKLETS ABOUT SEA-SHELLS

By N. A. WARFIELD

In 1936, the Field Naturalists Club of Victoria published the second of its handbooks—*Victorian Sea Shells*, by Charles J. Gabriel. The booklet dealt with about one hundred species, all of which were illustrated by Joyce Allan of the Australian Museum, Sydney, and, as the *Foreword* stated, all were to be found about Port Phillip Bay. In *Victorian Sea Shells*, the beachcomber, whether child or adult, had an ideal guide; but unfortunately the little book is long since out of print.

Then, in 1946, the South Australian Museum issued Bernard C. Cotton's *South Australian Shells*. The present (third) edition is about double the size of the original, and it contains excellent illustrations and short notes covering 226 species. Twenty-five kinds of introduced snails and slugs are included too.

The reviewer recently received from the pupils of a Victorian school a collection of twenty-three shells for identification, and all were readily named by reference to Cotton's booklet. One can therefore strongly recommend it for use in this State, particularly as it may be acquired from booksellers for the modest sum of 3/-.

On comparing these two publications, the reader must be very forcibly struck by the lack of conformity in the matter of "common" or "popular" names. When this is coupled with a major amount of revision of technical nomenclature, the result is most bewildering. The point is illustrated by three species in particular: Gabriel dealt with the "Fan-Mussell" or "Razor Edge" (*Pinna tasmanica*), the "Fan-Shell" (*Chlamys asperimus*) and the "Razor-Shell" (*Solen voginoides*), and Cotton has apparently the same three species respectively as "Razor Shell" or "Fan Shell" (*Pinna dolabrata*), "Prickly Scallop" or "Doughboy" (*Minachlamys asperimus*) and "Southern Finger" (*Solen voginoides*)!

The development of common names for even a small proportion of the native flora and fauna of this comparatively young country and the incorporation of these into our everyday language, must needs be a very gradual process. Both Gabriel and Cotton took a step in the right direction, by using a common name first for each species they dealt with and relegating the technical name to second place. However, one wonders whether even the enthusiastic naturalist would ever refer to a sea-shell he sees on the beach as a "Donax-like Razor", "Umbilicated Sand-Snail", "Scar False Limpet", "Dannevig's Volute" or "Round Back Sea Ear"!

It seems quite impractical to try to popularize a distinguishing common name for each of a number of similar species. Such an attempt defeats its own ends and confuses the layman who, in any case, would never go further than to use short simple names to cover groups of similar species. As a popular guide to our sea-shells we need a pocket booklet in which the common species are illustrated under group names such as whelks, olives, cowries, clams, cockles, volutes, etc.

Some suggest that the scientific names should be adopted for popular usage, and indeed these are often comparatively short and euphonious. Such has been done in many cases with plant species; many generic names, such as *Boronia*, *Petunia* and even long ones such as *Chrysanthemum*, have become everyday words. But in zoology, technical names are constantly subjected to sweeping changes, as in the classic example of our egg-laying mammals. No sooner had we incorporated the names *Echidna* and *Platypus* into our Australian language, than bulls were found to be technically invalid and were replaced by *Trachylottis* and *Ornithorhynchus* respectively.

From the Government Printer, Hobart, there has come for review the second edition of W. L. May's *Illustrated Index of Tasmanian Shells*. It was published first in 1923, and in the present edition Miss J. Hope Macpherson

of the National Museum of Victoria, has brought the nomenclature up to date, adding each author's name and the dates of publication of the species. There are additional illustrations to cover those added to the Tasmanian lists in the past thirty-five years; and a total of 1,086 kinds are dealt with both in the text and in the fifty half-tone plates.

The book is not concerned with common names, but is a worth-while proposition for the more serious-minded conchologist who wishes to identify shell species not only of Tasmania but of temperate Australian waters in general. There are 72 pages stapled into a Mamilla cover, measuring 10 x 7½ inches overall. It is obtainable from the Tasmanian Government Printer, Box 246C, G.P.O., Hobart, for 10/6, including postage.

The Victorian naturalist who has leanings towards this subject may be interested to know that Miss Macpherson and Mr. Gabriel have completed the manuscript of a handbook of Victorian sea-shells and that this should be available within a year or so.

NOTES FROM SOUTH GIPPSLAND

Further to my somewhat belated "Notes on Wilson's Promontory", which appeared in last April's issue of the *Naturalist*: The Country Roads Board, acting on the advice of and with some financial help from the Native Plants Preservation Society, has enclosed two long strips of the Yanakie roadside flora and erected suitable noticeboards on them. On the matter of destruction of flora by the heavy machinery meandering about on the roadsides, the Board very kindly asked that the contractors confine their travelling as much as possible to one side of the road, and a great improvement has since been noticed.

Emus, which are a rarity now in this part of Gippsland, descended upon the Soldier Settlement Estate in large numbers to feed upon the newly established pasture areas, and many local people took a Sunday drive down that way to watch the mobs of emus feeding amongst the cattle. One wonders what the upshot will be when the farms are allotted and both settlers and birds are competing for the grass! Almost all the natural shelter was cleaned off the Yanakie estate in the initial operation. When the planting of shelter-belts is being considered, a place should be found for that hardy and handsome local shrub, *Kunzea ambigua*.

The Shire Council at Foster, again assisted by the N.P.P.S., has reserved a large area of excellent heathland flora adjacent to the reservoir immediately east of the township on the highway to Yarram. This includes a smaller central sanctuary within the larger reserve, which is gravelly country and has been worked to some extent by gold prospectors in earlier times. Near the corner of Amey's Track an old water race has eroded into a sizeable gorge, well filled now with tree-ferns and sheltered with banksia, *Olearia*, mallee and peppermint. The Council shows a very lively interest in the survival of native plants of their district.

—ELLEN LYNDON, Leongatha

THE TAILED SPIDER

On page 53 of his book, *Spider Wonders of Australia*, the late K. C. McKeown wrote:

Another curious orb-weaver is the little Tailed Spider. Perhaps her inclusion in this highly skilled company of the orb-weavers is scarcely justified, since her snare is only an incomplete orb, for the radii and spiral lines are omitted from quite a large sector, giving the web a damaged and broken appearance; this is not the effect of wear and tear, but is deliberately contrived, although its purpose is not apparent.

Having a Tailed Spider (*Arachnura higginsii*) under observation at the present time (April 7), it occurs to me that the purpose of the incomplete orb-web is to protect the egg-sacs from falling leaves and twigs, and blundering insects. As built, they are safe from anything but a direct hit.

If severed from the orb, the egg-sacs could easily be rejoined to the old web, or used as the centre of a new one. The egg-sacs are held in position by a swirl of silk which is, in turn, held by stays, which as far as I am able to determine have no connection with the orb. The only connection between the sacs and the orb is a short swirl of silk along which the spider rests. The swirl of silk and egg-sacs are covered with the stamens of a gum tree, but the orb is free of stamens or any other foreign matter.

The late Mrs. Edith Coleman described and illustrated this species and its web in the *Victorian Naturalist* (Vol. 49, page 83). In the same volume Mr. L. S. G. Butler, described it on page 279 and provided a coloured plate opposite page 271.

April 11.—I have just been into the garden (8.15 p.m.). Tonight the spider has made an almost complete orb. Less than two inches is missing. Two small leaves have been added to the swirl of silk, but the rest of web is free from foreign matter.

—MARC COHEN, Bendigo

WHAT, WHERE, AND WHEN

Future F.N.C.V. Meetings:

Monday, November 10—"Royal Botanic Gardens, Melbourne", by K. W. Atkins.

F.N.C.V. Excursions:

October 17-19—Botany Group excursion to the Grampians. Details at group meeting.

Tuesday, November 4 (Cup Day)—Emerald. President's Picnic. Leader: Mr. Garnet. Take 10.10 a.m. train to Fern Tree Gully, then bus to Emerald. Bring two meals.

Group Meetings:

(8 p.m. at National Herbarium unless otherwise stated.)

Wednesday, October 15—Microscopical Group.

Monday, November 3—Entomology and Marine Biology Group. The meeting will be held in Mr. Strong's rooms in Parliament House. Enter by private entrance at south end of House.

Wednesday, November 5—Geology Group. Subject: Literature Night. Speaker: Mr. Gill.

Preliminary Notices:

Sunday, November 23—Parlour-coach excursion to Starlings Gap. Leader: Miss M. Elder. Coach leaves Batman Avenue at 9 a.m. Fare, 17/- Bring two meals.

December 26-January 4—Bogang High Plains. Leader: Mr. Garnet. Accommodation is available at Falls Creek at 14 to 16 guineas per week, for which a deposit of £5 should be paid to the Excursion Secretary by October 15. Transport will be by parlour-coach from Melbourne and the coach will remain with the party for use in day trips. Fare, £7/10/-.

[V.N.P.A. Excursion to Kinglake, Saturday, November 8—Parlour-coaches to leave Whight's Tourist Bureau at 9.30 a.m. A naturalist is needed to lead each coach party; those prepared to act in this capacity should contact the Club President. Members wishing to book through the Club should pay fare (£1) to the Excursion Secretary by the end of October.]

—MARIE ALLENDER, Excursion Secretary,
19 Hawthorn Avenue, Caulfield, S.E.7

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No. 899

PROCEEDINGS

The President, Mr. J. R. Garnet, occupied the Chair, and about 100 members and visitors attended on the occasion of the Club gathering at the National Herbarium on October 13.

Extraordinary General Meeting

An Extraordinary Meeting was held to consider the application of the Hamilton Field Naturalists Club for affiliation with the F.N.C.V. This was approved unanimously on a motion by Mr. T. H. Sarovich, seconded by Mr. E. H. Coghill.

General Meeting

Dr. M. M. Chattaway and Mr. A. Matthews gave short reports on the recent Adelaide meeting of A.N.Z.A.A.S.; and it was mentioned that Dr. W. Geroe, the remaining delegate, had reported fully to the last Council Meeting.

The speaker for the evening, Mr. E. Hamilton-Smith, gave an illustrated lecture on "Caves and Bats", in which he outlined some particulars of a research project being organized by Australian cave exploration societies. At the conclusion of the talk, Mr. Hamilton-Smith was inundated with questions, and it was only with difficulty that consideration of the rest of the business was resumed. A vote of thanks was carried enthusiastically on the motion of Messrs. D. McInnes and N. A. Wakefield.

The following new members were elected: Mrs. Florence Lethbridge, Miss Winifred Smales and Miss Ruth Doig, as Ordinary Members; Mr. Leo Cady as a Country Member; and Miss Jennifer Lethbridge and Miss Ann Ballantyne as Junior Members.

The President announced that one of our members, Mr. K. C. Halatoff, the well-known authority on lyrebirds, would appreciate help and collaboration from a musician or music-lover in connection with a project to analyse the song of the lyrebird. Anyone qualified was asked to contact the Secretary.

Mr. A. A. Baker exhibited and discussed specimens of garnet from Broken Hill and U.S.A. Mr. Wakefield displayed a "Rock Lily" (*Dendrobium speciosum*) in full bloom, and a Streaked Rock-

orchid (*D. striolatum*), both collected in East Gippsland over ten years ago and cultivated since in flower-pots. Among other outstanding exhibits was a set of twenty-four flowering plants collected by Mr. J. M. Wilson at one spot near Pomonal.

GEOLOGY DISCUSSION GROUP

Twenty-one members attended the October meeting, with Mr. Blackburn in the Chair.

Mr. Henamy submitted a report on the Mystery Excursion of September 7, to the valleys of Emu Creek and the Maribyrnong River, eight miles north of the junction of the Sunbury-Bulla Road and Lancefield Road. The Emu Creek section at Konagaderra Road showed volcanic ash inter-bedded with lava, resting on an irregular surface of ropy, scoriaceous lava. Further on, Fenton's Hill, an eruptive point of lava of the surrounding area was seen, and at the village of Konagaderra, folded strata of Palaeozoic sediments were examined. Resting on these eroded sediments were Tertiary sands and gravels, which were overlain by residual Newer Basalt.

Mr. Blackburn presented "Further Studies in Volcanism". He dealt with the formation of scoria cones, lapilli and bombs, cones of normal, composite and parasitic structure, domes formed of fluid lava, mameions and calderas. Then followed lava types, such as "aa" and "pahoe-hoe", the shape of the lava vesicles, lava tunnels, blisters and barrier mounds. The effect on the landscape—blocking of the drainage system, lateral and twin lateral streams, lava plains, lakes and maas, and the re-vegetation of the lava fields, completed this study of products of volcanic activity.

Specimens to illustrate the study were handed round for examination, after which Mr. Fisch showed his colour film of volcanic areas in Victoria—Mt. Franklin, Trentliam Falls and the lava fields seen from Pretty Sally Hill near Wallan.

The meeting concluded with exhibits by other members.

BOTANY GROUP

As Mr. Pitt, the scheduled speaker for October 10, was unable to attend, the Club President, Mr. Garnet, delivered a lecture on Australian Wattles. This covered an extremely wide field; particular mention was made of Victorian species, and the subject was supported by the showing of numerous specimens from Mr. Garnet's collection.

Mr. Tincham displayed a book of beautifully mounted wildflowers, mainly from the Sydney area.

On Sunday, October 12, members took part in an outing to the Heathmont-Bayswater area. Mr. H. Haase was leader and over eighty species of wildflowers were observed, including numerous orchids. Members lunched at the home of Mr. and Miss Haase, where they enjoyed seeing the former's paintings of native orchids.

MICROSCOPICAL GROUP

The meeting on the evening of October 15 took the form of a projection night. Several of the members exhibited their home-made micro-projectors, and slides were shown and commented upon.

The speaker for November 19 is to be Dr. R. M. Wishart whose subject is "Blood Circulation". Other members of the Club are cordially invited to be present at what augurs to be an interesting evening.

SHERBROOKE DIARY

By K. C. HALAFOFF

One of the chapters of a well-known British book on birds has a title "Who Sits and Watches". I know of no better advice to the lyrebird observer. Often the forest seems empty at first, but if you wait, you notice a lyrebird scratching busily for food, another comes and joins it, a distant silvery call is answered by a sonorous song nearby—and another chapter of the Tale of Sherbrooke begins to unfold before you. A notebook, a light camera, some chocolate and plenty of patience is all that is needed for a fruitful day in the majestic beauty of the forest, in the society of one's winged friends, each with a pet name to which it may even respond. From time to time, among daily routine events, an interesting episode occurs and is hastily pencilled down, while close by, shining eyes in a jerking black head watch curiously that incomprehensible human pastime.

Lyrebirds are playful creatures, and the "chase" is not their only entertainment. One summer evening, I saw two adult males engaged in a strange play. One of the birds flew up a large mountain ash trunk, and jumped down. Then another did the same. Then the first flew up again—and so they proceeded, strictly in turn, for several minutes. Three years later, I saw two young males, one of which was in a playful mood and he flew up a tree trunk in the same manner, but his companion did not pay attention to the hint. A chase was started instead, and after much running, the other male came, looking as if he had had enough of it and stood quietly, partly concealed among low-growing ferns. His gay mate reappeared and soon located him, and coming close behind, lifted his foot and smacked his sluggard friend over the end of the tail.

That playful youngster, Bobby, a brightly coloured male, liked to play with short lengths of treefern trunk, balancing himself on a piece which he rolled backwards and forwards, flapping his wings when he was on the point of losing his precarious balance.

His companion, Kiddy, much darker in colour and steadier in temper, used to sing sometimes in the absence of his friend, to a protruding twig, but a much greater thrill was provided by a long swaying fern frond. Kiddy sang and danced in front of this, and each time the leaf ceased to sway, he brought it back to life by brushing past it, and then resumed his make-believe performance.

A fern frond played a main role in another episode. It was a large, long frond of a nearby treefern, hanging very low over the centre of a mound which Spotty had decided to renovate. Spotty repeatedly grasped the frond and tried to bend it down, but as soon as the grip was released, the stubborn thing sprang back into its former place. Finally, by bending it short and pushing it back, he succeeded in engaging the enemy in contact with the ground and, held by friction,

PLATE V



Above: Female Lyrebird and Nest in Odel Gully.

Below: Spotty in Display.

it was at last out of the way. But then Spotty found that a blade of sword-sedge, previously concealed by the conquered frond, formed a new obstacle. Taking hold of it, he touched the fern which, disengaged from its connection with the soil, immediately sprang back into its initial position. That was too much for Spotty and he left the mound in obvious disgust.

Another comical incident occurred while I was returning to the firebreak from Odel Gully through a mass of sword-sedge. I saw a male singing on a moss-covered "musk" tree branch, ten feet from the ground, and stopped to listen; but it was growing late, and the only possible way up was under him. On my approach he started to move towards the end of his branch, but his feet slipped on a wet moss, and next moment he was hanging upside down, his claws still gripping the treacherous branch. He was obviously surprised but not in the least alarmed by that unusual position; he was apparently thinking about the way out. First, he tried to push his head between his feet, but found it did not work. Then he released the grip of his left paw, still clinging to the branch with the right one, and with a flap of wings jumped safely to the ground. I was so amused watching him that I realized too late what a unique photograph could have been taken.

The unperturbed dignity so characteristic of the lyrebird's bearing may, under certain circumstances, look rather funny. An adult male was performing on some bare ground in virgin country. Going backwards he did not realize, in the fervour of the dance, that right behind him there was a step in the downward-sloping ground, and before he knew what was happening he went over the edge and fell. But just like a ballerina who, having slipped on the stage, proceeds with the dancing and smiling as if nothing has happened, this male got up in an instant and resumed his dance with an air of solemn dignity despite the hearty laughter that I was unable to suppress.

The quickness of the lyrebird's reaction to danger is amazing. Once Spotty was feeding quietly under a large mountain ash tree when a loud crack was heard among the top branches. In a flash Spotty was about twenty yards away, jerking his head and looking at the top of the tree. Nothing fell, however, but it took him a couple of minutes to decide that it was safe to return to his digging under that tree.

On another occasion an accident with my flashgun provided the means of measuring that speed of reaction. Spotty was performing on a mound at the firebreak when, after having exhausted my supply of small flashbulbs, I put a larger one into the gun. The result of pressing the release button was like a rifle shot: despite dry weather and good package, the bulb exploded. It was as if Spotty has suddenly dematerialized—he was there when I pressed the release, but in the next fraction of a second there was not a trace of him. I was very worried until I found him next day when he met me as if noth-

ing had happened. But great was my surprise when the film came back from processing; on that particular frame, there was only a faint ghostly trace of one of the tail feathers, nothing more, on the correctly exposed background. As the picture was taken at 1/40 of a second, it took the bird only a small fraction of that time, probably a tenth of it, to disappear.

Several years ago two stray dogs noticed Spotty and gave him a chase. They indeed hadn't a dog's chance of catching him. After having given them a hard run through thickets, Spotty escaped to a tree from which he viewed unperturbedly the madly barking pursuers. The incident however did not disappear at once from his memory; for the next three weeks or so the barking item was included in nearly every song, to the immense delight of visitors.

The lyrebird's memory is remarkable indeed. Often in the parts of Sherbrooke which I visit only rarely, a lyrebird comes to me on hearing my whistle and behaves herself as if we are old friends. It is apparently a result of one or two meetings which occurred a long time ago and which I have forgotten, but the bird has not.

Recently I had proof that in such cases the lyrebird responds only to a definite kind of whistle known to her. Wanting to attract the attention of a newly-matured male which I did not know well, I tried to imitate a rosella, and then a pilot bird call which I was using frequently at that time. There was no response—the male continued scratching for food. But when I gave an imperfect imitation of a young magpie, the bird immediately left his digging and came to me through the ferns. I recollected then that I had not used that magpie call for a long time, and the bird must have heard it from me at least a year before, yet it had obviously remained firmly imprinted in his memory.

Another time, while walking past the landslide of Clematis Avenue, I heard a lyrebird singing in the forest above, and my son went there to investigate. He soon reported seeing an adult bird and a friendly chick. I whistled, and the chick, about two years old, appeared on the edge of the cutting and ran to and fro along the top looking for a suitable spot to descend.

On finding it, he came down within range of my outstretched hand, from which after some little reluctance he took some food. I was quite certain I had seen that chick no more than three times, the previous time was four months before, but he had identified me at once.

The first meeting with that chick—he was a year old then—occurred under rather adverse circumstances. On coming to a turn of a track, I ran into a family of lyrebirds: father, mother and chick. I stopped, fishing out my movie camera from the bag. The father bird apparently considered the proximity of his offspring to me undesirable, and he tried to frighten it away by one or two flaps of his wings. The chick however proved unwilling to depart.

Then the mother bird raised her foot and gave it a sharp smack on the head. This time it worked—the youngster ran, flapping his wings in panic, into the forest, and the parents followed.

For several years Petty was the old child in Spotty's family. At the age of two he not only spoke to his mother, Smoky, in babyish notes, but often used to beg for food. If Smoky paid no attention, he would sometimes catch her by the tail and let her drag him, until she would give him a worm in order to get rid of him.

Once Petty and Smoky came down to a pool where Spotty was already standing in the water. Smoky started to bathe in an adjoining pool, so Petty found no spare bathroom available. He descended then down the valley to a very small pool habitually used by tiny birds, and started to rock and roll the stones in it, trying to widen it and so to have that pool all to himself. Once we met Petty at the top of the gully, and after giving us a small concert, with song and dance, he followed us down to the large pool and after wading in it and fishing out a twig from the bottom he started to sing, standing in the water and facing us. This is the only time that I have heard a lyrebird singing in the bathroom.

The pool was situated on the margin of Spotty's territory and he apparently regarded it as his property. He disliked the use of it by some of the maturing males, which he invariably chased out of it. One of them was nicknamed "Always-hot", as he was fond of bathing and on hot days always came to the pool with his beak half-opened and feathers fluffed. He came this time and waded into the water, but Spotty, suddenly materializing from nowhere, ejected him before he had a dip. But as soon as the rightful owner left, Always-hot reappeared and, emitting loud incessant alarm hisses, started to descend to the pool, completely ignoring our presence. Having silenced by his alarm all the lyrebirds in a half a mile radius, he plunged into the refreshing water and had indeed the bath of his lifetime, disturbed by nobody.

In the lyrebird dictionary there is a sound expressing grumbling: short, deep notes not unlike those made by a man trying to lift a heavy weight. Once we heard them emitted by Kiddy who was standing in a pool when Bobby unceremoniously started to splash himself in it and sprayed his friend with a shower of drops. And another time it was Spotty grumbling, probably about the presence of our naturalist friends. He delivered that protest repeatedly while drying himself on a log above the pool.

When next we saw two lyrebirds in one pool, the actors were silent and feelings were expressed by a pantomime. A bird with feathers fluffed, looking nearly twice its natural size, was standing in the centre of the only deep pool available, when a younger bird appeared at the entrance. The newcomer made a feeble attempt to splash himself, but he soon thought better of it and went into a

PLATE VI



Courtsip Display.
Note the Short Rounded Wings.



The Strong Claws Grasp a
"Handful" of Soil

nearly shallow pool full of silt and started to bathe literally in mud, scattering it in all directions.

Once it was Spotty's turn to be ejected from foreign territory on which he had trespassed. We saw him looking rather humble, closely followed by a fluffed male, and the sounds of the conversation were quite unusual—I had never heard that kind of talk before. Several ordinary looking lyrebirds followed at a distance, and the leaders of the procession soon vanished among clumps of wire-grass.

Contrary to the popular belief that lyrebirds never fight, there are some cases of conflict which lead to a collision. Once a large male, which I believe was Timothy in the last year of his life, was feeding at the edge of a mound where a youngster was dancing and advancing now and then in his direction. When he repeatedly came too close, the old man lost his patience and up they went like two rousters, and the youngster hastily took his leave.

On another occasion near Wattle Walk track, an adult male was feeding and another performing on the bare ground. Suddenly a third male appeared from somewhere and collided with the dancing bird in the same up in-the-air way, which resulted in the departure of the performer.

It was surprising to find that lyrebirds consider black cockatoos unwelcome visitors. Once three screeching cockatoos arrived in the treetops near Clematis Creek, and soon we heard the alarm hisses of the lyrebirds. On coming to the trouble spot, I found several lyrebirds walking and jumping excitedly on logs and stumps, while an adult male flew up and slowly and menacingly advanced along a branch towards the intruders. The latter flew over the track, and the male bird, joined by a female, went over also, to restore order. A lovely year-old chick was showing a great interest in the proceedings but was left behind. Soon the cockatoos took off and after circling above the treetops, left the area. Then the lyrebirds began to disperse and resumed their feeding.

On another occasion a mother lyrebird raised her crest and glanced with resentment at a small flock of rosellas which alighted on a tree; but she was probably worrying about her offspring, which was sitting on a branch near the tree occupied by the rosellas.

The small fry like scrub-wrens, pilot birds and yellow robins are always tolerated by lyrebirds, and if any harm comes it is only by accident. Once a yellow robin was hopping about out of reach of the strong claws of Spotty, who was digging for worms. A substantial lump of earth was obstructing Spotty's digging, so he lifted it and threw it sidewise. Unfortunately it hit the yellow robin which fell under the impact, but it recovered at once and flew off.

There was a strong mutual attachment between Spotty and his late mate Smoky. On hearing Spotty's song deep in the gully, I descended and found Smoky hiding under a treefern log. She was

obviously unwell, her feathers were fluffed, and she stood motionlessly in the deep shade. But Spotty was walking all around the place, lifting his short wings and singing incessantly. At one stage he gave a singing lesson to Petty, his chick, who was also present. I never heard Spotty singing his courting song—with a lot of castanets, cymbals and kookaburra calls in it—for so long. Obviously, his intentions had nothing to do with mating . . . it was December and his partner was sick. Did he realize that and was he singing to entertain her? Smoky, I am sorry to add, apparently never fully recovered; she died that year. I had known her as Spotty's faithful companion ever since I met them about five years ago.

Another singing lesson was observed under more favourable circumstances, when both parents were well. Spotty stood in front of his offspring, lifting his wings and singing; and Petty faced him like a soldier before a sergeant, and now and then tried to sing a phrase of song. Smoky who was watching the proceedings also put in a word or two from time to time. Then Spotty heard a distant singing and hastily departed. The tuition was now transformed into a dancing lesson, Smoky showing Petty how to lift the tail and Petty nearly losing his balance every time he tried it. That loss of balance, due probably to a weight of the boyish fully-webbed tail, is a common occurrence during the youngsters' first attempts to dance.

Once, near the edge of the firebreak, on a hot summer afternoon, we heard a broken chirruping lyrebird's song as if the bird was talking to itself, but the singer was hard to see in the patchy sunlight. It proved to be a young bird which, sitting comfortably in a shallow hole formed by digging for food, was cooling itself and expressing pleasure by singing from time to time. Several years later we saw a similar sight and heard a similar song at almost the same spot.

Several years ago, my son and I stayed late in the forest to escort Spotty to bed. It was growing dark, and Spotty, perched on a musk branch fifteen feet from the ground, was murmuring his lullaby, preparing for sleep. A sudden shower caught us by surprise, and after trying unsuccessfully to find a shelter, we noticed a large clump of wire-grass. Having hastily widened the space under it, we sat there crouching shoulder to shoulder in very uncomfortable positions. By that time Spotty began to reawaken, and on seeing us diving into that bush he emitted a short chuckle, followed soon by loud kookaburra laughter. It was, of course, entirely improbable that the bird realized the humour of our position and started to laugh at us; the outburst of the well-timed laughter was no more than a coincidence; yet there was an unmistakable fairy-tale flavour in it, an irresistible impression of participating in one of those enchanting tales about a bird endowed with magic power and capable of speaking in human voice.

A SCRAP OF HISTORY

By A. H. CHISHOLM

J. R. Garnet's article on the late P. Crosbie Morrison (*Vict. Nat.*, 75, 21, June 1958) is fully appreciative and fairly comprehensive, but it may usefully be extended on two points. First, note should be made of Morrison's book, *Melbourne's Garden* (1946), an admirable work of its kind; and, secondly, some reference to the beginning of his published writings on natural history seems desirable.

That beginning had for its medium the *Melbourne Argus*. The year was 1937, but it is necessary to return beyond that period to get matters into perspective.

For many years the *Argus* had been a vital force in promoting interest in natural history. The chief individual writer on the subject, over a lengthy period, was Donald Macdonald, who, in addition to producing many special articles, from time to time, conducted regular columns that were largely composed of paragraphic contributions by readers. The senior column, "Nature Notes and Queries", was launched early in the century (soon after Macdonald returned from the Boer War) and "Notes for Boys" was started a few years later. Each feature appeared weekly, each was highly popular, and each was conducted by Macdonald for about a quarter-century—until shortly before his death in November 1932. Moreover, he was in control for some time of "Bush Notes" in the *Australasian*, the weekly "stable-mate" of the *Argus*.

Through those mediums, as well as his articles and books, Donald Macdonald exercised a profound influence on nature-study in Victoria and elsewhere, and so, fittingly enough, a memorial to his memory was erected, by public subscription, near his home at Black Rock.

Early in 1933 I took over all three of the columns mentioned. The *Argus* management, it appeared, had recalled that I had been a frequent contributor (as a youth in the Victorian bush) to the Macdonald features, and knew also that I had afterwards conducted similar columns in Brisbane and Sydney. At any rate, I was invited to transfer from Sydney to the *Argus* when Macdonald fell ill; but, knowing that my old friend would guess that I was "standing by" to fill a potential vacancy, I declined the invitation. Then, a month later, I received a telegram that read, "Donald Macdonald died last night—will you now join the *Argus*?" and this time I accepted the invitation. Starting in March 1933, I conducted the three features until, in July 1937, I had to relinquish them through becoming editor of the *Argus*.

When that change occurred, Crosbie Morrison was, as he had been for several years (following a brief period as a junior teacher at Wesley College), a reporter on the *Argus*, and at various periods,

when I was on holiday, both he and Norman McCance had taken over one or another of the Nature columns. Now, at his own earnest request, I gave Morrison control of the features. (It was at this time that he rejoined the Field Naturalists Club.) He was to hold the position for only about a year, but it was an important period for him in that it led to his launching the monthly magazine *Wild Life** and establishing himself in broadcasting.

* Not rendered *Wildlife* (one word) as stated in the *Vict. Nat.* of June last.

Midway in 1938 I was in England, and there I received a note from Morrison telling of the proposed launching of *Wild Life*. The project, it appeared, had originated with W. R. (later Sir Russell) Grimwade and Sir Keith Murdoch, and as Morrison had been given the editorship he was transferring to Murdoch's organization. He was very pleased by the development. His letter concluded, "Yours, sitting on top of the world, Crosbie".

As matters fell out, I too joined the Murdoch organization on returning from Britain, and later I relieved Crosbie (as he had previously relieved me) by acting for some months as editor of *Wild Life*. In that period, also, I was writing the Nature page of the *Weekly Times*, and eventually that feature was taken over by another former *Argus* colleague, Norman McCance, who is conducting it still.

The journalistic wheel spun again when, following the regrettable closing-down of *Wild Life*, Morrison returned to the *Argus*, but soon afterwards, and also most regrettably, this publication also was closed down. (Meanwhile, the wheel had turned in my case as well, in that I had returned to Sydney to edit the *Australian Encyclopaedia*.)

Mark how the whirligig of time has operated! Only twenty years have elapsed since I received that joyful message, "Yours, sitting on top of the world, Crosbie", and yet *Wild Life*, the *Argus*, Sir Russell Grimwade, Sir Keith Murdoch, and Morrison himself have all gone.

The question now arises, How long will influence endure in some of these cases? There is no criterion to indicate the extent to which the influence of broadcasts may persist, but, certainly, *printed material* on natural history has lasting qualities. Thus, in Morrison's case, *Melbourne's Garden* will live on, and so will the files of *Wild Life*. So, too, of course, will the various books of Donald Macdonald.

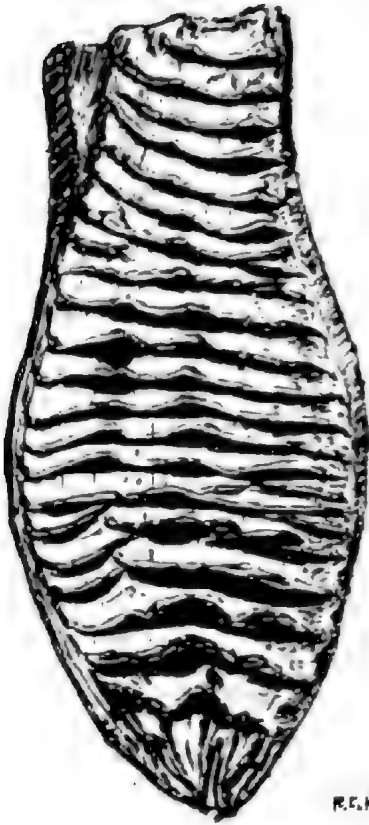
The Nature columns of the *Argus* and the *Australasian*, being buried among masses of other writings, are less readily accessible. But, at least, they exercised a healthy influence during many years (under the control of various naturalists besides those mentioned) and it may be that an element of their influence still prevails. Possibly, indeed, some diligent workers of the future will disinter much of the material. Their searching could well be soundly rewarded.

NOTE ON A SHARK'S EGG

By R. C. KERSHAW

Among the assemblage of curiosities washed up on the beach there are occasional sharks' eggs, sometimes several, and most people can recognize them. But a type not so well known is the laminated egg; and recently two of these, collected by Master Terry Shephard of Beaconsfield, Tasmania, were brought to my notice. They were obtained in January 1957 on a beach near St. Helen's on the east coast of Tasmania.

These eggs are also of interest as one of them (see figure) is ebony-black in colour, while the other is a beautiful honey-yellow. Unfortunately this latter was damaged, and both eggs were incomplete in that they lacked the usual tendrils, the purpose of which is to anchor an egg after it is laid. The laminated egg is oval and it is distinguished by the series of laminations or leaf-like processes which stand erect transversely on the ventral or dorsal surfaces. There is a flattened margin along most of the circumference. In the black egg the measurements were: maximum length, 98 mm.; maximum width, 44 mm. A figure of a Victorian egg is given by Whitley (1940) and of a South Australian egg by Hale (1939), and these are closely similar to the eggs referred to here.



Laminated Shark's Egg.

However, it is not absolutely clear to which shark this type of egg belongs. Hale observed the laying of a laminated egg by the South Australian Swell Shark, and he refers to earlier work by Whitley in which this authority had at first believed the egg to be that of a Swell Shark but was later led to believe that it was that of the Catshark. In the case of Hale's species at least, a Swell Shark was responsible for a laminated egg. However, Whitley adheres to his former opinion as he states (*l.c.* 43) that laminated eggs seen by him contained "embryos, little Catsharks of sorts". The egg according to Whitley is a "beautiful treacle-yellow" with nineteen or twenty laminations, which would describe the "yellow" egg mentioned above from Tasmania. If there is any significance in the difference in colour between the two Tasmanian eggs, then possibly there is one of each type of shark involved, but this is only conjecture. Perhaps more will come to light with embryos present to help elucidate the point.

Plain brown eggs with a wide fringe-like margin have been noted several times in the Tamar River. These eggs are very similar to that of the Elephant Shark as figured

by Mr. Whitley, though much broader. Several were found in the West Arm, usually in the late summer, and on one occasion a school of young sharks was observed some time later swimming in the West Arm, but these were not seen by the writer.

References

- Hale, H. M. (1939)—*South Aust. Nat.* 19 (4) : 1.
Whitley, G. P. (1940)—*The Fishes of Australia. Part 1. Sharks, etc.*

F.N.C.V. LIBRARY—OVERDUE LOANS

Members are reminded that books and other publications borrowed during or previous to August this year are now due for return to the library. The following are among those overdue:

- Science Marches On*, by Shepherd.
My Jungle Trails, by Verill.
The Great Boomerang, by Idriess.
Lightning Ridge, by Idriess.
Old Yarra History, by Pritchard.
Memorials to Explorers and Discoverers, by Daley.
Science and Scientists in the Netherlands, by Verdoord.
Trees and their Life History, by Grove.
An Anthology of the Eucalypts, by Grimwade.
A Botanist in Southern Africa, by Hutchinson.
The World Was My Garden, by Fairchild.
Australian Plants.
Native Trees of Australia, by Audas.
The Food of Plants, by Laurie.
Handbook of Forest Trees, by Ewart.
On Buds and Stipules, by Lubbock.
Plants Poisonous to Stock, by Barden and Good.
Weston's Flora.
Victorian Orchids, by Dickins.
Revised List of Fruit Trees, etc.
Australian Botany, by Guilfoyle.

NATURALISTS' NOTEBOOK

(Reserved for your Notes, Observations and Queries)

NATURE'S TWIST: SOME RANDOM OBSERVATIONS

In *Twining Plants*, in *S. Aust. Nat.* 26: 28 (1951), Professor J. B. Cleland gives notes on the direction of ascent of a number of twining plants. Observations indicate that there is definite direction in the twist of other plant parts in a variety of species. The spiral made by a twining plant or by the twisting of an awn is best described as a helix or screw coil as distinct from the flat coil of a watch spring. It can be determined by experiment with thin wire that two distinct screw coils are possible. Direction of twist of such coils traced according to the rule—*from within, out, and towards the observer*—is defined in its relation to the movement of the hands of a clock.

The column of the awns of a number of grasses have been observed by the writer to twist anti-clockwise invariably. Species studied in sufficient numbers to check this characteristic include *Danthonia caespitosa*, *D. duttoniana*, *Bromus macrostachys*, several *Stipa* species and *Avena barbata*. The awned appendages on the seeds of various Geraniaceae also have been found to twist in the direction opposite to the movement of the hands of a clock, namely

Erodium moschatum, *Pelargonium australe*, *P. modora* and the cultivated ornamental *P. sputale*. The idea that the twist of certain grass awns have a definite direction is not new; as early as 1909 Darwin and Acton in *Practical Physiology of Plants* (Cambridge University Press—London) describe experiments with the awns of a species of *Stipa*, and they define a "wet" and a "dry" direction in relation to the movement of the awn in the presence or absence of water. Their "dry" direction is anti-clockwise and is in accordance with my observations.

Perhaps not so clearly defined, but nevertheless evident, is the clockwise rotation of the extreme tips of a variety of grasses. Those studied have been *Hordeum leporinum*, *H. marinum*, *Lolium rigidum* (mature plants with long lax leaves) and *Elythraea longiflora*. To follow the sun, or conversely to avoid it, the leaf blade would move in an anti-clockwise direction in this hemisphere. That the twist of the leaves is directly opposed to this motion is difficult to understand.

Pods of *Medicago denticulata*, *M. minima*, *M. tribuloides* and *M. sativa* appear to twist consistently clockwise. The flowers of the little lily, *Coesia vittata*, become spirally twisted after flowering—in an anti-clockwise direction. Flower buds of a number of species (notably of the families Convolvulaceae and Apocynaceae), the spiral arrangement of the florets in the flower heads of the clover *Trifolium tomentosum* and the peristome of certain mosses (such as species of *Tortula*) all twist according to an individual plan characteristic of the respective species.

Finally, to show that Nature is consistent even with the larger members of its Animal Kingdom, the tassels on the tails of all thirty five cows in the writer's dairy herd, twist invariably in the clockwise direction.

—LINDLEY D. WILLIAMS, Meningie, South Australia

SALMON TROUT, WHITEBAIT, GULLS AND FISHERMEN

On Saturday, April 12, 1958, at about 3 p.m., when watching from the cliffs at Point Lonsdale, a friend and I saw a great concourse of gulls some distance out in the open sea. Gradually they came nearer. The tide was flowing strongly. Ebb tide that day was at 11.31 a.m. at Port Phillip Heads, and the flood tide was at 6.35 p.m.

Suddenly the pier, which as usual on a fine week-end was lined with fishermen, was a scene of wild activity. Everyone got a bite at once, and in a few minutes over a hundred large salmon trout were flapping on the decking.

A few minutes later, the commotion had started to pass the pier and a solitary fishing boat, with two men in it, went round and round in the area hauling in fish until, presumably, it had caught its quota, when it went home.

Soon the whitebait (perhaps more properly called pilchards), for undoubtedly it was a shoal of these that had caused the excitement, were close to the shore and one was able to see what was happening. It seemed that the small fish, having come in almost due north from the open sea until they had rounded the Lonsdale reef and reached the pier, had turned westerly into shallower water and were making their way along the coast in about four feet of water or less. Every few minutes a big salmon trout would dash into the shoal, the small fish scattering in all directions to avoid it. The ripples caused by their movements could be seen easily from the shore, as both pursuers and pursued frequently broke the surface or swam just beneath it. This was the birds' opportunity. Instantly the terns would be diving into the waves, then the excitement would be over until next time.

It was noticeable that the silver gulls, though present in large numbers, took no active part in the chase. Presumably they were looking for scraps or disabled fish.

By dusk, about 6 p.m., the circus was over. The shoal and its accompanying tormentors had rounded the next point and we did not follow them. The distance covered by the shoal in about 3 hours was approximately a mile.

Unlike the occasions mentioned by E. S. Hanks and myself in two notes published last year, none of the small fish was driven on to the beach.

This event was reported by telephone to one of the daily papers in the hope that publicity might bring in further reports and enable us to trace the progress of this shoal into the Bay, but it was not published. Can any naturalists help?

—E. H. COGHILL

References.—Two notes under this title, by E. S. Hanks and E. H. Coghill respectively, *Vict. Nat.*, 74: 57, 105.

ERRATA

The following corrections should be made to last month's issue of this journal (*Vict. Nat.* 75, October 1958):

p. 96—Transpose numbers 4 and 5 on text-figure.

p. 100, line 16—Correct price to 3/6.

p. 100, line 51—Correct spelling of *Tachyglossis*.

WHAT, WHERE, AND WHEN

F.N.C.V. Meetings:

Monday, December 8—Palaeolithic Art of Europe, by Dr L. Adam.

F.N.C.V. Excursions:

Sunday, November 16—Geology Group excursion. Details at Group Meeting.

Sunday, November 23—Parlour-coach excursion to Starling's Gap. Leader: Miss M. Elder. Coach will leave Batman Avenue at 9 a.m. Fare, 17/- Bring two meals.

Saturday, December 6—Royal Botanic Gardens. Leader: Mr. A. Burke. Meet at gate nearest the Herbarium at 2.45 p.m.

Group Meetings:

(8 p.m. at National Herbarium unless otherwise stated.)

Friday, November 14—Botany Group. A film night by Mr. G. Nicholls. The meeting will commence at 7.45 p.m. with a "Beginners' Talk" by Mr. A. J. Swaby.

Wednesday, November 19—Microscopical Group.

Monday, December 1—Entomology and Marine Biology Group. The meeting will be held in Mr. Strong's rooms in Parliament House, at 8 p.m. Enter through private entrance at south end of House.

Wednesday, December 3—Geology Group. Speaker: Mr. R. Davidson. Subject: Gem Stones.

Preliminary Notice:

December 26-January 4—Bogong High Plains. Parlour-coach will leave Flinders Street, opposite Gas and Fuel Corporation, at 7.30 a.m. *The fare, £7/10/-, should be paid to the excursion secretary by the December General Meeting.* Accommodation is at the Grand Coeur Chalet, at 14 to 16 guineas per week. There are power points in all rooms (230 volts A.C.) and air-heating.

—MARIE ALLENDER, Excursion Secretary
19 Hawthorn Avenue, Caulfield, S.E.7

The Victorian Naturalist

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DECEMBER 11, 1958

No. 900

PROCEEDINGS

At the General Meeting at the National Herbarium on November 10, Mr. J. R. Garnet presided and about 100 members and visitors were present.

Mr. K. W. Atkins showed and commented on an excellent set of colour slides of the Royal Botanic Gardens throughout the year. He was warmly thanked by the Chairman.

The Secretary was directed to congratulate the Government on its action in proclaiming the pink form of the Common Heath, *Eparris impressa*, as Victoria's floral emblem, and to suggest that it be placed on the list of protected plants.

The following were elected to membership of the Club: Mrs. Gwynneth Taylor, Miss E. Ann McMurtrie and Mr. Rudolf Thomas, as Ordinary Members; Mrs. Ingeborg Thomas and Mr. Ida Joan Hooke, as Joint Members; and Mr. Owen Benson Williams as a Country Member.

Mr. C. J. Gabriel exhibited and commented upon a number of specimens of Victoria's only Spiny Oyster (*Spondylus tenellus*); and other exhibits included a large number of garden-grown native plants.

GEOLOGY DISCUSSION GROUP

With Mr. Blackburn in the Chair, twenty-nine members and friends attended the November meeting.

After formal business, the meeting was given over to Mr. E. D. Gill, of the National Museum, who presented "The Geological Literature of 1958". In reviewing some twenty-five books and periodicals, Mr. Gill discussed their importance to geological study. Outstanding features were the increase in publications dealing with atoms and radioactivity, several small popular books on general geology, revised editions of standard works on petrology, non-metallic minerals and sedimentation, and the increasing number of periodicals, published both in Australia and overseas. The speaker referred to the growth of literature dealing with the Quaternary Period, and he considered that radio-carbon dating had been a stimulus to that branch of study. Discussion continued as the literature was handed round for inspection, and at the conclusion Mr. Cobbett moved a vote of thanks to Mr. Gill, on behalf of the members.

The meeting concluded with exhibits and comments by members. These dealt with minerals from Central Australia, Tasmania and Victoria, rocks and fossils from Mansfield, and magazine cuttings of geological interest.

BOTANY GROUP

On Friday, November 14, the guest speaker, Mr. W. G. Nicholls, projected his coloured film of Wilson's Promontory. Highlights were shots of bird life at incredibly close range, and a profusion of wild-flowers of which the Club emblem *Correa reflexa* was one. A second coloured film, of similar high standard, showed the life cycles of butterflies.

Opportunity was taken to express the thanks of group members to Mr. A. J. Swaby for his outstanding leadership of the recent camp-out at the Grampians.

No group meeting will be held in December, and at the January meeting the group will hold a Members' Night and Miss M. J. Lester will speak on exhibits for the 1959 Nature Show to be held in the Hawthorn Town Hall.

F.N.C.V. LIBRARY—OVERDUE LOANS

Members are reminded that books and other publications borrowed during or previous to September this year are now due for return. The items outstanding include the following:

- Flora of Victoria*, by Ewart.
- The Lichen Flora of Queensland*, by Shirley.
- The Sun Orchids of Australia*, by Nicholls.
- Key to the System of Victorian Plants*, by Mueller.
- Forest Culture of Eucalypt Trees*, by Cooper.
- The Mycetozoa*, by Fry.
- The Romance of Plant Life*, by Elliott.
- Guide to the Orchids of New South Wales*, by Rupp.
- Practical Plant Ecology*, by Tansley.
- Mendel's Principles of Heredity*, by Bateson.
- Atlas of Biology*, by Howes.
- Animal Biology*, by Haldane and Huxley.
- General Biology*, by Hargit.
- Back in the Stone Age*, by Chewings.
- The Platypus*, by Burrell.
- The Platypus—Its Life and Habits*, by Radie.
- The Discovery of Man*, by Casson.
- A Short History of Ancient Egypt*, by Childe.
- New Light on Most Ancient Egypt*, by Childe.
- Tales that Dead Men Tell*, by Pearce.
- Wonders of Nature*, by Tunnicliffe.
- Natal Brooks*, by Mann.
- Life of a Cell*, by Thompson.
- Sex*, by Thompson and Geddes.
- Australian Aboriginal Art* (Australian Museum).
- Mammals of South Australia*, by Wood-Jones.
- The Aquarium*, by Sowerby.
- A Manual of the Mollusca*, by Woodward.
- Geology of Australia*, by T. Edgeworth David.

Quite a number of periodicals are also overdue. As the Librarian is compiling a list of our periodical holdings, which should prove of great value both to members and to scientific organizations entitled to borrow from our Library, an appeal is made for all periodicals on loan to be returned by December 30.

When returning publications to the Library, please place them in the box on the Librarian's table.

SECOND EDITION OF WILDFLOWERS OF VICTORIA

By A. B. COURT

The publication of the first edition of *Wildflowers of Victoria* by Miss Jean Galbraith in 1950 satisfied an urgent need for a general text dealing with species of our State. Recently, the second edition of this well-known book appeared, and this will continue to meet the demand for a popular but accurate and reasonably comprehensive guide to our native flora.

The book contains 223 pages, including 48 pages of half-tone pictures, measures $8\frac{1}{2} \times 5\frac{1}{2}$ inches, the binding is full cloth and there is an attractive dust-cover.

The manner in which the material is presented to the reader is very pleasing indeed, and Miss Galbraith deserves the praise she has received. A glossary, accompanied by four pages of figures illustrating the terms listed, precedes the descriptive text. The descriptions of the 900-odd species are clear and concise, and include the most important characters needed to identify them. Species have been placed in groups under sectional headings, the names of which aptly describe the plants in them. Common names and brief notes on distribution have been given for nearly all plants listed. The regional lists of species which follow the main text have proved very useful in aiding the identification of an unknown plant. Plates depicting 188 different species are grouped together at the back of the book, and these are followed by an index containing adequate cross-references to the common and scientific names of all plants mentioned in the entire work. Miss Galbraith has succeeded where many others have failed: she has presented a difficult subject in such a way that very little knowledge of botany is needed for one to make full use of the book.

How to use this Book

The principle underlying the determination of an unknown species depends on the successive elimination of the most unlikely groups and species of plants. First of all, look at the illustrations at the back and select those species which resemble the unknown. Find out if any of these are listed for the area in which it was found (see pages 160-8). If a likely name has been found, check it against the description given in the text. If this search seems unrewarding or no illustration has been found, try to place it in the appropriate section by using the information under the heading "Plant Classification" on page 22 and also the details of sections as given on pages 5-12. The following notes are also useful. Ferns are treated in sections 1-4, clubmosses in 5, taxids and pines in 6, and the true flowering plants in 7-100. The last group is divided into monocotyledons

(sections 7-11), and dicotyledons (12-100). The dicotyledons can be divided conveniently into two smaller groups. Those having flowers without petals or with petals separated to the base are dealt with in sections 12-65, excepting two species of *Correa*. Those with petals present but joined at least at the base are included in sections 66-100.

The reader should continue to make full use of the glossary until he becomes familiar with the various botanical terms used, and should bear in mind that the more practice he has the quicker he will become at making determinations.

Additions, Alterations and Corrections

Miss Galbraith has requested that the following changes be made to her book:

- p. 7, Section 32, line 8: For "ovalute" read "or white".
- p. 8, Section 50, line 4: For "fine lobed" read "five lobed".
- p. 9, Section 63, line 5: After "flowers" add "Feathery water-plants".
- p. 11, Section 91, line 4: After "*Scaevola*" add "Tiny creeping herbs, blue or white flowers".
- p. 61, Par. 5, line 4: After "point" add "white flowers, hairy".
- Par. 6, line 2: After "fruits" add "white flowers, not hairy, leaves straight pointed".
- Par. 8, line 11: After "orange-scarlet" add "ovary and flowers silky".
- line 14: After "white" add "hairy inside only".
- line 16: After "red" add "and with very long styles".
- line 19: After "white" add "leaves and flowers without hairs".
- p. 105, Par. 1, line 7: Delete "Another form . . . green leaves" and replace with "*H. virgata* is erect with narrow channelled leaves and usually has smaller flowers".

The Field Naturalists Club of Victoria has taken over from the publishers the entire stocks of Miss Jean Galbraith's *Wildflowers of Victoria*. It is obtainable for 15/-, post free, from

Sales Officer

Field Naturalists Club of Victoria

c/o National Herbarium

The Domain

SOUTH YARRA, S.E.1

Victoria

F.N.C.V. NATURE SHOW SPRING 1959

THE F.N.C.V. Nature Show Sub-committee has chosen the Hawthorn Town Hall as the venue for the 1959 Nature Show to be staged on Monday, Tuesday and Wednesday, October 5, 6 and 7.

Since the F.N.C.V. is the foremost natural history organization in Australia, it follows that our nature shows should be and can be a *highlight* for all people interested in natural history, of *real value* to junior science teachers, a *stimulation* to school-children, and a *field for the recruitment* of new members to this Club. These aims can be achieved, but only with the help of many people, but we must not leave it all to our experienced naturalists who cannot achieve all this alone. The help of the less knowledgeable and beginners is needed, in addition to that of the more experienced members.

Most F.N.C.V. members are busy people and cannot give much time to the preparation of a nature show, but many could help in a small way. A little help from a large number of members can make a very big difference to the standard of the forthcoming Show.

Each Discussion Group has one or more plans in hand for displays, but Club members who are unable to attend these Groups can share in other exhibits. The Sub-committee is bearing in mind that members may be preoccupied, and will readily present plans for displays when help is needed. Each exhibit usually requires the help of several people at least, each making a small contribution in time and effort. Display ideas will be announced at general meeting and in the *Naturalist* from time to time. Please consider them carefully and give as much help as you can afford to those projects that interest you most.

—F.N.C.V. Nature Show Sub-committee

A VICTORIAN ABORIGINAL BARK DRAWING IN THE BRITISH MUSEUM

By A. MASSOLA

The object of this paper is to record a Victorian bark drawing preserved in the British Museum, and to refer to the occurrence of other types of bark art in Victoria.

The existence of the bark drawing was made known to the present writer by Miss Janice Packer (now Mrs. Lloyd), who noticed it while engaged in studying the Australian Collection in the British Museum. Through the courtesy of Mr. B. A. L. Cranstone, Assistant Keeper of the Ethnographic collections, a photograph of the drawing was obtained and is here reproduced and described with his permission.

There are, however, difficulties connected with describing an object of this nature from a photograph, and the present writer realizes that the record should have been made by someone who has, or had, access to the original. However, since no description has appeared for nearly one hundred years, it is considered important that the existence of the drawing should be made known to students. In a letter to the writer, Mr. Cranstone stated that the drawing is in fairly good condition, though it is difficult to take a photograph of it which would reproduce satisfactorily. Nevertheless, as can be seen by the illustration, the photograph is clear enough to show that the general rendition and the grouping of the figures is similar to that presented in the only other known Victorian bark drawing. The latter is treasured in the National Museum of Victoria, and was accurately described by Brough Smyth in 1878, in *The Aborigines of Victoria*.

It is obvious that the British Museum specimen represents a hunting scene. The figure in the right-hand top corner depicts a man about to spear the kangaroo seen in the left corner. The man holds a spear-thrower in his left hand and the spear is poised on it, about to be thrown. His right hand holds an object which cannot be recognized from the photograph, but it is possibly a shield. Behind the man can be seen the figure of a woman carrying a baby on her back. Below are two male figures, each carrying a shield in the right hand, and a boomerang and one of those peculiar hooked clubs (used in hand-to-hand combat and known as *Leonile*) in the left hand. They are approaching a tree, at the foot of which an animal is depicted as lying on its back. It has the body filled in with criss-cross lines. Below this group there is another tree, with an animal, probably a goanna, on its uppermost branch, and some barely visible human figures nearby. A spear is plainly seen. This, of course, is interpreted from the photograph. It is probable that in the original more details would be discernible.

There is no doubt that the technique used in the production of this drawing is the same as in the one described by Brough Smyth.

He stated that "the bark was smoked on the inside by placing it over a fire of twigs and leaves, until the surface was blackened but not charred, and the artist drew the figures with the nail of his thumb". On the next page of his work, this same author refers to it having been "carved and indented with the nail of the thumb or a piece of bone". Further, he states that the drawing in his possession, and now in the National Museum, came from Lake Tyrrell, and was sent to him "some years ago" by the Hon. Theo. J. Sumner. Mr. Cranstone informed the writer that the bark drawing in his care has no history. It was transferred to the British Museum from the Royal Botanic Gardens at Kew about a hundred years ago, but its original provenance is not known.

However, in the National Museum of Victoria are preserved some diaries which possibly throw some light on the early history of this drawing. These diaries once belonged to the late R. E. Johns, P.M., and the present writer has quoted from them on former occasions. In this case Johns states: "I saw two or three sheets of bark with human and other figures engraved on them, which were sent to an Exhibition at Sandhurst* held in 1854 of objects to be forwarded to the International Exhibition at Paris. The figures were simply scratched on sheets of bark about 18 inches square and were not in groups. I inferred from their arrangement that they were rude hieroglyphics. . . . The bark sheets shown at Sandhurst were sent by Mr. John Hunter Kerr, a settler on the Loddon near Korong."

Should the drawing in the British Museum be one of those seen by Johns at Bendigo, it would seem that it originated in a different place, although in the same general locality, as the National Museum example. That drawings of this type were made in this locality is also clear from the fact that G. A. Robinson, Chief Protector of Aborigines, "observed sketches of emus, kangaroos, and other birds and animals, also festive scenes . . . a large party of natives spearing a white man was also described", in April 1843. This was while he was on a journey from the junction of the Loddon with the Murray to Mount Zero, in the northern Grampians.

Kreft is another traveller who noticed "tracings on sheets of blackened bark" amongst the Murray tribes in the locality visited by Robinson.

The rarity of bark drawings in collections is not due to the fact that the Victorian aborigines did not often practise this art, but because of the perishable nature of the material. It is possible that they were the result of "doodling" on the part of the natives while sheltering from the rain. The bark slabs, which were used by the aborigines to make their rough shelters, were admirably suited to receive drawings. As the slabs were leaned against their supporting frame with the cortex on the outside, they presented to the sheltering natives, smooth, flat surfaces. When these surfaces were

* Now Bendigo.

sufficiently blackened by the smoke from the camp-fire, it would not take long for the bored natives to discover that they could scratch designs on them. Obviously, the idea would then quickly spread.

Another way of decorating these slabs appears to have been by the drawing of the figures with a lump of charcoal. Although no examples of this type are known to have survived, their existence is clear from several accounts left by early writers. Thus they are mentioned by Curr as occurring on the upper Murray: "Occasionally the men drew pictures of corroborees and hunting scenes, with charcoal, on the sheets of bark of which the mia-mias were composed," and by Brough Smyth. These two authors also state that these drawings were known from Gippsland, and Brough Smyth quotes A. W. Howitt as saying that he noticed a hut on the Wannangatta River, which had been made by bending a sheet of bark across its middle, and setting it up like a tent. It had figures of men, emus, etc., drawn on the underside with charcoal, or perhaps red ochre. Lloyd, an early settler near Colac, claims that the natives of that locality "sometimes attempt to delineate with a piece of charcoal, on a sheet of bark, horses, carts, and other things".



Aboriginal Bark Drawing.

Other types of bark drawings appear to have had a ceremonial use. This is seen from the evidence supplied by William Thomas, Guardian of Aborigines, to the Select Committee of the Victorian Legislative Council on the Aborigines. The report states that: "They (the Natives) have occasionally religious or commemorating corroborees, when are introduced devices, painted on large sheets of bark, representing what has occasioned the corroboree, or commemorating some tradition. . . . Near the junction of the River

Plenty with the Yarra, were for ten nights continued corrobberies, all commemorating religious or traditionary events, when huge and strange figures were placed and borne in the corrobberies. I have seen many since then, but have not the materials. I was anxious to preserve those of the Plenty, but while in Melbourne, one day, parties came with two drays and took the huge sheets of bark away for roofing purposes. I may here remark that they do not seem to hold them with much veneration after their dance is over, as they do not seem to preserve them, or take pains to destroy them."

Richard Howitt had earlier stated (in 1845) that the natives (of the Melbourne tribe) kept a day sacred like our Sabbath in commemoration of the creation, "the dance on that day being of a peculiar kind, called gaygip; at which time they corrobory before images carved curiously in bark". This introduces still another type of bark art, because apart from the above references, bark carvings are also mentioned by R. E. Johns. He states that John Hunter Kerr had also sent to the Bendigo Exhibition "a bark sheet cut into the outline of an emu, which he told me the natives were accustomed to bring into some of their night corrobberies with great ceremony. It was nearly of life size, and was carried by a native who imitated the gait of the bird, while the others danced around. Sometimes another figure, of great length, resembling a crocodile, and also cut out of bark, was brought into the corrobory circle by two men, and danced around. Can these ceremonies be religious? The natives would never explain their meaning to Europeans, and would not even permit them to be spectators. After the corrobory was over the bark figure was thrown into the dense scrub and left there." In this case the bark figures would simply disintegrate, and through the agency of insects and weather, within a very short while no trace would remain.

Bark art must have held an important place amongst the Victorian aborigines. It is another of the many little-known aspects of their life.

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EXCURSION HOLIDAY IN THE KENT GROUP

By COLIN A. GABREAU

Most field naturalists will agree that the enemy of field collectors is time—so much so in my case, that I recently decided to spend my annual holidays collecting at home, among the Kent Group islands in Bass Strait. Many colourful personalities, including Robert Brown and Baron von Mueller, have visited and collected from these islands. The F.N.C.V. also held a ten-day excursion there during November 1890. The scope for collection presented by these lonely islands is almost unlimited.

One sunny morning my wife and I commenced our excursion by beach-combing and scouting among rock pools. We were amazed to find stranded in one pool the Flapjack (*Ibaeus peronii*) which is a rare visitor to shallow waters. The Flapjack is a cousin to our grayfish and is reported to be good eating. Numerous chitons or "coat-of-mail shells" (*Ischnoradisia australis*) were there too. These fascinating molluscs when found are usually in large numbers—dozens may be clinging to an upturned stone. Over 160 species of chitons have been recorded on our coasts.

Another mollusc, which prefers to elude daylight, is the common muttonfish (*Haliotis ruber*). As it possesses remarkable adhesive powers, considerable force was required to prize a large specimen from the rock. We later measured this shell at $6\frac{1}{2}$ inches across. A common resident of most pools, the sea-urchin (*Heliocidaris erythrogramma*) is an interesting creature to study as it "walks". Waving its spines in all directions the urchin slowly moves off, using as its locomotive means the tips of the underneath spines.

We were very fortunate in finding several nautilus "shells". These beautiful, fragile specimens are the aim of many collectors. The "shell" is the egg-case of the female paper nautilus (*Argonautia nodosa*) and it serves to protect the mass of white eggs secreted in the "tail" of the case. I have often witnessed voracious gulls pecking holes in the cases in an endeavour to reach the succulent eggs. Unfortunately many shells are damaged in this way and perfect specimens are difficult to obtain.

At low water we were able to collect several seaweeds, species of which were first collected at the Kent Group by Robert Brown in 1803. Easily obtained was the common bull-kelp (*Sarcophycus patatorum*) which attains lengths exceeding 25 feet. Also plentiful were the bubble-weed (*Phyllospora comosa*), "Neptune's necklace" (*Ilormosira banksii*) and the sea lettuce (*Ulva lactuca*). There was also the flowering plant known as strap weed (*Posidonia australis*) and a few other seaweeds we were unable to determine.

The flotsam and jetsam found at high water level provides a veritable treasure trove for the naturalist. It was amongst a pile of such "rubbish" that we found many sponges and sponge skeletons, including the finger sponge (*Chalinopsis*), the cup sponge (*Phyllosporgia*) and a few varieties of *Stelosporgia*.

Inclement weather gave us three days of indoor work, sorting and pressing, then we were pleased to see the skies clear, allowing us to continue in the field.

Deal and Erith Islands consist mainly of huge granite formations dotted at intervals with outcrops of dune limestone (*Aediantite*). The granite is of Devonian age and some sections are badly weathered. The limestone is most probably of Pleistocene age and contains fossil leaves of the Short-tailed Shearwater (*Puffinus tenuirostris*). As "mutton birds" no longer migrate to these islands, it would appear that despite the countless numbers recorded in Bass Strait in the past, man has thinned their ranks over the years. Roaming among the weathered rocky sections we collected samples of tourmaline, diorite, limonite, coarse and fine grained granite and a rather eye-catching sample of granite containing a geode.

These islands could well be described as a paradise for a keen botanist. A wonderful assortment of our native flora is available in a comparatively small area. We commenced collecting on Deal Island, where, prominent among the flowering species are the variable Sallow Wattle (*Acacia mucronata*), White Kunzea (*K. ambigua*), Large-leaf Bush-pea (*Pultenaea daphnoides*), Common Heath (*Epacris impressa*) and Hop Goodenia (*G. ovata*). Very numerous is the Drooping Sheoak (*Casuarina stricta*), but this lovely old tree is slowly losing ground due to annual burning off killing the young ones. This is unfortunate, as the family Casuarinaceae dates comparatively early in our botanical history. Some palaeobotanists consider they evolved during the Cretaceous period.

Among the rarer groups on the island are Kurwan (*Bursaria spinosa*) of which we found only one small tree and the tiny pratia (*P. iryigua*). Undoubtedly, many such plants as the pratia have been choked out by the ever-increasing Silvery Tussock (*Poa caespitosa*). One plant that holds its own with the tussock is the plentiful Trigger-plant (*Stylidium graminifolium*).

Damp gullies shaded by eucalypts make ideal sites for the lowly plant life and the bryophytes are well represented. We collected fourteen species of mosses, eleven lichens, two liverworts and several fungi. Easily collected and maintained, the bryophytes make an intriguing study. We have kept the fungus from dead branches (*Poria leucoplatca*) and (*Stereum yellowcum*) in the house for six months without specimens receiving attention of any description.

Sailing across Murray Pass to Dover and Erith Islands, we recalled how Joseph Gabriel collected nearly a hundred specimens of polyzoans in these waters in 1890. Landing between Dover and Erith we looked at the forbidding terrain of the former and decided to leave it for another day. Sheer cliffs and almost impenetrable scrub form a natural barrier and the island remains virtually untouched. We noted thick bushes of Crimson Berry (*Cyathodes juniperina*), Prickly Moses (*Acacia verticillata*), and Tree Broom-heath (*Monotoca elliptica*).

Erith Island proved similar to Deal and we were able to collect almost at the water's edge. The succulent New Zealand Spinach (*Tetragonia*) covers large areas of the foreshore. Above the beach many species grow in profusion, including the Forest Zieria (*Z. smithii*), Coast Everlasting (*Helichrysum yunnan*), Hazel Pomaderris (*P. speciosa*), Boobyalla (*Myoporum insulare*) and Sea Box (*Alvia baxifolia*). It is interesting to note that Robert Brown collected the original specimen of Boobyalla when at this group of islands in 1803. Reaching one of Erith's peaks, we noticed about three-quarters of a mile away, what appeared to be a granite outcrop covered with orange coloured lichen, but closer inspection revealed a large area of red-brown noon-flower (*Mesembryanthemum australe*). Below this colourful display lay a small cove in which we found several more finger sponges (*Chalinopsis*) and dozens of capsules of the castor oil plant (*Ricinus communis*).

We had to wait several days for suitable conditions to land on North-east Isle. This lonely granite mass provides a rather hazardous landing on its rocky shore. Inhabited only by the migrating mutton bird (*Puffinus tenuirostris*), Pacific Gull (*Larus pacificus*), Silver Gull (*Larus noronae-hollandiae*), and, loud in their protests to the intruders, the Fairy Penguin (*Eudiptula minor*).

We found an old crayfish pot washed ashore and from it obtained a piece of lace coral (*Acropora jacksonensis*), which appears to have all the attributes of coral but is really a polyzoan. Numerous goose barnacles (*Lepas anatifera*) were found attached to a plank. These will attach themselves to almost anything that floats, and when caught in tidal streams they must travel considerable distances. We also found an egg case, probably from the Port Jackson Shark (*Heterodontus portus-jacksoni*).

After a steep climb of some 300 feet we reached the top of this rugged island to find the place pitted with mutton bird burrows and covered knee

high with tussocks (*Poa caespitosa*). We concluded our field work with the trip to North-east Is'e and consider our holiday well spent.

[Plants mentioned were identified by Mr. J. H. Willis of the National Herbarium of Victoria, and the fossils and rock specimens were named by Mr. Edmund D. Gill and Dr. A. Beasley respectively, of the National Museum of Victoria.]

HELICHRYSUM COSTATIFRUCTUM R. V. SMITH— A DETAILED DESCRIPTION AND DISCUSSION

By R. V. SMITH

In *Vict. Nat.* 75: 83 (Sept. 1958) there appeared a brief preliminary paper on *Helichrysum costatifructum*, consisting of a Latin diagnosis, English translation, a brief note on its distribution, and the type designation. The following paper gives a detailed description of *H. costatifructum* and a discussion of its affinities with, and differences from, other members of the genus.

Detailed Description: Shrub 1-2 m. high, with erect branches bearing terminal inflorescences. When growing, leaves held at right angles to stem, but becoming reflexed on drying—particularly the older leaves. *Tomentum* a loose tangle of rather fine spreading hairs very irregularly waved and twisted, varying from ca. 0.25-1.0 mm. long, and with appearance of a woolly fuzz; dense on young shoots, upper stems and inflorescences, but becoming sparser on older parts. *Leaves* linear-oblong, thick, coriaceous, blunt pointed, margins revolute; upper surface glabrescent, dull to slightly shiny, with irregular transverse wrinkles or impressions, and with the deeply impressed midrib forming a prominent longitudinal channel; lower surface densely hairy except for midrib which is glabrescent in older leaves and shows as a greenish stripe; in youngest leaves, whole of lower surface including midrib densely hairy, while upper surface sparsely hairy; dimensions vary considerably even on the one specimen; in majority of cases 1.0-3.0 cm. long, 2.0-2.5 mm. broad, white for all material examined limits of variation are 0.5-2.8 cm. by 1.5-3.5 mm. *Inflorescences* in loosely branched terminal panicles bearing from 20-40 capitula; panical branches subtended by narrow subulate green bracts 2.0-3.0 mm. long, hairy in lower part, glabrescent to glabrous above; ultimate panicle branches bearing the capitula, 0.5-1.0 cm. long, with small semi-scarious glabrescent bracts 1.0-1.5 mm. long at irregular intervals. *Capitula* varying from ovoid in bud to urceolate in young flowering stage, and from hemispherical to broadly campanulate at maturity, length 6.0-7.0 mm., breadth 5.0-8.0 mm. (variation in breadth depends largely on degree of maturity); after the shedding of florets and achenes involucrel bracts spread out horizontally, and total width of capitulae then ca. 1.0 cm. *Involucre* of several rows of bracts, more or less hairy on outside, completely glabrous inside; outermost bracts at base of involucre approx. deltoid and acute to bluntly pointed; outer bracts above these, short, broad, obtuse, approx. oblong, 1.5-3.0 mm. long, 1.0 mm. broad, lower part thick opaque and covered with coarse wool, upper part thinner more membranous glabrescent; intermediate bracts oblong, obtuse, 3.5-4.5 mm. long, 1.0 mm. broad, lower half thick opaque and sparsely woolly except for a short glabrous basal portion, upper half thinner with a short semi-transparent basal region and the remainder pale opaque and with a short greyish white tip; both outer and intermediate bracts convex outside, concave inside and with upper margins slightly lacinate-fimbriate; inner bracts narrower than outer and intermediate ones, 4.0-5.0 mm. long, narrowed in lower half into a thickened claw slightly concave on front, keeled on back, 0.3-0.7 mm. broad, widening out in upper half into a

thinner lamina 0.5-1.0 mm. broad; innermost bracts are the narrowest being usually 5.0 mm. long, with lamina 0.5-0.7 mm. wide, and with claw 0.3-0.5 mm. wide; claw sparingly woolly at top, but main part glabrous; lamina with a short semitransparent basal region but remainder opaque, creamy white, erect or slightly spreading, oblong, obtuse, crenulate and with strongly lacinate-fimbriate margins; in the younger capitulae the thickened opaque lower part of bracts (claw in case of inner ones) greenish-yellow while in mature capitulae dingy brown or pale tawny. *Receptacle* varies from almost flat to quite strongly conical, varying considerably even on the one plant; diameter varies in different specimens from 1.5-2.5 mm. though fairly constant in the one specimen. *Florets* mostly hermaphrodite tubular; in some capitula all

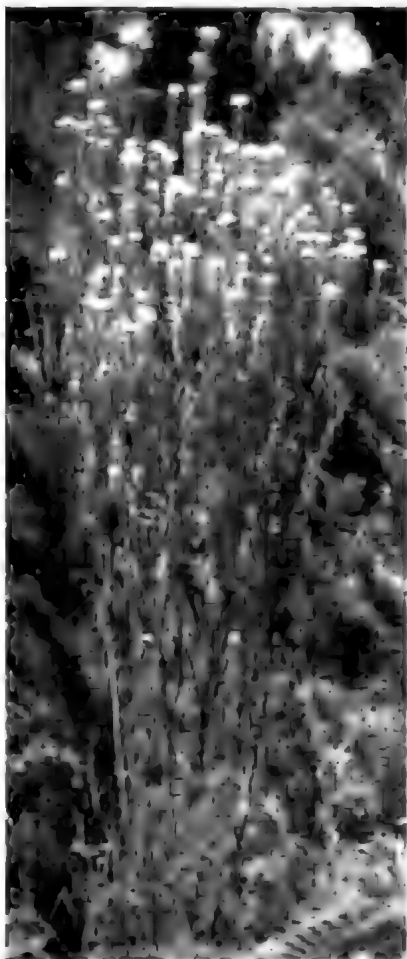
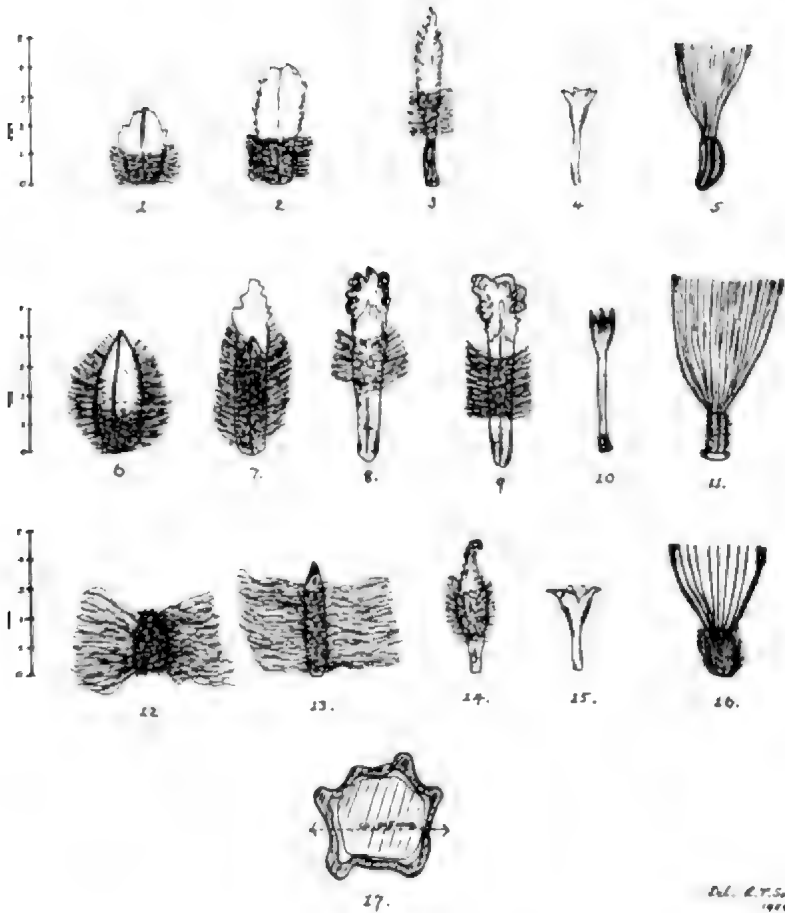


Photo: W. M. Curtis
H. costatifructum, in situ.
At Flowerpot, southern Tasmania.

florets hermaphrodite, while in others a single female floret occurs amongst about 40 hermaphrodites; hermaphrodite florets narrow cylindrical in lower part, widening out to a more or less campanulate top; in great majority of cases length 2.7-3.0 mm., maximum breadth 0.5-0.7 mm. and minimum ca. 0.2 mm., while for all samples examined limits of variation are length 2.5-3.0 mm. and breadth at widest part 0.3-1.0 mm.; female florets differ externally from hermaphrodites in having a narrower tube, not conspicuously widened at the top; number of florets in each capitulum varies greatly, in majority of cases being about 30-40 but all told varying from about 20-60. *Achenes* more or less cylindrical to ellipsoidal-oblong, curved or oblique towards the slightly hollowed base; in majority of cases 1.0-1.3 mm. long and 0.3-0.5 mm. wide, though for all samples examined limits of variation for length are 1.0-1.5 mm.; whitish, almost glabrous except for minute scattered hairs often more frequent towards top; with 5-9 conspicuous irregularly spaced longitudinal ribs, in great majority of cases 4-5 of ribs very prominent while remaining 2-3 (if present) smaller and less pronounced. *Pappus* bristles white, minutely barbellate for greater part of length, prominently thickened at apex, number per achene in great majority of cases 20-23, though for all samples examined 17-26.

[Dimensions given above for florets and achenes, achene-rib counts and pappus bristle counts, were obtained from at least 30 samples and in some cases nearly 50.]

Discussion: Affinities with both *H. gunnii* (HK.f.) F. Muell. ex. Benth and *H. reticulatum* (Lab.) Less. From *H. gunnii* (the common Victorian and Tasmanian form) it differs in shape of capitula (distinctly turbinate in



Floral details of *Helichrysum costatifructum*, *H. gunnii*, and *H. reticulatum*

Figs. 1-5—*Helichrysum costatifructum*: 1-3—Involucral bracts (1, outer; 2, intermediate; 3, inner). 4—Hermaphrodite floret. 5—Achene and pappus.

Figs. 6-11—*H. gunnii* (common Victorian form): 6-9—Involucral bracts (6, outer; 7, intermediate; 8 and 9, inner). 10—Hermaphrodite floret. 11—Immature achene and pappus.

Figs. 12-16—*H. reticulatum*: 12-14—Involucral bracts (12, outer; 13, intermediate; 14, inner). 15—Hermaphrodite floret. 16—Achene and pappus.

Fig. 17—Transverse section through achene of *H. costatifructum* showing prominent though irregularly distributed ribs.

H. gunnii), laminae of inner involucreal bracts (longer, conspicuously lacinate-fimbriate as compared with those of *H. gunnii* which are shorter, entire, and strongly crenulate), number of florets in each capitulum (more than 30, as compared to about 20 in *H. gunnii*), achenes (longer, white, almost glabrous, prominent longitudinal ribs and a small basal attachment; as compared with *H. gunnii* where they are shorter, strongly angled, dark brown, covered with prominent glandular papillate hairs and have a prominently thickened basal attachment), pappus bristles (in *H. gunnii* more slender and much more numerous, over 40), receptacle (in *H. gunnii* much narrower), inflorescence (capitula in *H. gunnii* are on shorter stalks giving a dense arrangement to the panicles), leaves (narrower in *H. gunnii*). From *H. reticulatum* it differs in leaves (very much shorter, c.f. 4-6 cm. long. in *H. reticulatum*), tomentum (crisp and spreading, as compared with dense and flat in *H. reticulatum*), involucreal bracts (in *H. reticulatum* they are very woolly, with dingy scarious, obscurely spreading bluntly pointed tips), achenes (strikingly different—in *H. reticulatum* very short and broad, somewhat flattened and densely covered with long stiff bristles), pappus bristles (more strongly barbellate in *H. reticulatum*).

In some forms of *H. ledifolium* (DC.) Benth. there is quite a resemblance to *H. costatifractum* in vegetative characters—reflexed leaves and rather strongly fuzzy tomentum. However, *H. ledifolium* is at once separated on its floral characters—involucreal bracts, number of florets in each capitulum, characters of achenes, etc.

The achenes of *H. costatifractum* show some similarity with those of *H. rosmarinifolium* in being glabrous and ribbed. However, in *H. rosmarinifolium* several of the ribbed angles are produced into narrow longitudinal wings, a feature not found in *H. costatifractum*. In many other characters, both floral and vegetative, *H. rosmarinifolium* is quite distinct from *H. costatifractum*.

During the preparation of this paper, a careful examination was made of the material in the National Herbarium of Victoria of a number of the Ozothamnoid species of *Helichrysum*, and as a result of this examination, some interesting facts have emerged on floral arrangement in the genus. It is intended at a later date to publish a paper on this subject.

I wish to make thankful acknowledgement for help, advice and co-operation in connection with research on the subject of this paper, to Dr. W. M. Curtis of Hobart, to Miss N. T. Burbidge of Canberra, and to Messrs. J. H. Willis and A. B. Court, both of Melbourne.

COMMUNITIES IN THE SEA

More than half of our globe consists of abyssal ocean (below 2,000 metres deep, nearly $1\frac{1}{2}$ miles), and there is life in the deepest trenches penetrated (about 64 miles). Life occurs at all levels between the deepest ocean and the surface, and is stratified according to temperature rather than pressure. Fish brought up from abyssal depths die of heat rather than change of pressure. In the rifts that form the deepest oceans the temperature approaches 0°C., and the pressure is over 1,000 atmospheres. All levels of life, however, depend ultimately on the rich, sunlit surface layer. Life on earth would cease if the sun ceased to shine. The horizontal currents of the ocean are often strong, but the vertical currents are extremely sluggish. The carbon dioxide in water at great depth is used to obtain a radiocarbon date for the time when it was last at the surface and exchanging freely with the atmosphere. On the seafloor are wide plains and terraces, mountain ranges, deep canyons, and flat-topped mountains (guyots). The guyots were planated by the sea, and shallow water fossils on them tell how long ago those surfaces now deep below the ocean were at sea level.

The life of the ocean is not haphazard, but exists in communities with a high degree of dependence of one form of life on another. Some communities are comparatively restricted (like the intertidal fauna), while others have a great range. Some organisms leave their usual habitat to breed in freshwater where there is not so much competition and their young will have better chance of survival. Salmon, for example, make rivers their nurseries. On the other hand, eels found in the deep abyss of the oceans spawn near the surface. The young have to swim miles downwards!

It is interesting to trace marine communities back into the past and discover what changes have taken place through geological time. One outcome of this study is to show that coral reefs constitute one of the oldest communities in the world. Communities have changed through the ages with the emergence of new kinds of animals and plants.

The Geological Society of America has recently published a massive Memoir (No. 67) consisting of two large volumes that deal with the "household of the sea". Over 100 authors have written some million and a half words dealing authoritatively with marine ecology (Vol. 1) and a palaeoecology (Vol. 2). The work was organized by a Committee of the U.S. National Academy of Sciences, and the publication is of great scientific importance.

—EDMUND D. GILL

WHAT, WHERE, AND WHEN

F.N.C.V. Meetings:

Monday, January 12—Illustrated talk on aspects of Natural History in Queensland, by Mr. Stan Collier of Brisbane.

F.N.C.V. Excursion:

December 26-January 4—Bogong High Plains. The parlour-coach will leave from Flinders Street, opposite the Gas and Fuel Corporation, at 7.30 a.m. on December 26. Members should bring a picnic lunch. The fare, £7/10/-, should be paid to the Excursion Secretary by the December General Meeting. Accommodation is at the Grand Coeur Chalet, which has power-points (230 volts A.C.) in all rooms. The leader, Mr. J. R. Garnet, suggests that members who have sandshoes should bring them. Members travelling by private car will not require a permit provided they can show that they are members of the party and have accommodation booked at the Chalet. The party will be expected, and if necessary the gate-keeper can be asked to ring through to the Chalet to check credentials.

Group Meetings:

The Botany Group and Microscopical Group will not meet in December.

The Geology Group will not meet in January.

The Entomology and Marine Biology Group will not meet in December or January.

Preliminary Notice:

Monday, January 26 (Australia Day)—Parlour-coach excursion to St Leonards. Leader: Mr. E. H. Coghill. Coach will leave Batman Avenue at 9 a.m. Fare, £1. Bring two meals.

· MAURIE ATTENDER, Excursion Secretary

19 Hawthorn Avenue, Caulfield, S.E.7

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PROCEEDINGS

At the General Meeting of the F.N.C.V. on December 8, Mr. J. R. Garnet presided and about a hundred members and visitors were in attendance.

Dr. L. Adam, a world authority on primitive art, gave a lecture on Palaeolithic art of Europe. This was well illustrated with projected slides, with also some illustrations for comparison of Bushman art of South Africa and that of Australian aborigines. A vote of thanks was carried by acclamation.

The following were elected to membership of the Club: Mrs. Violet Westbury, Mr. G. R. J. Forbes, Mr. John Martin and Mr. Brian M. Nicholson as Ordinary Members; Mrs. Elsie M. Garnet, Miss Ruth Parkin and Mr. A. K. Parkin as Joint Ordinary Members; and Mr. Don. S. Dangerfield as a Country Member.

Exhibits included Austral Dodder, *Cuscuta australis* in flower (Mr. J. R. Garnet), an aboriginal axe (Miss Neighbour), and Mrs. E. E. Bennett sought help in identifying a large spider.

F.N.C.V. LIBRARY

With a view to increasing Library facilities for members, the Librarian would appreciate suggestions for new books, periodicals and other publications, either from individual members, or through Group secretaries. Suggestions will then be submitted to Council for consideration.

As several members holding long-overdue loans have ignored repeated requests for their return, it has been regretfully decided to take action for the recovery or replacement of the publications concerned. It is pointed out that under the Club's constitution and by-laws, publications should be returned or renewed within two months of being issued on loan, the maximum loan period is six months and a fine of two shillings per month is chargeable on overdue loans. The Library facilities are available to financial members only. In order to assist members to return loans promptly, slips of paper are being attached inside the back of each volume so that the date two months forward may be entered thereon, either by the Librarian, or by the member borrowing the volume. Your co-operation in this matter would be greatly appreciated.

CONTRIBUTIONS TO THE "NATURALIST"

The Editor requires contributions, for publication in the *Victorian Naturalist*, of short scientific papers, popular articles on natural history subjects, and short paragraphs of the kind that appear in the section entitled "Naturalists' Notebook". Manuscripts may be typed or written clearly by hand, but space should be left between lines for any necessary editing.

* Published: December 22, 1958.

THE BURNING MOUNTAIN AT WINGEN, NEW SOUTH WALES

By ALFRED A. BAKER

The village of Wingen is situated on the New England Highway in the valley of the Page's River, 215 miles north of Sydney. To the north-west lie the Liverpool Ranges, at an elevation of 3,300 feet above sea level, forming part of the Great Dividing Range of eastern Australia. They are composed of Tertiary lava flows of basalt, overlying sandstones and conglomerates of Triassic age.

A few miles to the north, through the town of Murrumbidgee, the Highway winds in its crossing of this spectacular mountain range; whilst around the town itself, residuals of the conglomerates stand out like ruined castles, their formation due probably to erosion by Page's River prior to the outpouring of the lava. An easterly spur from the Liverpool Range extends to Mount Murrumbidgee (2,400 feet), which is a conspicuous point seen from many places along the Highway north of Wingen.

The Burning Mountain is situated a couple of miles north of the railway station of Wingen, amongst steeply sloped hills of Permian age. At the top, over an area of about half an acre (at present fenced-in and held under a mineral lease), bluish coal-smoke, choking sulphurous fumes and intense heat issue from cracks and crevices up to several feet long in the broken rocky surface. Varying degrees of heat can be felt over a much greater area, but the emission of smoke and fumes is much less. Sparkling crystals of yellow sulphur are deposited by sulphurous fumes on the walls of the crevices and whitened rocks at the surface.

Although no actual flame has been recorded, the burning section is far too hot to walk over and the destructive action of the sulphurous deposit quickly damages clothing or metal objects. In evenings or in damp weather, when moist atmosphere comes in contact with the heated ground, the area is enveloped in fog.

The "path" of the fire has been traced for at least nine miles. Near the burning section, stepped subsidences down to several feet from the surface and fallen dead trees indicate that a cavity had formed below. Records of rumbling, more severe in the past than recent times, also adds evidence to this earth movement.

The first white person to have discovered the Burning Mountain was probably Dr. Archibald Little, of Cressfield Station, near Scone, in 1826, although it was known to the aborigines for a long time before that. Legend handed down from tribes that roamed northern New South Wales has it that an aboriginal lighting a fire near the summit was carried off into one of the deep chasms by the "evil" one. Unable to escape, the poor unfortunate used his fire sticks to set the mountain afire as a warning for all other tribes to keep away

thousands of years), but fracturing of rocks, allowing entry of water and oxygen, could well have occurred in the distant past.

Other causes which are remotely possible have been suggested, such as lightning, aboriginal camp-fires, or natural bush-fires.

However, the facts remain: sufficient air reaches the fire to keep it burning at the slow rate of about three feet a year; the cracks allow the elimination of the burnt gases; and the overlying rocks are sufficiently stable to prevent complete collapse which would otherwise smother the fire.

But the work of Nature goes on. A new growth of vegetation takes the place of fallen trees, and wind and rain restore the surface of the broken land. With the passing of time, the evidence of a Burning Mountain at Wingen will be lost forever.

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NOTES ON THE OCCURRENCE OF *AMANITA MUSCARIA* AT DONCASTER EAST

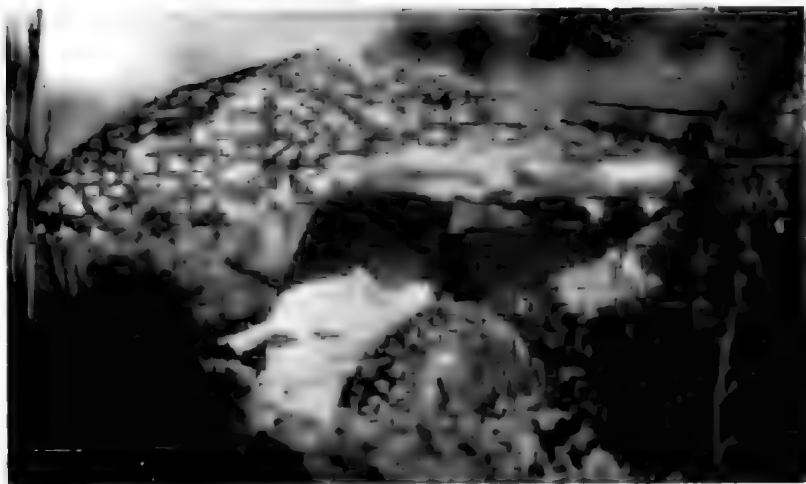
By PAUL FISCH

During June 1958, we discovered, much to our surprise, that dozens of fruiting caps of *Amanita muscaria* (Fly Agaric) were growing along a row of pines (*Pinus radiata*) running south from Beverly Street between Leeds and Blackburn Roads. Miss Salvana, schoolmistress at Doncaster East School, also reported their occurrence along Pine-ridge Road, Donvale, under pine trees. During this same month we collected and photographed *A. muscaria* at the usual place at Emerald under chestnut trees, birches, beech trees, and, for the first time, under young exotic ornamental conifers growing on the grassy slope above Emerald Lake. In *Wild Life*, August 1946, the occurrence of *A. muscaria* under pine trees at Beaconsfield was established. German and Swiss fungi books list *A. muscaria* as growing under deciduous forest trees and conifers.

Throughout 25 years of residence in the Doncaster district we have always "kept an eye open" for our fungus flora and this unexpected appearance certainly caused quite a lot of excitement and interest. I had always considered that the restricted occurrence of *A. muscaria* in the Dandenongs and at Mount Macedon was due to the presence of exotic deciduous trees and the moist autumn conditions. However, relative to the Doncaster appearance we have two facts to bear in mind—*poor rainfall and dry soil conditions*.

This year we experienced very dry autumn conditions, the rain-

fall until June being 1,139 points (of this, March 94, April 80, and May 430.) The specimens grew under well matured pine trees which were spaced only nine feet apart, mainly on the eastern side of the pine row, that is, the rain shadow side. The *Amanita* were confined to the area between 15 and 32 feet from the base of the pines, while *Boletus luteus* occupied the adjoining area between 32 and 42 feet. Virtually no other plant growth was contained within the 42 feet from the trees, indicating this to be the extent of the feeding area of the pines. Any mycologist, I think, would consider these very dry conditions as most unsuitable for fungal growth, yet the specimens observed were big and perfect; mature caps measured up to eight inches across.



Photos: Mrs. B. Norbury

Amanita muscaria, growing in association with *Pinus* at Doncaster.

It seems quite obvious that *A. muscaria* is in mycorrhizal association with *P. radiata*. In such associations a fungus normally forms a dense covering of hyphae on the white absorbing roots of the tree. Root hairs are poorly developed or absent and the absorption of solutions from the soil is taken over by the fungal hyphae. The *inorganic* nitrogen content of the soil under pine trees is rather low, as closely planted trees make heavy demands on it. The *organic* nitrogen contained in the raw humus (matted pine needles) is, however, readily absorbed by the fungus, which in turn makes some of it available to the tree. The mycorrhizal association does not always appear essential to the existence of the trees; but as the associated fungus makes organic nitrogen of the raw humus available, the trees seem to benefit by it.

In the case of our *Amanita*, the observation seems to indicate that the trees would have to supply the fungus with moisture, as the mycelium is growing in the driest section of the trees' rooting systems and not in the region of its most vigorous absorption. In fact, in the latter region another mycorrhiza-forming fungus, *Boletus luteus*, was observed.

To sum up, I would like to draw attention to three interesting facts:

1. The sudden appearance of this fungus in the Doncaster area.
2. Its occurrence under very dry conditions.
3. Its unorthodox mycorrhizal association with pine roots; that is, its fungal hyphae do not seem to associate with the trees' absorbing roots but rather with its older roots closer to the tree trunks.

The fungal activities under such conditions as just observed may therefore illustrate how efficiently Nature works, and emphasize the importance of the work of this unobtrusive section of the plant kingdom. The assignment of fungi is really the reduction of dead organic material of the forest floor into simple soluble plant foods again. So we realize the truth of the foresters' statement, "No forests without fungi."



Boletus scaber at Emerald.
Associated with birch trees.

Reference: *Australian and New Zealand Botany* (McLuckie & McKee).

BIRD NOTES FROM IVANHOE

The flowering of *Eucalyptus cosmophylla* last August brought a pair of Rainbow Lorikeets to the garden. With their brilliant colours and rosy-pink beaks, they were a joy to watch as they climbed around the outer tips of the tree, feeding and chattering. Occasionally they were accompanied by an immature bird, possibly last year's young one. They stayed for 10 to 15 minutes before flying off, always in the same direction. Our garden is on a busy corner of Lower Heidelberg Road, Ivanhoe, and during the last few years over twenty different birds have been noted here. Some are rare visitors, but others return regularly. The Eastern Spinebill and Eastern Shrike-tit can be watched very closely. I might add that magpies have been coming to us to be hand-fed for nearly ten years, and each spring when the young are strong enough to make the journey, they are brought across the main road and practically left on our hands to be provided for.

—J. M. SAVAGE

PRESERVATION OF BOTANIC SPECIMENS

By A. STEN

There are several methods used for the preservation of plants, the herbarium method of pressing being the most popular among amateurs and expert botanists. Unfortunately, this method cannot be used satisfactorily for the preservation of large specimens such as branches, flowers and fruits, etc. A simple process and one which gives ample opportunity to the student to retain plants in all their original form and colour is their preservation in chemical solutions with the application of dyes or paints if necessary, and the modelling of flowers and fruit which, of course, would later be attached to the branches.

The history of plant preservation in chemical solutions and the modelling of foliage and fruit is closely associated with museum development especially in U.S.A. and U.S.S.R., and the majority of museums now use preserved or modelled plants in their natural history displays. Preservation methods described below are based on a study of American, Russian and German literature and have been proved successful by experiments carried out at home.

Before considering the preservation of plants in chemical solutions brief mention may be made of other simple methods.

1. *Preservation by Air Drying*

The simplest method of preserving plants other than the herbarium one is as follows: flowers with stems and leaves are placed upside down in a dry, dark, well-ventilated place for a fortnight or more (stems can be shaped to any required form by wiring). Even some flowers can be preserved in this manner, for instance, hydrangeas, delphiniums and chrysanthemums.

2. *Preservation in Sand*

Plants can be dried and preserved in a box of dry sifted sand, with the flowers placed face downwards and covered lightly with sand. The stems are also covered and the plants kept in the sand from one to three weeks depending on the nature of materials and climatic conditions.

3. *Preservation in Powdered Borax*

Plants can be also dried and preserved in powdered borax ($\text{Na}_2\text{B}_4\text{O}_7 \cdot 10 \text{H}_2\text{O}$), but unfortunately borax has a tendency to bleach and burn flowers if they are kept in it for too long. Treatment time varies for almost every group of plants.

4. *Preservation in Borax-Sand Mixture*

A mixture of powdered borax and dry sifted sand in the proportions of 2:1 respectively is a popular medium for preservation,

especially when flower colour has to be considered. Specimens are treated in a box as above.

5. *Preservation in Corn Meal and Borax Mixture*

A mixture of white corn meal and powdered borax in the proportions 6:1 respectively is another medium whereby flowers can be dried and natural colours preserved.

Methods 4 and 5 have been used satisfactorily for magnolias, lilacs, gladioli, dahlias, carnations, daffodils, chrysanthemums, anemones and others.

PRESERVATION OF FOLIAGE IN SOLUTIONS

There are several methods of preserving foliage and in the majority of cases glycerine ($\text{CH}_2\text{OHCHOHCH}_2\text{OH}$) is used as the main preserving chemical.

PURE GLYCERINE METHOD

The following are two variations of this method:

1. *Cold Variation*

One part of glycerine is used with two parts of water. Glass containers are the best for all chemical methods of preservation. Carefully wash all specimens, branches with leaves, flowers, fruit, etc., in cold running water and stand upright in the jar containing the above solution for 2-5 weeks.

As a rule this solution is used only for branches bearing leaves. Jars should be left open and kept in a well-ventilated place and the leaves should be wiped from time to time with glycerine.

The colour of the leaves is changed by the glycerine and when this colour change is uniform throughout, the specimen should be removed from the solution, washed in cold running water and drained.

Many plants when treated this way lose their original colour but there are others which, if not left too long in the solution (not more than a week), do not change, e.g. plums and crab-apples.

Depending on soil conditions and the season, the same plant may show different colour reactions when treated in the water-glycerine solution. Hence this method is used for preparation of plants for decorative purposes.

2. *Hot Variation*

Some plants retain their natural colour when treated in hot water-glycerine solution, e.g. azalias and privets, but others may become yellow or brown. For this method, water-glycerine solution is heated to 40° C. and the branches left standing upright in this solution for one hour or more.

SKELETONIZATION OF LEAVES ("ANGEL FEATHERS")

In the U.S.A. so-called angel feathers are very popular and are used commercially in bouquets, corsages and other floral arrangements. These are skeletonized leaves prepared in the following way. Half a teaspoonful of caustic potash (KOH) is added to one pint of water. The leaves are placed in boiling potash and boiled for 20-30 minutes, after which the solution and leaves are cooled. The leaves should then be laid on paper and the soft tissues gently scraped away with a blunt knife leaving the skeleton of veins. The skeletons are next bleached by immersion in a bleaching solution for one to one and a half hours and then spread on a sheet of paper and allowed to dry.

Occasionally angel feathers may be found in the garden, probably as a result of insect and bacterial activity and action of chemical compounds in the soil.

Angel feathers treated with sheet celluloid can be used for any decorative work. The procedure is as follows. The natural leaves are removed from the branch, prepared as angel feathers and covered with sheet celluloid. Before covering with celluloid, two sheets of cellophane paper are rubbed with vaseline. Twice as many pieces of celluloid as there are angel feathers are cut from a thin sheet, making sure that the celluloid pieces are slightly larger than the angel feathers. A piece of celluloid is immersed for three seconds in acetone, and then quickly placed on a prepared sheet of cellophane paper. The angel feather is placed on this and covered immediately with another piece of celluloid also treated with acetone. The celluloid pieces are pressed together, using the second sheet of cellophane paper, so that the celluloid penetrates between the veins and thus both pieces of celluloid join firmly with one another. The cellophane sheets are removed and the celluloid leaf pressed between two sheets of cardboard, and when dry (in a day or two) the edges are trimmed and coloured. Finally, the leaf is attached to a branch with celluloid glue.

Beautiful decorations can be made by this method.

We have considered some popular methods of preserving flowers and leaves but there are several more complicated procedures and there are two main points to be considered with these.

GAM METHOD (GLYCERINE-ACETONE-
METHYLATED SPIRITS)

This method is used when the retention of natural colour is not important.

Glycerine ($\text{CH}_2\text{OHCHOHCH}_2\text{OH}$), acetone ($\text{CII}_3\text{COCH}_3$) and methylated spirits ($\text{CH}_3\text{CH}_2\text{OH}$) are used in the proportion 2:1:1 by measure. Botanical materials are placed in a glass jar of this solution and left there for a week or a fortnight. Fruit should be removed and treated separately, the method for which will be

dealt with below. After a week or two the material is removed from the solution, rinsed in cold running water and left in the sun for five to ten days.

Leaves treated in GAM solution lose their natural colours and turn white, yellow or brown. Plants with hard fibres should first be treated in oxalic water solution (water and a few drops of oxalic acid $(\text{COOH})_2$ for 24 hours and then transferred to the GAM solution. Plants preserved in this manner are usually kept for study purposes but they could also be dyed or painted and used for decoration. Usually the preparation of botanical material for colouring or dyeing requires preliminary bleaching.

BLEACHING SOLUTION

This solution consists of six chemicals, viz.: 10 fluid oz. of water in which $2\frac{1}{2}$ teaspoonfuls of sodium bisulphate (NaHSO_4) are dissolved. To this, $\frac{1}{2}$ teaspoonful of dry oxalic acid $(\text{COOH})_2$, several drops of acetic acid (CH_3COOH) followed by $2\frac{1}{2}$ pints each of methyl alcohol (CH_2OH) and acetone (CH_3COCH_3) are added.

The plants are left in a glass jar with this solution until completely bleached, then washed in cold running water and treated with the preservation solution AMSG (acetone, methylated spirits, stearic acid, glycerine).

AMSG METHOD AND SOLUTION

Although this solution has a bleaching effect it is nevertheless one of the best preserving methods for plants, and may be prepared as follows. Into a container of boiling water removed from the flame pour a mixture of the following: methylated spirits, acetone and stearic acid ($\text{CH}_3(\text{CH}_2)_{16}\text{COOH}$) and stir well; when the mixture is half cooled, slowly add glycerine. Allow the solution to cool and it is ready for use. The proportions in which these compounds are used depends on the nature of the material being treated and can best be determined by trial and error. Plants should be left in this solution from a week to a fortnight, then removed, washed in cold running water and left in the sun. When dry enough they may be coloured.

Plants preserved and coloured in this way make excellent decorations and are widely used as background material for natural history dioramas in museums. Amateurs may also use them for decorating their homes, for instance, in wall dioramas, floral pictures, etc.

Before dyeing or painting the material it should be stiffened with a coating of shellac, or celluloid dissolved in acetone (CH_3COCH_3) to which some beeswax is added. This solution may be divided and each portion differently coloured and placed in a separate tube, so one then has readily available numerous colours. Three, four or

five layers of liquid celluloid and beeswax are applied to the material, making sure that the previous layer is always dry before applying the next. The specimen should be shaped at the same time.

Colour notes are taken from fresh leaves and flowers, but colour reproductions could also be of great help. It is essential wherever possible to make colour notes immediately the specimen is procured. The best way to accomplish this is to obtain colour cards with samples of basic colours and their variations. An amateur could make these cards as follows. For three or four dozen tubes of paints, a card index is prepared, one card being assigned to each definite colour, e.g. red, yellow, brown, blue, etc., and their variations. For example, green may be represented by the following shades: cadmium green, chrome green, sap green, prussian green, emerald green, etc. Small squares are drawn on the left-hand side of the card to correspond with the number of colour variations. The squares are coloured and opposite each is written the corresponding name of colour, e.g. YELLOW: maple yellow, aurora yellow, lemon yellow, cadmium yellow, etc. When making colour notes it will then only be necessary to put the name or number of the appropriate colour card on the sketch, and such notes will be invaluable in colouring preserved materials.

In most cases it is advisable to remove fruit and flowers, leaving only the leaves, buds, etc., on the stems, as it is simpler to treat the flowers and fruits individually, but not all fruits can be preserved in the usual way and it is often better to model and cast fleshy or aggregate fruits. Collective fruits such as legumes, capsules, siliques, and follicles, are best treated in solution to avoid splitting while drying and if mounted open to avoid loss of seeds or shape. Dry fruits such as acorns, achenes, nuts, and utricles should be prepared by removing the contents and filling with hot wax. However, such fruits as samaras should be treated in AMSG preserving solution. Cone-like fruits or gum-nuts may be kept in their natural state for many years without preservation.

It is recommended that flowers, like leaves, be treated with preserving solution in separate containers, care being taken to retain their natural shape. In some cases, such as trumpet-like flowers, the natural shapes may be retained during drying by using thin flexible wire. Cardboard, thick paper, pins, etc., may also be useful for preserving shape, depending on the type of flower.

Interstitial Dyeing

This method is used when the retention of natural colour in preservation of botanical specimens is essential.

The preserving solution consists of the following eight compounds.

1. Water (H_2O)	1 gal.
2. Copper sulphate ($CuSO_4$)	160 gm.
3. Table salt ($NaCl$)	40 gm.

4. Alum ($K_2SO_4 \cdot Al(SO_4)_3 \cdot 24 H_2O$)	24 gm.
5. Methyl alcohol (CH_3OH)	80 gm.
6. Acetic acid (CH_3COOH)	40 gm.
7. Copper subacetate ($C_2H_3O_2$) ₂ Cu.Cu(OH) ₂	80 gm.
8. Sodium bisulphate ($NaHSO_4$)	20 gm.

Dust and dirt are removed by washing and the material placed in a jar with the solution for a week or a fortnight, then removed, washed in cold running water and transferred either to AMSG or GAM solution for preservation. It is washed once again in cold running water and allowed to dry. (N.B. The solution loses its strength after a fortnight.)

In some cases the results are entirely satisfactory, but in others may require additional touching-up. Natural colours can also be preserved in tertiary butyl-alcohol (C_4H_9OH), thiourca (NH_2CSNH_2), citric acid ($C_6H_8O_7$) or sodium citrate ($Na_3C_6H_5O_7$) as described in my article, "Embedding of Biological Specimens in Plastic."*

Study Plants and Celluloid

Dry pressed faded leaves, leaves preserved with natural colours, artificially coloured leaves, or small pressed flowers, together with small twigs and stalks, may be put between two sheets of celluloid as follows. A sheet of relatively thick celluloid is placed on a sheet of glass, and three coats of acetone are applied with a brush. The specimen is placed on this sheet and then covered with another sheet also treated with acetone. The sheets are pressed together firmly and the pressure maintained between cardboard for 24 hours, after which the cardboard is removed and the edges trimmed. The specimen is then always readily available for study.

Celluloid prints of both sides of a leaf can be prepared as follows. The leaves are treated with a sheet of celluloid in the same manner as for angel feathers, but using thicker celluloid and immersing for a briefer period in acetone.

The author is indebted to Miss Jean Matheson for her assistance in the preparation of this article.

PUBLICATIONS AVAILABLE AT THE SOUTH AUSTRALIAN MUSEUM

Australian Aboriginal Culture, 2/6.

Australian Aboriginal Words, 2/-.

Birth of the Kangaroo, 1/-.

Harmless or Harmful, a handbook of South Australian snakes, 4/-.

National Parks and Reserves, 5/-.

Shell Collecting at the Outer Harbour, S.A., 1/6.

South Australian Shells, 3/6.

Post Cards in Colour:

Bird Dioramas 1/6 (set of 6), Wild Flowers 2/6 (set of 9).

* See *Vict. Nat.*, March, 1958

MOLLUSCAN FIELD NOTES—Part 2

By ROBERT BURNS

Notasuisaster robusta (Laseron) 1954

Some 15 specimens, largest 5.5 mm. in length and 1.5 mm. in breadth, collected at Portarlington 7/4/1958; under stones between tide levels on a flat reef.

Field-notes—"Animal dimensions of the largest specimen 1.5 mm long and 0.75 mm. broad. Body colour clear white with quite large yellow and smaller white spots on the edges of the foot and the sides of the body. Foot grooved, with a longish tail. Tentacles long, with two yellow patches along length, tips rounded, extend well in front of siphon, eyes included in tentacle bases. Siphon short, starts just behind the anterior edge of the foot. Operculum thin, yellowish multispiral."

The very beautiful animal of this species was well worth the trouble taken to observe it. The yellow spots fall into three pairs of lines—two lateral pairs and one cephalic pair. The former pairs are respectively on the lower and upper edges of the foot while the latter pair runs dorsally from the tip of the siphon, between the tentacles and then continues onwards and upwards until lost inside the shell aperture. The white spots are irregularly spaced all over the body except for the sole of the foot which is clear of all markings. Dorsally between the tentacle bases is a sharply defined transverse connecting ridge which may be termed the "cephalic ridge". From the lateral extremities of this cephalic ridge arises a single faint line which appears to form a division between two surfaces of the upper body. Similarly just below the upper lateral line of yellow spots there is another faint line which forms a division between the sides of the foot and the upper body; this line runs from what may be termed the "siphonal notch" to the upper edge of the operculum peduncle. The siphonal notches are deeply incised in either side of the siphon. The whole anterior of the foot and the siphon is often in rear of the cephalic ridge but is capable of extending as far forward as the tentacle tips. The operculum is carried on the upper posterior side of the foot, its peduncle is not raised; between the spiral ridges on the operculum are curved radial lines. The shell has a three-whorled protoconch, the lower whorl of which is keeled and the upper two are smooth. The colour in a large series of the species varies from golden-yellow to near black but always with the upper row of gemmules of each whorl white or whitish, there being three rows on each whorl. The gemmules are large, rounded, and flattened on top.

In a letter to the National Museum of Victoria, Mr. C. F. Laseron (who in 1954 revised the N.S.W. Triphoridae and described the present species) stated the following after examining a series of specimens from Victoria, "... are all the same species, differing only in intensity of colour, but all having the same protoconch, sculpture, aperture, and with the upper row of gemmules white. They are very close to the N.S.W. *robusta* but probably constitute a separate geographical race." The writer agrees with this statement but for the present feels that the Victorian specimens should be known by the same name as the N.S.W. species. This record of *Notasuisaster robusta* Laseron constitutes a new record for Victoria although possibly it has been in the past wrongly identified with the closely allied *N. labrata* (Adams) which is recorded from our coastline.

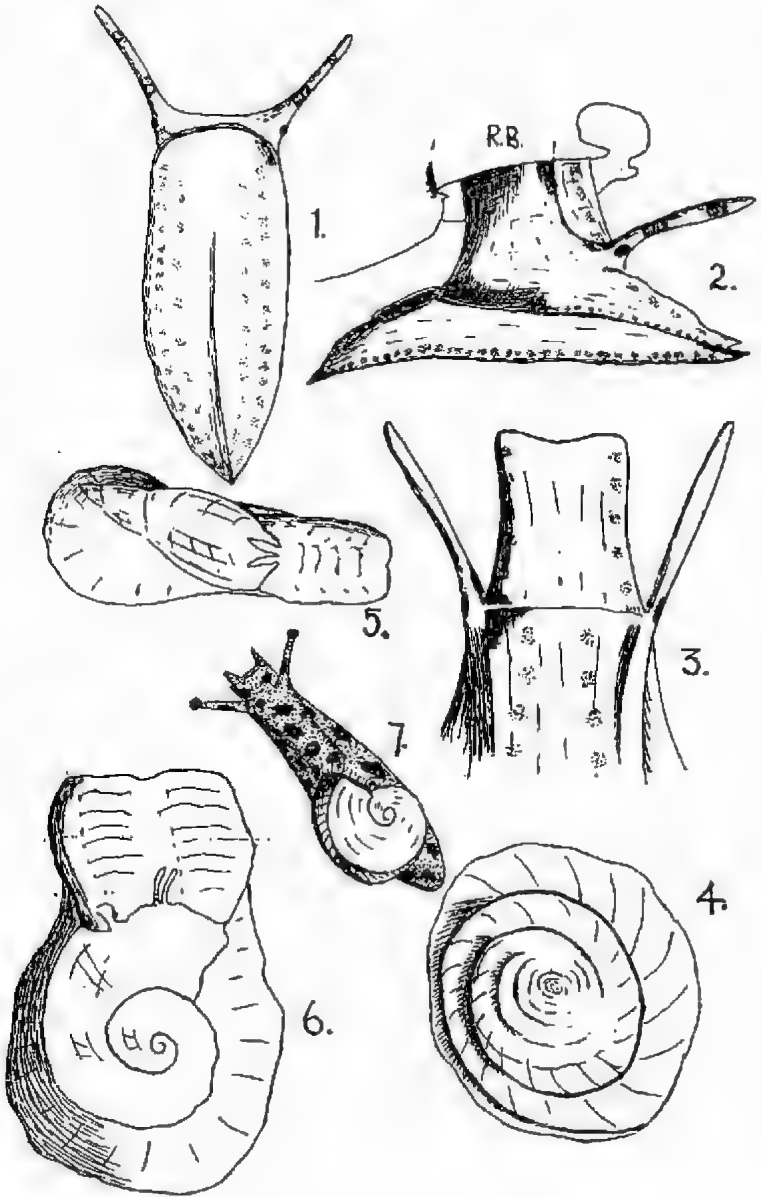
The 15 specimens upon which this record is based have been presented to the National Museum of Victoria, Melbourne.

Cauler conicum (Lamarck) 1822

Numerous specimens, up to 25 mm. in length, collected at Norman Bay, Wilson's Promontory, 9/2/1958; between tide levels on the open beach.

Field-notes—"Animal quite slender, a little wider than shell, neck very long and squarish in front. Anteriorly greyish fawn, lighter on the edges

PLATE VII



(For key, see opposite page)

which are thickened. Posteriorly the foot is much wider, very much rounded, and pale-grey. Tentacles minute, linear, pale-grey lined on the edges with black. Anal siphon small, merely a fold in the head mantle. Mantle does not envelop shell."

The tentacles are quite stout at their base and lay back upon the body whorl of the shell. The animal is approximately twice as long as the shell.

This species and the next are extremely common between tide levels on Norman Bay beach, making tracks through the sand for long distances. Great numbers of specimens not more than 5 mm. in length can be collected at any low tide but large specimens are very hard to procure. If anything this species prefers a slightly higher part of the beach than the next species although they do intermingle on many parts.

Comber incci (Philippi) 1851

Many specimens, up to 30 mm. in breadth, collected at Norman Bay, Wilson's Promontory, 9/2/1958; between tide levels on the open beach.

Field-notes.—"Animal very broad but not quite as broad as long. Colour milky white posteriorly, anteriorly more intense. Head very broad, dorsally lowly crenulate. Mantle practically enveloping the shell except for the upper central portion. Tentacles very close together, upright with the tips curled back, front edge light-brown. Tail very thin, margin undulate. Anal siphon a large fold in the mantle on the left side."

The animal is more than twice as long as the shell.

C. incci is far less common than *C. conicum* but more adult specimens of the former were collected than of the latter.

A third species, *C. sordidum* Swainson 1833, was collected in the muddy sand of the mouth of Tidal River, Norman Bay, 9/2/1958. This species is intermediary in size and shape of shell and animal between *C. conicum* and *C. incci*. The colour of the animal, however, is dark grey brown. This species is restricted to a very small part of the river mouth and only receives fresh salt water at high tides.

Thalassohelix translucens Gabriel 1934

Ten specimens, largest 12 mm. major diameter and 10 mm. minor diameter, collected at Lilly Pilly Gully, Wilson's Promontory, 15/2/1958, under logs and bark on damp ground.

Field-notes.—"Large brownish shell—translucent with faint bands of orange in radial pattern. The animal shows through the shell. When extended the animal has a long narrow neck, blue-grey in colour with blue-black spots on the sides and the top. Tentacles (four in number) are all tipped distally with blue-black. Sole of foot yellowish-blue."

The animals are very active and the shells with extended animals exhibit large yellow patches, but with the animals withdrawn the shells exhibit dark-blue patches all over.

Iredale 1937 places this species in his genus *Mulathena* Iredale 1933 (*vide* Gabriel 1947, p. 115). This species has its type locality in Lilly Pilly Gully and therefore these specimens are topotypical. Other species collected in the same locality were *Allodiscus dandynongensis* Petterd 1879, which Iredale 1933 referred to his genus *Pillomena*, and a juvenile *Charopa* sp.

The writer wishes to thank Mr. C. J. Gabriel for the identity of the three land shells.

EXPLANATION OF PLATE

Figs. 1, 2, 3, 4. *Notasimister robusta* Laceron—ventral view, lateral view, dorsal view of head, and operculum respectively.

Fig. 5. *Comber conicum* (Lamarck)—dorsal view

Fig. 6. *Comber incci* (Philippi)—dorsal view.

Fig. 7. *Thalassohelix translucens* Gabriel—dorsal view.

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CATTLE EGRETS AT PORTLAND

About eighteen months ago two residents of Portland—Messrs. C. and S. Keiller—who take a keen interest in natural history, told me they had seen three strange birds on the Portland Lagoon. They were about the size of ibis and white with red head, neck and breast. I told them that they must have been mistaken as there was no such bird in Victoria. However, they were so emphatic that the incident remained in my mind as an unsolved puzzle. Then in the *Victorian Naturalist* (Vol. 75, p. 80) came an excellent account of the Cattle Egret and its Victorian appearances. With this I went to the Keiller brothers and verified their description of the unknown birds. There is no doubt they had seen three Cattle Egrets, another Victorian record of the bird.

—NOTT. F. LEARMONTH, Portland.

WHAT, WHERE AND WHEN

F.N.C.V. Meetings:

Monday, February 9—"Snowy River". by Mr. N. A. Wakefield.

F.N.C.V. Excursions:

Monday, January 26 (Australia Day) Parlour-coach excursion to St. Leonards. Leader: Mr. E. H. Coghill. Coach leaves Batman Avenue at 9 a.m. Fare, £1. Bring two meals.

Saturday, January 31—Marine Biology and Entomology Group excursion to Rickett's Point. Take the 1.47 p.m. Beaumaris bus from Sandringham, or meet at the Kiosk at Rickett's Point at 2.15 p.m.

Group Meetings:

(8 p.m. at National Herbarium, unless otherwise stated.)

Friday, January 16—Botany Group. "Identification Night". Members are requested to bring specimens and books or keys which would help in identifications.

Wednesday, January 21—Microscopical Group. Subject: "Water-mites", by Mr. J. Walsh.

Monday, February 2—Marine Biology and Entomology Group will meet in Mr. Strong's rooms in Parliament House at 8 p.m. Use private entrance at south end of House.

Wednesday, February 4—Geology Group Subject: "Geological Holiday Experiences", by Members.

—MARIE ALLENDER, Excursion Secretary

19 Hawthorn Avenue, Caulfield, S.E.7

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PROCEEDINGS

At the General Meeting of the F.N.C.V. on January 12, Mr. J. R. Garnet presided and about a hundred members and visitors were in attendance.

Mr S. Collier, of the University of Queensland, described recent developments in that State. He told of the Marine Biology research station on Heron Island, of building activity within the University, and of the search for oil and minerals. The speaker was warmly thanked by the President.

Miss R. S. Chisholm was presented with her certificate for Honorary Life Membership.

Exhibits included the egg sac of a giant praying mantis with parasitic wasps which had emerged from it (Mr. Coghill), a sand worm egg mass with young emerging (Mrs. Freane), mat plants (Mr. Garnet) and geological specimens (Mrs. Parkin) from the Bogong High Plains, and garden-grown native plants (Miss Macfie and Mr. Fisch).

GEOLOGY DISCUSSION GROUP

Twenty-seven members and visitors attended the December meeting, with Mr. Blackburn in the Chair. Mr. Dodds reported on the excursion to Coimadai, held on Sunday, November 16, at which twenty-four members and friends attended. Collections of specimens from the area were then described by Messrs. Baker and Blackburn, after which discussion took place concerning the places visited.

The subject for the evening, "Gem Stones", was given by Mr. Davidson. Gem stones were divided into precious and semi-precious stones, and, although mostly of mineral origin, animal and vegetable matter is also used. There was, however, an increase in the manufacture and use of synthetic stones. Cutting and polishing relative to hardness, colour and fashion, natural occurrence, and their appearance in a number of hand specimens was given by Mr. Davidson. Finally, a series of field tests, together with gravity tests, using liquid reagents, concluded this interesting discussion.

Exhibits: Mr. Cobbett—Gem stones from various localities.

Mr. Baker—A collection of gem stones. (Univ Geol. School Coll.)

Mr. Blackburn—Precious opal.

Mr. McLiness—Ostracods, recent and fossil.

Mr. Jeffrey—Quartzite with conglomerate bands.

COIMADAI EXCURSION

On arrival at Coimadai village, the leader, Mr. Dodds, described the geology and physiography of the area, emphasizing the altered drainage system of the area due to the outpouring of Newer Basalt from Mount Bullengarook. The party then walked to the mineral springs issuing from the banks of Pyrete

Creek, and they also viewed the upturned Ordovician shales and sandstones which were in places overlain by glacial tillite of Permian age. Nearby was the striated polished surface of a glacial pavement. Continuing downstream, the party visited Wightman's Rock (exposed on the hillside near the ruins of a stone house) and The Twins (in the banks of the Pyrete Creek) both of which are Ordovician rocks with striations and scouring on the polished surfaces. Further on, in the banks of Pyrete Creek were excellent sections of tillite; the creek then cuts its way through a gorge in Ordovician slates.

After lunch, the party visited Alkemade's quarry, where the contact of the magnesium limestone of Pleistocene age and the Ordovician was seen. Horizontally bedded, the limestone is considered to have been formed by chemical precipitation from springs in a lake or depression. The volcanic activity of Mt. Bullengarook may also have had a part in its origin. White crystals of magnesium sulphate (natural Epsom Salts) on the walls of the quarry were confirmed by those present. Fossils which have been found in the limestone consist of the bones of the giant kangaroo and wombat, the valves of ostracods, worm castings, chartaceous plant remains and pollen grains. Infilled mud cracks are common, but ripple marks or current bedding is not seen, indicating quiet conditions during deposition.

A yellowish volcanic ash layer, and dark mud layers containing rounded quartz pebbles, stand out in contrast to the whitish limestone bands. These mud layers were very conspicuous in Davis and Cooper's quarry which the party next visited. Mr. Cooper spent considerable time showing the party bores put down in search for palatable water, one shaft struck ample water but the concentrated carbon dioxide nearly caused the loss of his life. After examining the quarry face, the party returned to Melbourne.

MICROSCOPICAL GROUP

The subject for the evening on January 21 was "Water-mites" and the speaker Master John Walsh. It is a matter of regret that, owing to the holidays, there was not a larger audience present to appreciate the masterly manner in which our young member delivered his lecture. He covered the life history and habits of the creatures from the egg, through larval and nymph stages, to adult maturity. There were a number of microscopes on the bench and several of these showed Master Walsh's own mountings of water-mite larvae displayed in glycerine jelly preparations.

The evergreen subject, "Pond Life", which is most prolific at this time of the year, will be taken by Mr. D. E. McInnes at the Group Meeting of February 18. On the Saturday afternoon prior to this date, F. N. C. V. members are invited to join in with the Group on the occasion of their collecting outing at the Botanic Gardens, at 2.30 p.m. near the Kiosk, with the object of obtaining material for display on Wednesday night.

BOTANY GROUP

Members of the Botany Group combined in an instructive evening on January 16, when specimens collected mainly during the holidays were exhibited and some time was devoted to their identification.

A model of the Group's proposed exhibit for the Club's spring nature show was displayed by Miss Lester and discussed in detail. It was agreed to submit the model to the show committee and to seek their approval before further action.

There was some discussion of the idea of stimulating interest in the Group, and plans were adopted for securing some publicity for the Group's activities. All members of the F.N.C.V. are invited to support the Group by attending the interesting meetings which it holds on the Friday following the Club's General Meeting each month.

THE LARGE-BILLED SCRUB-WREN IN VICTORIA

By N. A. WAKEFIELD

The subject of this article is known to ornithologists as *Sericornis magnirostris*, and it is one of those insignificant little birds that flits about in the foliage of forest vegetation, rarely allowing an observer to see it sufficiently to form any definite opinion as to its identity. In fact, it has no outstanding feature that one can fix in mind as a key to recognition. It is slightly smaller than its cousin, the common White-browed Scrub-Wren (*S. frontalis*)* and it lacks the distinctive head- and wing-markings of the latter.

The Victorian form of *magnirostris* has dark brown upper parts and lighter (buff) under parts. The bill is scarcely larger than that of *frontalis* but appears larger in the field because of the smaller body size of the former bird. Moreover, the bill of *magnirostris* is quite straight and gives the impression of being angled slightly upwards.

When the Large-billed Scrub-Wren is encountered, one is immediately impressed by the difference between its habits and those of the White-browed. The latter is essentially a bird of low dense shrubbery, being almost invariably on the ground or within a few feet of it, hopping about on the forest floor, on logs and low branches with a characteristic crouching, mouse-like movement. The Large-billed, however, is not a ground bird but feeds about in the more open foliage of larger shrubs and small trees in dense humid forests; in which respect it resembles some of the Thornbill group rather than our common Scrub-Wren.

Record of the original discovery of the Large billed Scrub-Wren in Victoria is indicated by A. J. North, on page 302 of Volume 1 of his *Nests and Eggs*.† There we read: "Mr. Edwin Ashby has kindly forwarded me for examination an example obtained by him in Victoria, in July, 1886, in a fern gully at Boolarra, South Gippsland".

In the *Victorian Naturalist* of March 1898 (Vol. 14, p. 150) there is a list of ornithological exhibits shown at the February meeting of the F.N.C.V. by A. J. Campbell, and this includes "... skin of Large-billed Scrub Wren (new for Victoria)". Evidently this was the specimen referred to on page 248 of Campbell's *Nests and Eggs* (1900), where he wrote: "Mr. A. C. Smart kindly lent me a skin of this bird which he shot from a small family at Loch, South

* Although the popular reference, J. A. Leach's *Australian Bird Book*, cites the length of *S. magnirostris* as 4.7 and that of *S. frontalis* as 4.5 inches, Gregory Mathews' *Birds of Australia* (Vol. 10, pp. 4 & 8) shows length measurements of 100 and 120 mm. respectively for two specimens of the former, and 124 and 110 mm. for two of the latter. The smaller size of *magnirostris* is further indicated by the dimensions of eggs of the two species, given on pages 245 and 248 of A. J. Campbell's *Nests and Eggs of Australian Birds*; the ratio being about 6:7.

† *Nests and Eggs of Birds Found Breeding in Australia and Tasmania*, Vol. 1 (1904).

Gippsland, October, 1897". It seems that he did not know of Ashby's earlier collection.

The next indication, though a doubtful one, of the presence of this elusive little bird in Victoria, is given by C. E. Bryant in the *Emu* of January 1936 (Vol. 35, p. 228), in these terms: "The Large-billed Scrub-Wren probably extends as far as Marlo at least. A bird in thick scrub along the Brodribb was considered by J. Jones, who saw it there, as possibly of that species, but identification was uncertain."

In the January 1941 issue of the *Emu* (Vol. 40, pp. 330-1), Ina M. Watson published a concise summary entitled "Large-billed Scrub-Wren in Victoria", noting the records from Boolarra and Loch, and commenting on more recent observations in Sherbrooke Forest in the Dandenong Ranges, where families of these birds had been known for a number of years.

The present writer had opportunity to make very close acquaintance with the Large-billed Scrub-Wren in the Dandenong Ranges in November 1957, when descending the slope below Clematis Avenue in Sherbrooke Forest towards Kallista. There were a number of them in the foliage of Musk Daisy-bush (*Olearia argophylla*), Hazel Pomaderris (*P. aspera*)‡ and such tree-shrubs, and on a few occasions individuals came down and allowed themselves to be seen at close quarters. One was foraging for several minutes within arm's length, endeavouring to extract something from a ball of Pomaderris leaves that had been drawn together by webby material by an insect or spider. It was apparently oblivious of the observer and for a minute or so was actually clinging to a branch quite upside-down. Such procedure, together with the habit of probing into crevices of the bark of large shrubs, is reminiscent of the activities of *Sittellas*, and one cannot help noting a similarity in the bill development, too.

In Campbell's *Nests and Eggs*, the nest of the Large-billed Scrub-Wren is described as "Very similar in shape and construction to that of the Yellow-throated Scrub-Wren. . . . Usually suspended from pendulous branches or from lawyer palm (*Calamus*) canes, from three feet to thirty feet above the ground, in the densest of scrub". However, in reference to this, in the *Emu* of May 1955 (Vol. 55, p. 119), N. L. Roberts writes: "Hindwood§ informs me that his experience does not confirm this statement—that the nest of the Large-billed is never pendent, like that of *lathamii*, but may be built among creepers or vines, between palm fronds, or in similar situations, and is more like that of the White-browed Scrub-Wren. . . ." This last builds a bulky, domed structure set on the ground or some other solid foundation.

‡ *Pomaderris aspera*, which is distributed from the Otway Ranges through central and eastern Victoria to eastern New South Wales, is now considered to be specifically distinct from *P. apetalis* of New Zealand, Tasmania and the Victorian Grampians.

§ K. A. Hindwood of Sydney.

Perhaps the reason for the erroneous ideas about the kind of nest built by *magnirostris* originated from its habit, in New South Wales and Queensland, of appropriating the used or even occupied nests of the Yellow-throated Scrub-Wren (*S. lathamii*) and, to a lesser extent, of Warblers (*Gerygone*), which do build nests suspended from twigs and lianas by comparatively slender attachments. The nest of the Brown Warbler (*G. richmondi*), which occurs in East Gippsland, is illustrated in the *Victorian Naturalist* of April 1956 (Vol. 72, page 182), and it would be most interesting to find in Victoria such a nest being used by Large-billed Scrub-Wrens.

The Yellow-throated Scrub-Wren does not, as far as is known, occur in Victoria,* but both it and the Large-billed inhabit the scrubs of Mount Dromedary, near Narooma; so perhaps the latter carries on its pirating activities there as well as further north.

On December 29, 1957, Ian Hore-Lacy of "Mount Selby", Kallista, found a nest of the Large-billed Scrub-Wren in that area. It was placed about eight feet above a small creek, on the frond of a treefern, and it contained three young ones about four days old. Photographs were obtained of the nest with a parent bird in attendance, and two of these, taken by Trevor Pescott, are reproduced in Plate VIII. It should be noted, however, that the tone of the bird is actually much darker than it appears in these reproductions.

The nest at Kallista was of "old dried material, lined with feathers", and its form and situation are in perfect conformity with the description given to Roberts by Hindwood. Ina Watson had already reported (*l.c.*) that Howe had "found nests at Ferntree Gully in hanging clumps of wire grass at about a height of five or six feet", which also fits the general picture.

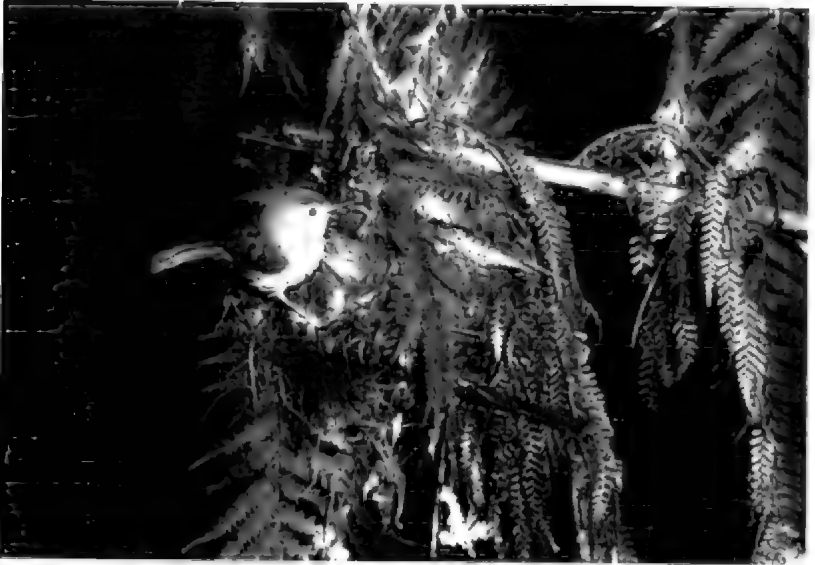
In the *Bird Observer* of February 1953, there is the report of a B.O.C. excursion to Toolangi, which is situated on the Yea River about 34 miles north-east of Melbourne. The outing took place on December 7, 1952, and members of the party saw the Large-billed Scrub-Wren feeding young on that occasion.

Early in 1951, personnel of the National Museum of Victoria camped on the heavily forested plateau towards the Snowy River about 14 miles north-east of Buchan, in East Gippsland. In the vicinity of the camp, *S. magnirostris* was observed in the thick undergrowth along creeks and also foraging in more open timber, though it was nowhere common. A specimen of an immature female bird was collected there on March 6, 1951, this being the only Victorian specimen of the species in the National Museum.

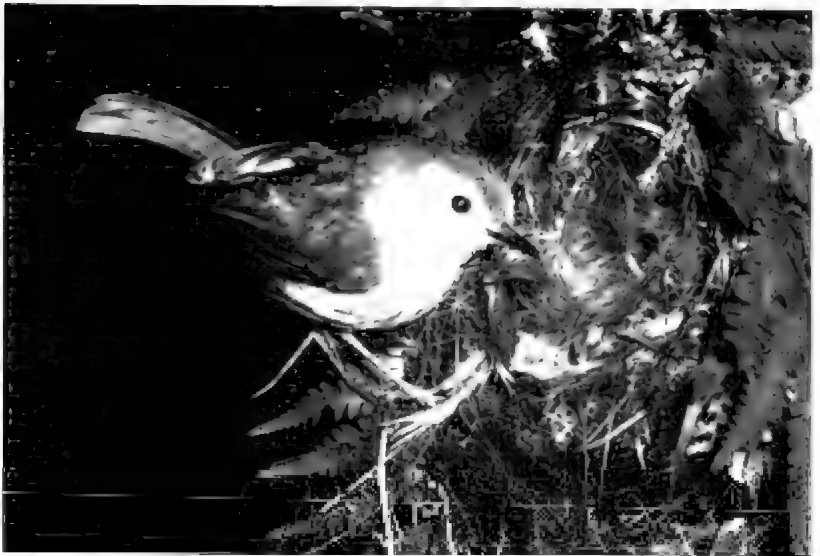
On January 19, 1959, the writer saw a pair of Large-billed Scrub-Wrens in a "jungle" gully which comes down into the Murrindal River about seven miles north-easterly from Buchan. This habitat was a typical pocket of subtropical vegetation, containing Lilly-pilly (*Eugenia smythii*) and various lianas; and, as is usual in such vegeta-

* See *Vict. Nat.* 74: 137, and *Emu* 58: 273.

PLATE VIII



Nesting Site of Large-billed Scrub Wren, Kallista



Study of Bird at Nest, with Young.

Photos: Trevor Pescott

tion in East Gippsland, the bird-life present included such species as the Black-faced Flycatcher and Rose Robin.

Ira Watson reported that at Sherbrooke "one family was seen to contain well-grown young early in November", and so commented that the species is an early breeder. In this connection it is noted that Ian Hore-Lacy's observation indicated that a clutch of eggs was incubated late in December.

In the *Victorian Naturalist* of November 1927 (Vol. 44, p. 190) L. L. Hodgson recorded our bird for the Mount Buffalo Plateau. He wrote: "The bushes and small saplings constituting the undergrowth, were usually well tenanted by numbers of small birds, chiefly Large-billed and White-browed Scrub-Wrens, *Sericornis magnirostris* and *S. frontalis*. . ."

Then in the March 1946 issue of the same journal (Vol. 62), there was record of an exhibit by H. C. E. Stewart of ". . . nest and egg of the Large-billed Scrub-Wren . . . from Mount Buffalo". On page 210 there appeared a note by the same gentleman, describing the finding of the exhibit (part of a nest and one of a clutch of three eggs) among logs in the engine-house woodshed of the Government Chalet. Discussion of some inconclusive observations is appended, and the final comment is that "the nest and eggs now place beyond all doubt the presence of the bird on the mountain. The bird's Victorian range must therefore be extended to the north-east of the State, with a breeding record of 4,500 feet altitude."

In the *Bird Observers' Club Monthly Notes* of August 1946, Blanche E. Miller discussed the Mount Buffalo nest and egg, stating that F. E. Howe "positively determined it to be part of the nest of the Large-billed Scrub-Wren".

In the present writer's opinion, these Mount Buffalo records apply to the White-browed Scrub-Wren. This bird is well known as an intruder into sheds and such buildings, both for foraging and nesting purposes; one of its indoor nests is illustrated in the *Victorian Naturalist* of June 1956 (Vol. 73, p. 25). The Large-billed is a bird of the near-coastal rain-forests of low to moderate elevations, it builds its nests several feet from the ground, and it is not known to enter buildings for any purpose. Moreover, it is very doubtful whether the species could be "positively determined" on the evidence of the materials of a nest or the characters of an egg. Series of eggs of each of the two species, in the National Museum of Victoria, show that there is overlapping as regards colouration, though the slight size difference is maintained.

On the evidence of a single specimen, Gregory Mathews† described the Victorian occurrence of the Large-billed Scrub-Wren as a sub-species, *Sericornis magnirostris howei*, distinct from the typical race of New South Wales. He notes that the southern speci-

† *Ref. Novitates Zoologicae* 18: 355 (1912).

men was browner on the upper surfaces, with throat buffish, and abdomen and flanks darker than in the typical form. Dr. Ernst Mayr† chose to consider this racial distinction "not proven", commenting however that, if further southern specimens show similar variation, the race *howei* must be recognized. There are six Victorian localities in which the Large-billed Scrub-Wren has been reliably recorded. Observations cover the four seasons of the year; the bird is a permanent resident in the rain-forests of the State's lower ranges, and future observation should show it to be in many other places in central Victoria and Gippsland.

APRIL EVENING BIRD CALLS

Between the valleys of the Yarra and the Little Yarra Rivers, which meet near the town of Yarra Junction, is the much smaller Britannia Creek valley. Steep hills on either side carry a fine young forest of *Eucalyptus regnans*—strong healthy trees almost all grown since the 1939 fires, the actual creek is hidden by a mass of ferns, Myrtle Beech, wattles and other cool damp-loving bushes and trees. The Women's Walking Club Hut is in a clearing approximately half-way up the valley, where stood one of Yelland's mills; actually the hut is on an old levelled tennis court. The day had been one of those completely perfect ones, so filled with peace that talking seemed superfluous; we went quietly about our tidying and repair jobs around the hut, and the birds came curiously, looking for food. The valley is not being used while the trees grow, so the birds live their natural lives seldom bothered even by hikers.

We listened for the various calls. The Crimson Rosella's was the loudest, but even that was a contented chatter of voices. A big party of them were in one of the very old apple trees, many birds in juvenile plumage testifying to a good breeding season even in these dry months. The little Fantail Cuckoo gave its plaintive call occasionally, not willing to dominate as it so often does. We heard a tree creeper several times, but did not identify which one it was; its note joined in evening chorus with Scrub-Wrens and Blue Wrens providing the background twitter. Mr Blue Wren must have been moulting or just not in his blue coat, for we did not catch sight of him at all; but like the parrots he seemed to have produced a big family.

In late spring the crack of the Whipbird is very frequent and so realistic that I have found myself looking and listening for the horseman to come through the hush, but on this autumn evening his crack was infrequent and quiet: in fact we wondered if the Lyrebird were mimicking, but I think this one had a black crest all right. I saw a Golden Whistler; he gave one call when he saw me and only one other call all the evening. Several friendly Yellow Robins were about—seen but not heard, except for the characteristic whirr of their wings.

A lovely Grey Thrush came very near us and took a big insect from our raked ground and "killed" it as the Kookaburras do, up on a wattle branch, taking some time to crush and eat it. He was about most of the evening, but uttered no call at all. A Mountain Thrush was there too—never heard and seldom seen; it must be one of the shyest birds of the forest.

Some Kookaburras gave us a good evening laugh at dusk, calling from big trees higher up the valley. But for lateness they were well beaten by the Lyrebird who had given his quiet contended call occasionally during the day and, being one of the few day birds that calls after sunset, he gave his last call at 6.30 p.m. The other night, almost in the middle of April, he called at 7.15 p.m., and it was quite dark by then. That is the Lyrebird's own "Good Night" to those who listen.

—M. ELLEN

† *American Museum Novitates*, No. 904, P. 16 (1937).

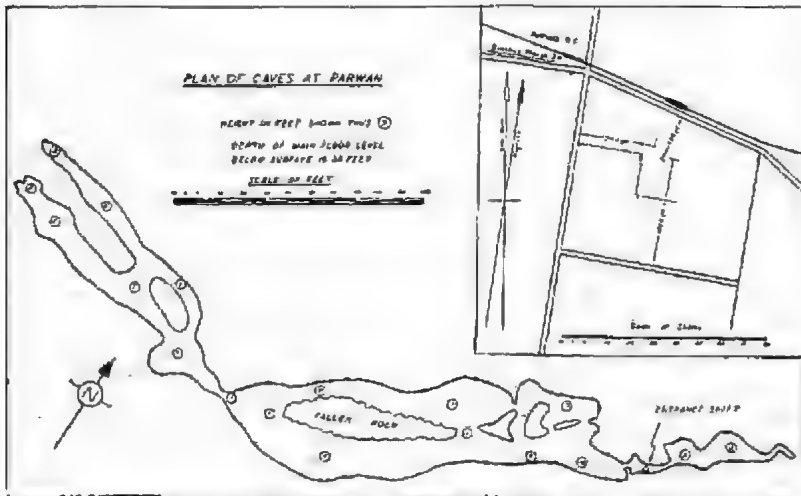
THE PARWAN CAVES, BACCHUS MARSH DISTRICT, VICTORIA

By D. J. REES and EDMUND D. GILL*

In 1916, members of the Field Naturalists Club of Victoria visited caves developed in basalt about half a mile south-east from Parwan railway station (O'Donoghue, 1916).

These caves have now been re-explored and mapped, the surveying being done by D. J. Rees and R. W. T. Wilkins. The grid reference for the Ballan Military Survey Map is approximately 533, 479.

The entrance to the caves is difficult to find, being a hole about two feet in diameter in a small depression on one of the low sinuous ridges that characterize the basaltic plain in this area. From the surface it is a drop of about twelve feet to a cone of rock and soil that was obviously once part of the



Details of the Parwan Caves

roof of the cave. The air temperature measured about 60° F., and the caves are damp, but not wet, although there is evidence on the floor that water flows through them from time to time. Two feet of red soil forms the floor in the eastern chamber, but no fossils were revealed by excavation. The roof of the caves consists throughout of irregular and angular blocks of basalt, and many blocks have fallen on to the floor. Some of these are of very large size. The horseshoe shape of the western extremity of the caves may be due to rock fall. There is little secondary mineralization, but at the western end a few stalactites were found, the longest being about eight inches.

ORIGIN

The caves are interpreted as a lava tunnel, i.e. when the basalt was molten, the surface congealed but molten lava still ran out from beneath to form a tunnel. Such caves have smooth rounded walls, and the present very rough nature of the walls and floors of the Parwan Caves is due to the rock falls that have taken place since formation. The general floor of the present caves is about 30 feet below the surface of the ground, but the original floor must

* National Museum of Victoria

have been below this. The basalt, therefore, is thicker here than in some places, and probably occupies some part of a former river valley, perhaps the ancestor of the Werribee River. The rock falls, the blocked east end in the cave where water readily escapes, and the reports of other caves suggest that those studied may once have been more extensive.

If the Parwan Caves represent a lava tunnel, then the age of the caves is the age of the basalt flows, which is probably Upper Pliocene. Basalt flows in the Keilor area are known to be of this age, and the Parwan basalt appears to be analogous. A similar lava cave of similar age at Parmure in western Victoria has been described (Gill, 1944). Much larger caves are known at Ryaduk and Mount Porndon (Skeats and James, 1937), but their geology shows that they are younger. Their smooth walls and more complete form also suggest this and there has not been time for many rock falls to develop.

The air of the Parwan Caves is fresh, and life is found near the entrance. Plants are growing round the entrance shaft, and fungi occur in pieces of wood introduced into the cave. A frog (*Hyla aurea*) was found by David Woodruft west of the entrance, while blowflies (*Tabanus*) were noticed round the entrance and in the chambers immediately east and west of the access shaft.

There are probably more lava tunnels under the basalt plain, but they are likely to be discovered only when a breakthrough from the surface occurs.

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- Gill, E. D., 1944. Basalt cave at Parmure, Western Victoria. *Vic. Nat.* 60: 167-8; 61: 42.
 O'Donoghue, J. G., 1916. Excursion to Parwan and Colmadai. *Ibid.* 33: 5-7.
 Skeats, E. W., and James, A. V. G., 1937. Basaltic barriers and other surface features of the Newer Basalts of Western Victoria. *Proc. Roy. Soc. Vic.* 49 (2): 243-78.

HERBERT FREDERICK CLINTON

The passing of Mr. "Bert" Clinton on September 3, 1958, has removed yet another link from the now slender chain of the older naturalists from the State of Victoria, and it will be with deep regret that his many friends will mourn his loss. He was a man of cheerful disposition with an infectious smile at all times, and meticulous and painstaking in all his work. Anything that he undertook was done with expert thoroughness, and his magnificent collection of micro-slides of *Mallophaga* and *Anoptera* gathered during his lifetime is only one monument to his ability and work.

He was born at No. 41 Bourke Street, Melbourne, on July 11, 1882. After leaving school he attended the Working Men's College, Melbourne, and was later employed in his father's business of shoe stores, and on his father's farm at Surrey Hills. Having always a love for the country he spent his sixteenth and seventeenth years working on Mr. E. Anderson's farm at Monbulk. He later received his first appointment with the Poultry Experts' Branch (temporary), on July 4, 1899. On July 27, 1907, he married Miss Bertha Whitmore of South Australia. His work with the Government Poultry Experts' Branch received recognition when he was permanently appointed to the position of Assistant Poultry Expert on October 26, 1925. He was entrusted with the poultry exhibits in the Government pavilion at the Royal Agricultural Show between 1899 and 1939. On October 12, 1936, he was promoted to the important position of Chief Poultry Expert.

During his lifetime his activities were indeed numerous, and his hobbies extended into the fields of photography, microscopy, philately, entomology, ornithology, and aviculture. On May 4, 1924, he passed the examination for Fruit Inspector in the Department of Agriculture with very high credit, and was made a Fellow of the Royal Microscopical Society of London in 1924.

In the early days of broadcasting he gave a talk over 3LO (November 10, 1925) on behalf of the Chief Poultry Expert, Mr. W. C. Rugg, and this was the first wireless talk given by an officer of the Department of Agriculture of Victoria. This was followed by many later broadcasts on the subject of poultry parasites and the general care and management of poultry.

In 1927 he was made a Fellow of the Royal Zoological Society of London, and in the same year became a member of the Entomologists' Club of Victoria. The same year also saw his appointment to the position of Stock Inspector. During 1929 he became a member of the Royal Zoological and Acclimatization Society of Victoria, and in 1930 was made a member of the Council of the Microscopical Society of Victoria. He was also appointed Health Inspector to the Department of Public Health on April 16, 1930, made a Fellow of the British Society of Aviculture and awarded the Diploma of Poultry Husbandry. He joined the Bird and Fish Exhibiting Society in the same year but resigned during that year.

His general interest in ornithology was rapidly increasing and in 1931 he became a member of the Gould Bird Lovers, and between 1932 and 1935 he was a member of the Bird Observers' Club. His interest in philately too had been growing over the years and he became a member of the Royal Philatelic Society of Victoria in 1932 and remained such until 1949.

In his official capacity he judged the poultry and egg exhibits at the Royal Agricultural Shows, including the Centenary Show held in 1934. His duties included the delivering of many lectures over many years.

His interests seemed never-ending and his energy tireless, for in 1935 he joined up with the Australian and New Zealand Association for the Advancement of Science. The study and practical application of photography also played an important role amongst his activities and during the years 1912-21 he was a member of the Working Men's Photographic Club. This led him into the inner field of photo-micrography, so in 1913 he joined the Microscopical Society of Victoria and remained a member until 1954. His official duties were held in such high esteem that in 1914 he became secretary to the Poultry Relief Board. The Field Naturalists Club of Victoria was honoured by his membership from 1916 to 1927.

Among his other activities may be mentioned the following: from 1918 to 1921 he was a member of the Prahran Philatelic Society; the Nature Photographers' Club of Australia, and the Royal Australian Ornithologists' Union (1919) of which he was made assistant secretary of its Council from 1920 to 1923, and lastly a member of the Central Draughts' Club of Victoria.

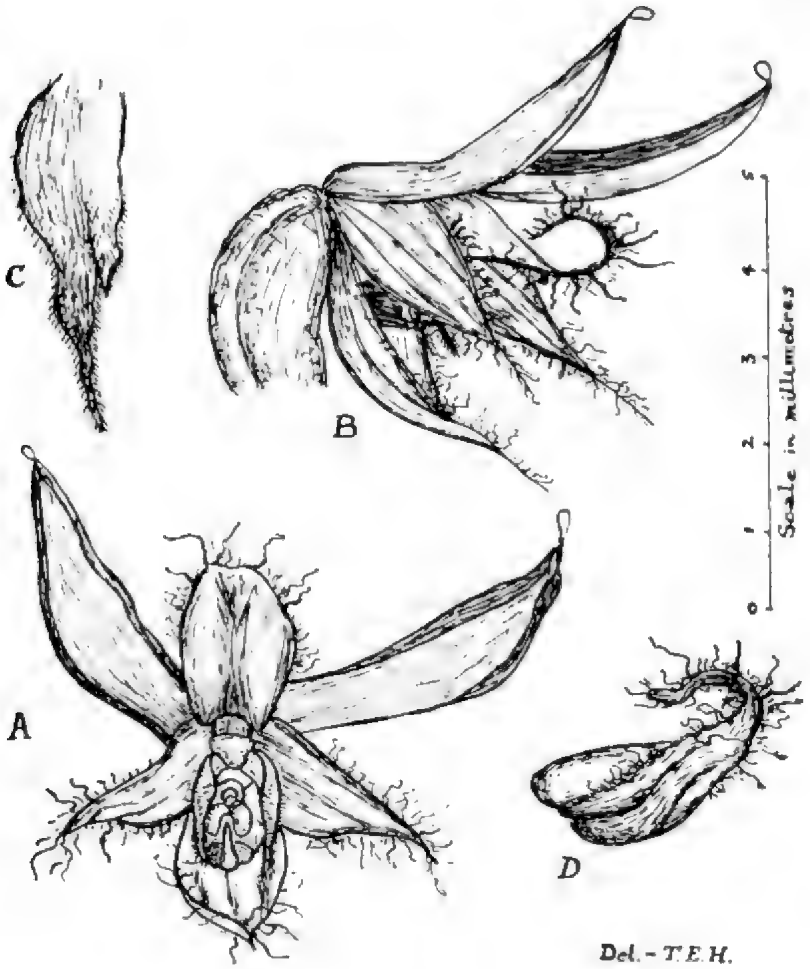
Over the many years during his terms as Assistant Poultry Expert and Chief Poultry Expert he published papers dealing with all kinds of problems concerning poultry in all its branches, and from his studies into external parasites of birds, he soon became the foremost authority in Australia on the *Mallophaga* and *Aculptua*. In 1920 he made a trip to West Australia where his interests centred on the study of birds and their parasites and the coleopterous family *Buprestidae*! His collection of micro-slides of Australian *Mallophaga* is probably the finest in existence, and the mounting and card indexing is a splendid example of his exactness for detail and superb workmanship. One of his earliest and perhaps most outstanding lectures was delivered to the Health Inspectors' Association of Australia (Victorian Branch) in the Melbourne Town Hall on November 6, 1906.

He retired from his official duties as Chief Government Poultry Expert on July 11, 1948, and continued his hobbies almost until the time of his death. His wife predeceased him on February 24, 1948, and he is now survived by his only son, Mr. Norman Clinton of Melbourne.

I am honoured by having been a friend of Bert Clinton, and in being able to subscribe these few words in honour of a very fine gentleman.

—ALEX. N. BURNS

PLATE IX



Del. - T. E. H.

Prasophyllum acuminatum Rogers

A—Flower from front. B—Flower from side. C—Column wing.
D—Labellum.

(A, B and D are according to scale provided; C is much more enlarged.)

PRASOPHYLLUM ACUMINATUM IN QUEENSLAND

By T. K. HUNT, Brisbane

A solitary specimen of this interesting species was found by the writer, on October 25, 1958, near the Bruce Highway some seven miles south of Caboolture in Queensland. A more prolonged search of the area a week later failed to produce any further specimens.

As the only specimens recorded earlier were confined to the area between the Hunter and Hastings Rivers in New South Wales, this extension of some 500 miles northward is particularly interesting.

To the best of the writer's knowledge, no plate of this species has ever been published, so one of the present specimen has been prepared. A photograph which illustrates well the habit of the plant appears in Rupp's *Guide to the Orchids of New South Wales* (1930).

The species was originally described by Dr R. S. Rogers, in *Trans. Roy. Soc. S. Aust.* 51: 291 (1927).

NOTES ON GUM EMPEROR MOTHS

This article is compiled around notes and data supplied by Naomi F. Robinson of Geelong East, who, over a period of twenty-two years, kept accurate records of the metamorphosis of various moths and butterflies which were kept in school classrooms. Most of the material deals with the Gum Emperor Moth; in a few cases the records begin with the laying of eggs, but most concern caterpillars brought in by school pupils, and in several cases the story is incomplete because cocoons were damaged and no moths emerged.

In an explanatory letter, Miss Robinson commented:

I first noted the length of time in the cocoons after reading in Leach's Nature Study book that there were normally two generations per year but that pupal stages as long as 400 days were known to occur. When my observations did not tally with these, I became more interested and found that several of the caterpillars over the years did not follow these rules.

The data concerning the Gum Emperor Moths are as follows:

1. Pupated 10/3/1936, emerged 1/2/1940. 1416 days in cocoon.
2. " 12/3/1936, " 4/3/1938. 716 " " "
3. " 8/3/1937, " 1/2/1939. 694 " " "
4. " 13/3/1937, " 18/12/1944. 2837 " " "
- 5 " 28/3/1937, " 20/12/1937. 267 " " "
- 6 & 7. Eggs laid 7/11/1939, hatched 9/2/1940 (94 days); cocoons spun 25/3/1940 and 24/4/1940 (larval stages 45 and 75 days respectively).
- 8 & 9. Eggs laid 17/9/1944, hatched 10/10/1944 (23 days); cocoons spun 2/12/1944 and 4/12/1944 (53 and 55 days respectively). Moths emerged during vacation (20/12/1944 to 29/1/1945), so less than 40 days in cocoons.
- 10, 11 & 12. Cocoons spun 28/3/1944, moths emerged 1/2/1949, 26/2/1954 and during the 1953-4 vacation. Pupal stages thus lasted 1771 days,

3622 days and something more than 3580 days respectively; the second of these being a month less than 10 years!

- 13 & 14. Pupated 7/4/1947, emerged 25/10/1949 and 7/3/1950 (932 and 1065 days respectively).
 15. Pupated 13/3/1948, emerged 5/2/1951. 1058 days in cocoon.
 16. " 13/3/1953, " 10/1/1954. 303 " " "
 17. " 6/5/1953, " 12/10/1954. 533 " " "
 18, 19 & 20. Pupated 24/2/1955, 26/2/1955 and 1/3/1955, emerged 14/11/1956 (629, 627 and 624 days respectively).
 21. Eggs laid 15/10/1956, hatched 12/11/1956 (28 days); cocoon spun 31/12/1956 (larval stage 49 days).
 22, 23 & 24. Cocoons spun 19/3/1957, 11/4/1957 and 16/4/1957, moths emerged 11/2/1958 (328, 305 and 300 days respectively).

Of the conditions under which the specimens were kept, Miss Robinson renders these notes:

All the caterpillars from 1936 to December 1940 were in a room on the ground-floor in the south-eastern corner of the building. The light came from four windows on the south side, four glass panels high up and a glass door in the north corridor wall. No direct sun entered this room. A mantel shelf was across the south-western corner. During the day the caterpillars were on sprays in jars on this shelf, but at night these were put into a large case with air vent at back and glass in front. This was on a table along the north wall. When ready to pupate, they were put into a smaller case (8 x 10 x 17 in.) with an vent and glass front. Some made cocoons on the twigs, others on the sides of the box, and each was dated when complete. Often the twigs hung on hooks on the high ledge of the mantel-shelf. This was quite 6 ft. 6 in. high. The moth that emerged on 20/12/1937 was one of these. Although it was break-up day, many of the children waited to see it ready to fly. One little fellow took it home.

From 1941 onwards, the room used was upstairs in the centre of the building, with four windows and four skylights on the east wall, thereby having plenty of morning sun. In the west wall between the two rooms were three windows, high up, but of course only a subdued light came in. The mantel-shelf is across the south-eastern corner of the room. The specimens were on sprays without boxes, so they had any amount of light during the day but at night were boxed and set on the table on the north wall. Here again, those cocoons on twigs were hung on hooks on the mantel-shelf which was 7 ft. above the floor. In these positions the classes and I very often watched and timed the moths as they came out.

The caterpillars of 17/9/1944 came from eggs laid on an east window-frame. Evidently the opening and shutting of windows had no ill effects. All the cocoons of 28/3/1944 were on the sides of the wooden specimen box which stood on the table along the north wall. This was very seldom moved, as a notice forbade same.

It has been interesting work. The Emperor that took nearly ten years to leave its cosy home tried my patience, for many times I was tempted to toss it away. However, when he did decide to move, he was perfect.

Finally, there is an appendix of further notes on the activities of the Emperors and other species:

(a) One moth took 47 minutes to rasp hole 0.4 in. diameter in cocoon, took $\frac{1}{2}$ minute to get clear of cocoon. Wings about 1 in. long, took $\frac{1}{2}$ hour to dry, then 2 $\frac{1}{2}$ in. long. Hung 1 hr. 25 min. before flying.

(b) One dark-brown Emperor had wing-span of just 7 inches.

(c) *Convolvulus* Hawk Moth pupated in soil on 23/3/1951, emerged 23/10/1951 (215 days).

(d) Cup Moth larva spun cocoon 16/9/1948, emerged 14/3/1949 (179 days).

(e) Vine Moth pupated underground 23/3/1943, emerged 23/2/1944 (338 days).

(f) Monarch (Wanderer) Butterfly. Larva found 5/3/1937, fed on Swan Plant, full-grown at 1½ in. long. On 22/3/1937 very restless all day; in evening lay stretched along roof of case. After 16 hours spun short thread, fastened to box, and hung head downwards (but with actual head bent up) for 28 hours. Small green "bubble" appeared at lowest point and after 5 mins. of wriggling, skin was withdrawn, leaving a beautiful chrysalis. After 21 days, the butterfly emerged, hung for 3 hours moving wings very slowly. Drank sweetened water, then departed for wide open spaces.

BENDIGO F.N.C.—SYLLABUS TO JUNE, 1959

Meetings are held at the School of Mines, on the second Wednesday in each month, commencing at 7.15 p.m. The programme is as follows:

February 11—Holiday Observations, by Members.

March 11—Geology of Bendigo Goldfields, by Mr. Chambers.

April 8—Specimens and Talks, by Members.

May 6—Committee Meeting.

May 13—Open, to arrange for display of nature films.

June 10—Open, to arrange for speaker from National Museum of Victoria.

Excursions begin from Gold Jubilee Statue, the half-day ones at 2 p.m. and full-day ones at 10 a.m. The following are arranged:

Sunday, February 15—Geology and General, Mount Camel via Toolleen, led by Mr. Robbins (full-day).

Saturday, March 14—Pond Life and General, Harcourt Reservoir, led by Miss Flanagan (half-day).

Sunday, April 19—Exploration, Coliban Valley, led by Mr. Robbins and Mr. Chambers (full-day).

Sunday, May 10—General, Southern Slopes of One Tree Hill, led by Mr. Eddy (half-day).

Sunday, June 21—General, Strathfieldsaye, led by Mr. Kellam (half-day).

Visitors from other Naturalists Clubs are invited to participate.

A. C. EBBON, Hon. Secretary

45 Lucca Street, Bendigo

EXCURSION TO STARLINGS GAP

Thirty-three Club members participated in the excursion to Starlings Gap on Sunday, November 23, 1958. The route taken was by way of Yarra Junction and Powelltown, thence home via Warburton.

On the outward journey the Black Wattles presented a magnificent sight, in full bloom along the Warburton Road, and *Leptospermum* was conspicuous, too. Beyond Powelltown there was a profusion of colour, with the mauve of the Round-leaf Mint-bush (*Prostanthera rotundifolia*) and the white of the Snow Daisy-bush (*Olearia lirata*). The Mountain Correa (*C. lawrenciana*) had just finished flowering, but many shrubs were in bloom. Of particular note were Sandfly Zieria (*Z. smithii*), Hop Goodenia (*G. ovata*), Long-leaf Wax-flower (*Friestemon myoporoides*), Tough Rice-flower (*Pimelia uriflora*), Golden Bush-pea (*Pultenaea gummii*), Blue Dampiera (*D. stricta*) and Pink-eye (*Tetradlea ciliata*).

Towards the main Warburton-Woods Point road, there were masses of Bitter-pea (*Dunisia*), yellow and pink Cassinia, Ivy-leaf Violet (*Viola hederacea*) and some blue Sun-orchids (*Thelymitra*).

F.N.V.C. LIBRARY

Members please note: You may borrow from the Library in the absence of the Librarian. The correct procedure is: 1. Enter the details of the loan in the Loan Book (the large tome on the Librarian's table). 2. If there is a loan slip in the back of the book, enter the due date (2 months later) on the slip. 3. When the book or journal is returned, make a notation in the appropriate column of the Loan Book, and place the publication in the "Returned Loans" box. 4. If you wish to renew the loan, the previous loan should be marked off in the Book, and a new entry made.

It is the responsibility of members to make themselves familiar with the relevant paragraphs of the Club's Constitution and By-laws regarding their privileges and obligations in connection with the Library; for details, see last month's *Naturalist*, or consult the notice in the Library. Judging from the lack of response to the appeal for return of overdue loans, and the lamentably few suggestions so far for new publications, it is doubtful if many members read these Library notes. It is easy enough to dismiss the Library as "not worth bothering about", but if you are not prepared to take an active interest in your Library, you cannot expect any great improvement.

WHAT, WHERE AND WHEN

F.N.C.V. Meetings:

Monday, March 9—"Wilson's Promontory", by Mr. David Morgan.

F.N.C.V. Excursions:

Saturday, February 14—Parlour-coach excursion to Phillip Island to see the Penguin Parade. The coach will leave Batman Avenue at 12.45 p.m. Bring evening meal, including thermos as water is not available on the Island. Fare, £1/4/-.

Saturday, February 14—Collecting pond life, with the Microscopical Group. Leader: Mr. D. E. McInnes. Meet opposite the Kiosk, Botanic Gardens, at 2.30 p.m.

Saturday, March 7—Geology Group Excursion. Details at Group meeting.

Group Meetings:

(8 p.m. at National Herbarium, unless otherwise stated.)

Friday, February 13—Botany Group. "The Structure of Trees", illustrated with slides from Burnley School of Horticulture, by Messrs. Swaby and Wilson.

Wednesday, February 18—Microscopical Group. "Pond Life", by Mr. D. E. McInnes.

Monday, March 2—Entomology and Marine Biology Group. The meeting will be held at Mr. Strong's rooms in Parliament House, at 8 p.m. Enter through private entrance at south end of House.

Wednesday, March 4—Geology Group. "Geology in Colour", by Members.

[The closing date for entries in the Photographic Competition, to be held in connection with the Moomba Nature Show in the Horticultural Society's Hall in Victoria Street from March 7 to 14, has been changed to February 25.]

—MARIE ALLENDER, Excursion Secretary
19 Hawthorn Avenue, Caulfield, S.E.7

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PROCEEDINGS

Mr. J. R. Garnet presided, and about a hundred members and friends attended on the occasion of the General Meeting of the Club in the National Herbarium on February 9. The President referred to the recent passing of Mr. Charles Barrett and Miss M. C. Dobson, and those present stood in silence in tribute to their memory.

Mr. N. A. Wakefield gave an illustrated address on the Snowy River system, explaining the intrusion into East Gippsland, via the upper Murrumbidgee and Snowy Rivers, of elements of the flora and fauna of inland areas of Australia. He was warmly thanked by the President.

Mr. Swaby stated that Maranoa Gardens would probably be enlarged within the next eighteen months and that a memorial tree to the late Mr. George Hyam would be planted in the new section.

Mr. Wilson stressed the necessity for controlling the sale of *Thyptomene*, and the President intimated that Council had the matter under consideration and was advocating a licensing system similar to that operating in New South Wales.

Mr. Phillip Hugh Colman of Narrabeen, New South Wales, was elected as a Country Member of the Club.

Mr. Gabriel exhibited two specimens of Spindle-shells (*Pleuroplaca*) with egg capsules. Mr. Hanks showed examples of Angular Pigface (*Mesembryanthemum aequilaterale*), the fruit of which was eaten by aborigines, and discussed their palatability; this led to members sampling some of the exhibits.

MICROSCOPICAL GROUP

The talk on "Pond Life" was led by Mr. D. McInnes at the February meeting. Following the excursion to the Botanic Gardens on Saturday afternoon, February 14, there was ample material for exhibition under the 16 microscopes set up on the benches. Mr. McInnes has a very thorough knowledge of creatures which inhabit ponds, and his lecture was enjoyed by all present.

Next meeting on March 18 will be led by Mr. Robert Lukey, with the subject, "Moulds and Toadstools". Members are reminded that microscopes are not required that evening.

F.N.C.V. LIBRARY

Members are reminded that publications borrowed during or previous to January this year are now due for return or renewal. Suggestions for new books, periodicals and other publications are still being awaited, particularly from members of the various Study Groups. These suggestions could be submitted through Group secretaries or direct to the Librarian, who will then place them before Council for consideration. Suggestions will also be welcomed in connection with ideas for improving the Library generally.

GEOLOGY DISCUSSION GROUP

The first meeting of the year was attended by eighteen members and visitors, the Chair being taken by Mr. K. Davidson. General business was quickly attended to, and the topics for the evening entitled "Geological Holiday Experiences" were then given as follows:

Mr. McInnes described the rocks collected and seen on the Club excursion to the Bogong High Plains. These included the basalt of Mt. Roper, columnar residuals of Basalt Hill and Ruined Castle, weathered granodiorite, hornfels, and orthogneiss from sections at the Pretty Valley Dam site, a carbonaceous clay from below the brown coal deposit near Mt. Jim, weathered dykes in cliff sections beyond Falls Creek, and a tourmaline pegmatite from a side track.

Mr. Baker dealt with the occurrence of rhyolite, an acid lava from Rocklands Dam, 10 miles north-east of Balmoral, Western Victoria. Textures showed flow banding and concretion, with phenocrysts of primary quartz and feldspar, and spherulitic growths, the colour of the rocks in varying shades of cream, red and green.

Mr. Birstow spoke on minerals of rhodonite and garnet, associated with the lead-ore body of Broken Hill, N.S.W.

Mr. Blackburn gave details of the occurrence of travertine and marine Tertiary (Miocene) fossils at a landslip along the coast at Bellarine, west of Portarlington, Victoria.

Mr. Tinkam told of the formation of concretions of limonite from the sandstone at Sydney, New South Wales.

Mr. Jeffrey spoke on the occurrence of trilobites in the mudstone of the Illaenus Band, of Silurian age, at Heathcote, Victoria. Mostly, these were found straight, but often they were obtained rolled in a ball, like "pill-bugs".

Mr. Davidson referred to an agate he had found at the Woolshed Creek, Beechworth, Victoria, which had been sliced and polished by Mr. Cobbett.

Before the meeting concluded, Mr. Jeffrey gave a personal description of the earthquake which occurred in Melbourne on January 19 this year. He was seated, with bare feet (the temperature was 104°) on the lawn at his home in East Malvern, at about 6.55 p.m., when a 'boom' resembling distant gunfire was heard; this was followed by a 'rumble' like the roar of an express train, and then he received a sharp slap on the soles of his feet. On looking for possible damage to the house, he found that a door which was previously slightly jammed, was fitting satisfactorily. It appears that the contact of bare feet on a grass lawn acted in the manner of a human seismograph.

Syllabus for 1959

Group Meetings (on first Monday of each month):

April 1—"Water", by Mr. Baker

May 6—"Rock Textures", by Mr. McInnes.

June 3—"Geology of Victoria", by Mr. Fisch.

July 1—"Geology of New South Wales", by Mr. Tinkam.

August 5—"Geology of Queensland", by Mr. Davidson.

September 2—"Geology of South Australia-Central Australia", by Mr. Cobbett.

October 7—"Geology of Western Australia", by Mr. Blackburn.

November 4—"Geology of Tasmania", by Mr. Hemmy.

December 2—"Literature of the Year", by Mr. Gill.

Excursions:

Sunday, May 10—Anakies. Leader, Miss Catalan.

Saturday, July 4—Building Stones of the City. Leader, Mr. Hemmy.

Sunday, September 6—Mystery Excursion. Leader, Mr. Watts.

Sunday, November 8—Mystery Excursion. Leader, Mr. Jeffrey.

MUSICAL ANALYSIS OF THE LYREBIRD'S SONG

By K. C. HALAFOFF

Though the song of the Lyrebird has been the subject of listeners' admiration for decades, little detailed study of its construction has been attempted. Such studies have been restricted mainly to the identification of imitated calls and, to a lesser extent, the Lyrebird's own items. Recently an attempt was made to evaluate the melodic value of that song, along with those of other Australian birds, and to check the faithfulness of the Lyrebird's mimicry.

Though interesting and valuable, methods of approach concerned only with one or two aspects of the Lyrebird's song could not give a picture of it as a whole, neither could they reveal its inner structure. To achieve that, it is necessary to consider the song as a musical piece and to analyse it in the same way as a composition would be analysed by a music critic.

Such a task is anything but easy, as one is confronted with many difficulties at the outset, the most formidable of them being the translation of the bird's notes into the note scale. While it is comparatively easy to write down a Grey Thrush or a Pilot-bird melody, it is almost—if not completely—impossible to put down in writing, say, a Scissors-grinder call or even the Song-thrush phrases. This difficulty may be somewhat obviated only if all the bird sounds are divided into three categories:

1. Tonality items (corresponding to those of orchestral instruments with definite pitch).
2. Percussion (without a definite pitch), and
3. Indefinite sounds which do not fit into either category.

The sonorous material (1) may be further divided into diatonic (belonging to a definite key) and chromatic (with the half-tone interval between sounds)

As almost all the Lyrebird's own items belong to either the first or second category, they could be written down using the conventional system of an orchestral score. The Lyrebird's own stanza, an ascending melody of great sonority and volume, adorned with glissandos and finishing usually with three highly emotional trills, is mainly diatonic, though it may have a short chromatic introduction, borrowed from the Pilot-bird. As for the Lyrebird's percussion items, there are many, all of them strictly rhythmic. For example, there are clicks (at a rate of two per second) often preceding a performance or heralding its approaching end; a short rattle, like castanets, may be rendered during the song; and there is an item resembling a clash of cymbals, sometimes combined with the sound of an axe, often used during the performance and the dance on the mound and especially in the "courting song". These sounds are always used *per se*, never as an accompaniment.

The borrowed material can be classed as belonging predominantly to the first and partly to the third category. Purely melodic items, mostly of diatonic character, such as calls of the Grey Thrush, Whipbird, Rosella, Magpie and Pilot-bird, predominate in the song. Chromatic items are represented by calls of the Black Cockatoo, the Gang-gang and the Pilot-bird. It is interesting to note that the purely chromatic call of the Pallid Cuckoo, so often heard in Sherbrooke, does not seem to find its way into the Lyrebird's repertoire. Apart from a few items borrowed from small forest fry, no sounds resembling percussion seem to be imitated, though a certain number of the musically undefinable imitated sounds are usually included in the programme.

Both sonorous items and percussion used in the Lyrebird's song are of vastly different timbre, ranging from the pure clarinet-like voice of the Pilot-bird to the high-pitched piercing screech of the Black Cockatoo. Some sounds are not just single notes: the Lyrebird's double call, for instance, is a complex sound which may be defined as a downward arpeggio chord, varying sometimes in key. While the song of a Grey Thrush may be compared with a melody of short duration written for a solo instrument, the Lyrebird's wide

LYREBIRD'S STANZA (ABBREVIATED VERSION)

GREY THRUSH

ROSELLA'S TRIPLE BELL

PILOT BIRD'S CALL

NOTE THE SIMILARITY OF THE KEY.

Items of the Lyrebird's Repertoire

The Stanza is given in a somewhat simplified version; it is a near-approximation of how it appears to the ear from a distance. The actual melody is much more complex: the first two bars comprise up-and-down glissandos interconnecting the notes of the tune, followed in the course of the song mostly by downward glissandos, with a few single notes sometimes inserted between. As regards trills, there are slower and faster ones, each actually consisting of the alternating notes of an interval of the fifth, and each series of trills is preceded and concluded by a short upward and a downward glissando respectively. This abbreviated version of the stanza was sung by a young male; the melody used by an old male (of 12 to 15 years) would be much more elaborate and the number of bars would be considerably greater. The tune differs a little sometimes with different birds, but its character and timbre remains the same.

range of timbres actually amounts to an orchestral assembly consisting not only of instruments with and without definite pitch but including also many intermediate sounds.

The time signature of the items—original or borrowed—differs considerably. Though the percussion episodes are usually all in march time ($\frac{4}{4}$), the melodic material shows considerable variation as regards the signature; and there are also wide variations of tempo. To add to the complexity of the material involved, the birds which the Lyrebird imitates often sing in different keys; that may occur even with different individuals of the one species.

One could imagine the confused medley which would inevitably result if all those sounds were rendered haphazardly, without regard for their tonalities, their content, volume, metric texture, and so on. The resulting "song" would be a disjointed succession of utterly unrelated, discordant episodes. Yet nothing of the kind happens. Not only does the song flow smoothly and with effortless melodiousness but, despite the great heterogeneity of the musical material employed, it gives the impression of strong internal unity; and though certain items are repeated from time to time, the song always sounds fresh and novel.

Such things do not happen by chance. The tiring monotonous twitter of some birds and the unpleasant screeching of others provide proof that not every bird song is necessarily beautiful, at least to our ears. The impression of inner harmony which is invariably gained from the song of an adult Lyrebird must have an explanation in its inner structure. It can result only from careful gearing together of the tonalities of the episodes employed and from the arrangement of them in a way very similar to the structure of a musical piece. In other words, the harmony is the result of a skilful and deliberate, though probably always improvised, composition by the Lyrebird.

The idea that a bird may compose its song is not in itself novel: the Blackbird, for instance, is a reputed composer that elaborates upon its musical phrases in a drive for perfection and combines them into a song. But the Lyrebird's rendition is infinitely more complex, for it includes practically all the elements of the theory of composition. It is therefore interesting to trace these systematically.

Listening to the Lyrebird's song, one notices particularly that the transition from one item to another is quite smooth, for the tonalities of the adjoining episodes never clash. Tests with a tuning fork reveal the surprising fact that the bird sings in a definite key, which in all the cases checked appears to be C major, and that the whole variety of melodic items—its own and those borrowed—moves within that scale. Often a new episode begins with the last note of the preceding one. There may be an interval of half a tone or a full tone, or a fifth, or even (in the case of a Whipbird) a full octave;

but each episode is geared firmly to the key in which the song as a whole is being composed, the same as that of the stanza and trills.

Now, it is disputable whether the Lyrebird actually transposes the imitated items into a key of its own preference, or simply selects those which fit into the basic diatonic scheme of the song. Many of the imitated birds sing in the key of C, the Whipbird notes, the Rosella's "triple bell" and the last note of one of the Pilot-bird melodies are pure C sounds. However, there are exceptions: near Kallista a Whipbird was heard to render its "whip" in D. Comparison between the Lyrebird's mimicry and the calls heard in the area does not settle the question, as the imitated calls have probably been learned from another bird of the same species years before. But even if the Lyrebird simply picks up those calls which readily fit into its scheme of harmony, it should certainly be credited with an extraordinary ear for pitch as we understand it.

As for the thematic structure of the song—the full-scale performance on a mound or log—it is easy to determine that it is, as a rule, built on the Lyrebird's own stanza and trills, with some other favoured items appearing as subordinate themes. The "courting song" in its turn is built around the Kookaburra and cymbals items. Though these themes reappear in the song now and then, the items are regrouped continually so that each section is different from the preceding one. No melodic item is repeated in the manner of the Song-Thrush, except in cases where the original consists of repeated sounds. The song amounts actually to an orchestra administered on solo lines, and in this aspect its structure is surprisingly close to the idea of interplay of different instruments used by Stravinsky in his "Soldier's Tale" or by Prokofieff in his "Peter and the Wolf". Stripped of the accompaniment, taking only the narrative, each score would reveal a very close affinity to the Lyrebird's composition, especially "Soldier's March" and "Little Concert" of Stravinsky's work.

Another likeness to the structure of modern music is provided by the Lyrebird's use of "recapitulation" and "bridge passages". When it so desires, the bird uses only portion of an item; so the stanza may be used without trills, or only a bar or two of it may be sung; and sometimes trills are used alone. Imitated items also may be condensed into a recapitulated version of shorter duration, and such shortened or abridged episodes may be used to interconnect the sections of the song. How close that construction comes to the composition devices used in contemporary music may be gauged from a comparison between portion of a Lyrebird's song (recorded on sound film by Mr. R. T. Littlejohns) and Stravinsky's "Symphonies for Wind Instruments". To make the comparison easier, the episodes in both cases will be set out using letters according to the following scheme:

Symphonies for Wind Instruments (according to White)—

- Content: A—Bell motif
 B—Chorale
 C—Two popular tunes (a) and (b)
 D—Pastoral
 E—Quicker bell motif
 F—Savage dance

- Composition: 1. Introduction—short references to A, B and F
 2. Tunes C in full
 3. Bridge passage (A plus B) followed by D
 4. Bridge passage (B plus A) followed by shortened D
 5. Similar passage (B plus A) followed by slowed-down C
 6. Bridge passage (A plus B) followed by shortened C
 7. E, followed by B and F
 8. Bridge passage (B plus E) followed by shortened F
 9. Echo of E
 10. Coda: chorale B

Compare it now with the portion of Lyrebird's song:

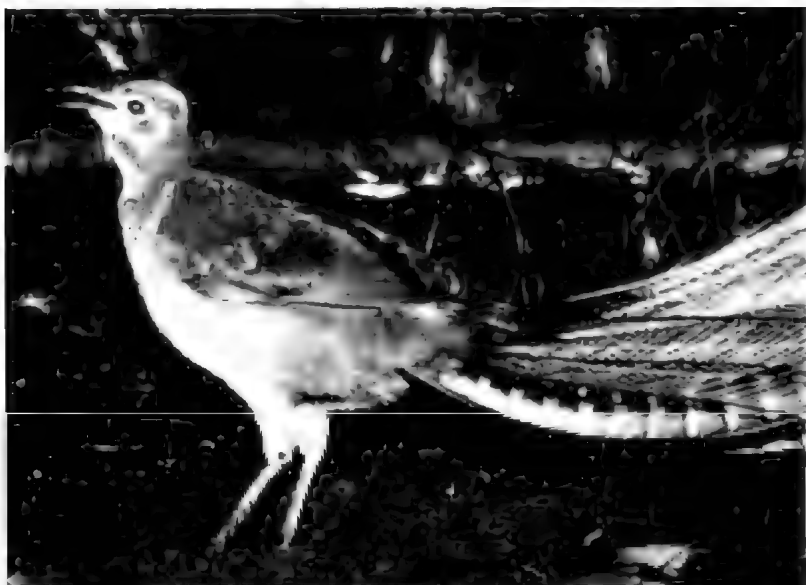
- Content: A—Rosella
 B—Grey Thrush
 C—Stanza and trills
 D—Black Cockatoo
 E—Pilot-bird
 F—Kookaburra
 G—Whiplbird
 H—Butcher-bird
 I—Percussion

- Composition: 1. Introduction—short references to A, B, D
 2. Main theme C in full
 3. Exposition of new themes E, F and G
 4. Bridge passage
 5. Recapitulation of B and of G (shortened)
 6. Full re-exposition of C
 7. Bridge passage—recapitulation of E and A
 8. Exposition of new theme H
 9. Bridge passage—shortened C (trills only)
 10. Exposition of I (percussion)
 11. Bridge passage—recapitulation of E, I, F and D
 12. Coda: stanza C in full

The close resemblance between these two compositions is obvious. It may be added that the analysis of the next section of the song,

which followed after a short break, showed a similar though not quite identical construction, the order of items being different. In both sections the number of episodes introduced between each use of the main theme C never exceeded five.

Not less extraordinary is the skill shown by the Lyrebird in the metric texture of its song where the episodes of different time signatures and different tempos are geared together. Though a large



The Bird's Throat Swells as it Gives the Kookaburra Call.

number of items can be considered as having $\frac{1}{4}$ or $\frac{2}{4}$ time signature, there are cases of $\frac{3}{4}$ time as well as other passages nearly a-rhythmic, yet it takes a strenuous mental effort to sort out these different time signatures in the song, so closely are they knit together.

The variations in tempo of the song are naturally dictated by that of the imitated and original episodes, but sometimes the usual tempo is changed: so an "accelerando" may occur in the strict tempo of "clicks" preceding or terminating the performance, if the bird is either hurrying up to a mound or is disturbed when performing. The varying tempo is one of the factors which gives a lively character to the Lyrebird's song. Each percussion item has its own tempo. While that of the "clicks" corresponds to a metronome ratio of 120, cymbal clashes are rendered at a ratio of about 180, that is, three clashes per second.

The range of the note scale which the Lyrebird is actually capable of reproducing is to some extent determined by the pitch of the

original and of the mimicked items; that alone amounts to at least about four octaves. The actual limits of the Lyrebird's voice may embrace even a greater length of the scale. The range of frequencies covering overtones as well as fundamentals seems to be considerable. "cymbals" probably rising to 14,000 c.p.s. Further investigations involving the playing of a recorded song using cross-over networks to separate the high and low frequencies from middle range may give more detailed information, at least within the audible limits.

Volume also varies during a performance, owing to the general habit of rendering the different calls in approximately their original strength. Sometimes, however, the whole song—especially when sung in the afternoon, from a branch during preening—may be rendered in a subdued manner, considerably quieter than usual. The greatest volume seems to be associated with the stanza and trills which, when heard very close, cause one's ear-drums to vibrate uncomfortably. This is the most emotional item of all, ecstatic and sonorous, and there is probably no more beautiful one in the whole song. As a contrast, the Pilot-bird melodies are usually rendered with a cool clarity and crispness.

The strict, almost mechanical, rhythm of the percussion episodes is also characteristic of a special item—the sound accompaniment to the jumps during the dance. This rhythm is accentuated by the flapping of the wings; and the item consists of a series of percussive notes followed by a short pause, the sounds resembling those produced by striking the middle of a stick (held at one end) against a hard object and allowing it to ricochet. It is definitely the least melodious item in the whole Lyrebird's reserve of sound effects, but it is interesting for its synchronization with the dance movements.

The use of counterpoint in the Lyrebird's song was actually known some time ago. The late Ambrose Pratt described the bird called "James" rendering human voices simultaneously with the imitation of the racket of a rock-crusher. Well-known items such as a chorus of Kookaburras or the rendering of cries of a flock of Rosellas simultaneously with the "swish" of the wings are also in this category. It may be argued that the bird does it unconsciously, simply imitating the combined sounds as it has heard them; yet the author's recent witnessing of Spotty's exercises in counterpoint made such a simplified explanation somewhat doubtful. On that occasion, Spotty was alone, singing at intervals between feeding, and apparently rehearsing—as the Lyrebird is wont to do—several new items, probably for a later inclusion in his regular repertoire. On one occasion, the screeches of the Black Cockatoo appeared against a background of the dying-away twitter of Scrub-Wrens; soon afterwards calls of the Gang-gang were interwoven with the Yellow Robin's notes. In each case there was something like an orchestral

"stretto"—two themes were overlapping for some time before the original one ceased, and the solo melody of the second one continued until replaced by the next item. On a third occasion, an especially successful counterpoint effect was achieved by the coupling together of two melodious calls, unfortunately both unfamiliar to the author. The result was fascinatingly beautiful and the themes were rendered with a precision and self-assurance which left little doubt that it was not just a matter of chance.

All these features of the Lyrebird's song—its diatonic character, the gearing of its content to a definite key, construction of the song around main and subordinate themes, the use of recapitulation and bridge passages, its rich metric texture and variations of tempo and volume, and last but not least, the use of counterpoint—are regular features of musical compositions. That the Lyrebird's song is not composed in advance but is put together while being sung, only adds a tribute to the composer. Few known musicians have been capable of successful improvisations. That again points to the extraordinary fineness of the bird's inner ear and to its superb musical gift.



The Beak is Wide Open
for the Whipbird Call.

That the greater part of the musical material of the Lyrebird's song consists of borrowed items does not detract from the bird's title as a composer. Many famous musicians—Bach, Ravel, Debussy, Stravinsky, to quote just a few—used borrowed melodies, sometimes to the extent of literal quotations. Stravinsky's "Pulcinella" and "Fairy's Kiss" are based almost fully on Pergolesi's and Tchaikowsky's melodies respectively, yet nobody would regard them as pastiches.

It should be noted that the songs of individual Lyrebirds, while based as a whole on the principles of composition listed above, vary considerably in the items used and also in the ratio between percussion and melodic items. Spotty, for instance, uses percussion in moderation, but his former neighbour from Clematis Avenue, now vanished without trace, was a real master of it, having at his disposal a whole arsenal of extremely beautiful and strikingly un-

usual effects. The content of the songs of young birds is usually restricted as far as the number of items is concerned, though a gurgling accompaniment to dance jumps may be repeated over a considerable time, this being contrary to the habit of adult birds. However, it is not unusual to hear a youngster rendering an extremely melodious and rich song.

Finally, the fact that as a rule a Lyrebird sings its song in the same key every time poses the question whether it is endowed with a gift of "absolute pitch". More listening tests would be needed for one to answer that question with certainty; yet it does not seem impossible, considering the bird's ability of faithful mimicry and of its supreme command over its wonderful musical apparatus.

This article is an attempt to reveal the structure of the Lyrebird's song on the basis of available data, which includes numerous notes taken during listening tests over a period of several years in Sherbrooke and Monbulk Forests, together with the available gramophone recordings. The author is especially indebted to Mr. R. T. Littlejohns for his help in identifying and writing down a number of items from a song recorded by him on a sound film at Sherbrooke Forest. All this material is still rather restricted in that it originated in one locality only. Further investigations, embracing the whole region inhabited by the Lyrebird, may widen the scope of this first attempt at a scientific study, adding new discoveries—and probably some corrections—to the few basic concepts set out here; and so a full tribute may be paid to this unique song which, by virtue of its content and emotional appeal, may truly be named "The Symphony of the Australian Forest".

APPENDIX

Hereunder is a part of the Lyrebird's song which followed, after a pause of a few seconds, the section set out in the main article. The same notation is used as before.

1. Introduction—shortened C (trills only).
2. Exposition of B
3. Bridge passage—shortened C (few first bars)
4. Exposition of G
5. Bridge passage—shortened C (trills variation)
6. Percussion item 1
7. C—main theme in full
8. G followed by B
9. Bridge passage—abridged C (with trills)
10. Exposition of H
11. Recapitulation of B
12. New theme—Yellow Robin
13. Bridge passage—trills from C
14. Novel theme—Honeyeater
15. Recapitulation of G and B
16. Exposition of A
17. Re-exposition of 1
18. Coda—C in full

Comparing this section with the first, it is readily seen that, though the general principles of the composition are the same, the second has a different sequence of items, and reference to the abbreviated pieces of the stanza C is more frequent. Two new themes (12 and 14) enter the composition, while three previous items (D, E and F) disappear. If the flow of episodes is closely followed, it is realized how carefully an exact repetition of their order is avoided by the winged composer. And even if it is done purely by instinct, what of it? There is no such thing in art as conscious inspiration.

PENGUINS—PAST AND PRESENT

By EDMUND D. GILL*

We hear so much in Australia about the penguins of the Australian Antarctic Territory that we are inclined to think of them as frigid zone birds, but this is not so. From Fremantle in Western Australia to South Queensland on the east coast the Fairy Penguins are to be found. The rookery of these little penguins on Phillip Island is justly famous, and many thousands of tourists have viewed them there. The Humboldt Penguin is a native of Peru and North Chile, while the Galapagos Penguin inhabits those islands right on the Equator. Penguins are thus found living at the present time from the Antarctic to the Equator, from the frigid to the tropic zone. They are confined to the Southern Hemisphere except for the few Galapagos Penguins that on some of the islands of that group are just north of the Equator. Penguins vary a great deal in size, from the little Fairy Penguin to the big Emperor Penguin.

PENGUINS OF THE PAST

Penguin history covers some 60,000,000 years, but through all that time they have been limited to the Southern Hemisphere. Why this should be so is not apparent. If they were confined to the frigid Antarctic, it would be understandable, but they cover all latitudes. Fossil penguins were first described by the famous biologist, Dr. T. H. Huxley, from specimens discovered in New Zealand. Recently, Professor Marples of New Zealand has re-described these penguins and many others. Eight species belonging to six genera are known from that country. However, the most prolific source of fossil penguins is Patagonia and the Seymour Islands, whence thirteen species belonging to seven genera have been described.

AUSTRALIAN PENGUINS

Mr. H. H. Finlayson of the South Australian Museum was the first to describe an Australian fossil penguin. It was an extremely ancient one, being of Eocene age. The fossil came from Christie's Beach, South Australia. Dr. M. F. Glaessner of the University of Adelaide has recorded further fossil penguins from that state, and these have been now fully described by Dr. G. G. Simpson of the American Museum of Natural History in New York. An Eocene

* National Museum of Victoria.

penguin from Aldinga, and an Oligocene penguin from Mount Gambier are thus made known.

When the writer was on a collecting trip to the Glenelg River area in western Victoria some years ago, he discovered on the river bank north of Dartmoor at a locality known as Devil's Den an arm bone (humerus) of a penguin. It came from a marine bed of Miocene age. Attached to it were the thin shells of *Dinoya*, a lamelli-branch that lives attached to some substrate. It would thus appear that after the penguin died, its bones lay on the sea floor for some time before being covered with sediment. The application of the fluorine test provided further evidence that it did indeed belong to that bed. *Dinoya* shells were found in the Miocene bed as well as on the fossil.

Dr. Simpson has recognized in this bone a new genus and species of penguin. Seventeen or eighteen genera of fossil penguins are now known, and the humerus is known in fourteen of them, so adequate comparisons can be made. The differences between known fossil humeri and the Glenelg River specimen are greater than those that exist between those of different genera of living penguins. The new genus is nearest *Archaeospheniscus*, a fossil penguin found in New Zealand. The penguins of this part of the world are quite distinct from the Patagonian fauna.

Finally, it may be said that the new species of fossil penguin consists of very large birds, markedly bigger than any living penguins. Many of the extinct penguins of Australia and New Zealand were large birds, some of them probably standing as much as five feet high.

MOLLUSCAN FIELD NOTES—Part 3

By ROBERT BURN

Elegidom audax Fedale 1924

Two specimens, the larger 25 x 16 x 9 mm., collected at Flinders, 25/5/58; both under a stone at low tide level.

Field-notes—"Animal dimensions 30 mm. in length and 20 mm. in breadth. Sole of foot white, mantle transparent pale blue with brown and white dots scattered over it. Mantle processes 44 in number, eusiform in general shape but with short lateral extensions. Shells are red-brown, apex internally blackish. Sides of foot similar to mantle in colour but tinged with yellow, the dots are larger, and the siphon has quite bright dots upon it."

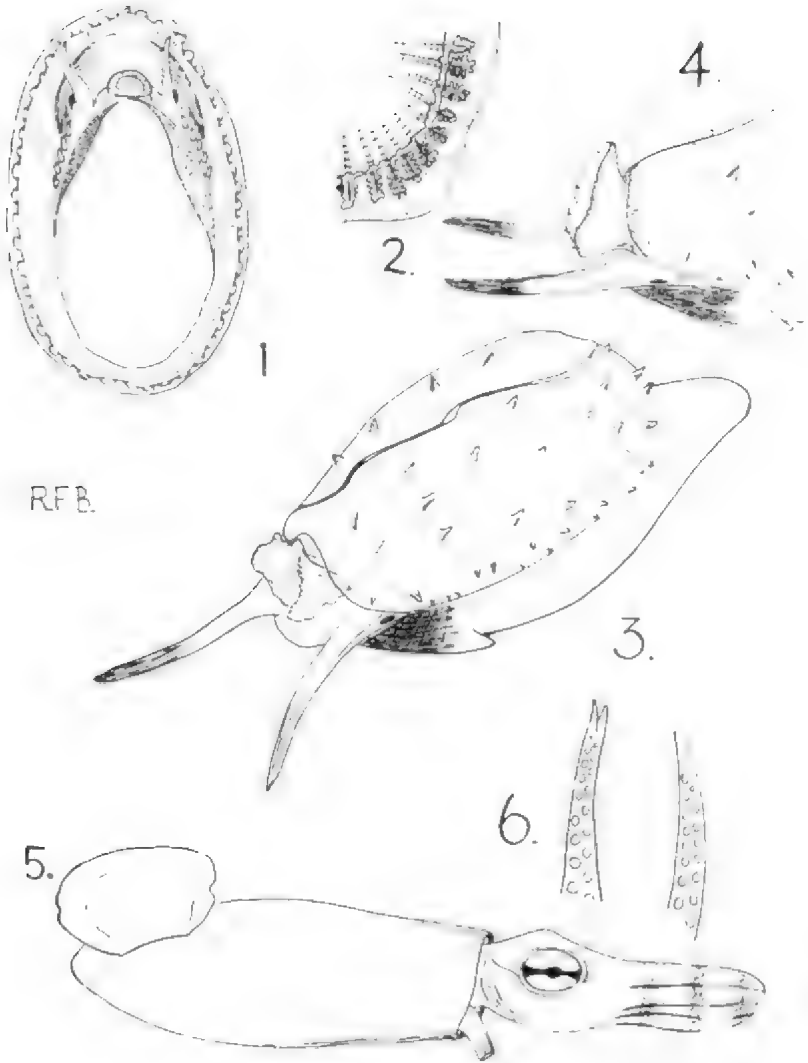
The 44 mantle processes correspond in number and position to the radial ribs of the shell. High above the foot but just below the mantle is a discontinuous row of wart-like pustules; these arise behind the tentacle bases on either side of the head. The tentacles are long and slender, distally pointed; the eyes are black and protrude laterally from the tentacle bases.

The colour of Victorian specimens of *E. audax* differs from that of typical N.S.W. specimens only in being paler about the animal. The species is somewhat of a rarity in Victorian waters but is common in N.S.W.

Notocypraea sp. indet.

One specimen, length 15 mm., collected at Flinders, 25/5/1958; under a stone in a rock pool near mid-tide.

PLATE IX



Details of Molluscs.

Figs. 1, 2. *Elegidon audax* Iredale—ventral view, detail of mantle and foot margin.

Figs. 3, 4. *Notocypraca* sp. indet.—anterior dorsal view, detail of head.

Figs. 5, 6. *Idioscpius notoides* Berry—right lateral view, detail of hectocotylized arms.

A BIRD NOTE FROM FALL'S CREEK, BOGONG

Mr. Haase and I were seated on large stones by the roadside watching the entrance of a Striated Pardalotes' nest in the embankment. A male Flame Robin sat unperturbed in a young sapling a few feet above the nest. We had not waited long before a parent Pardalote approached, carrying a morsel—a moth, I think—in its beak. When it was within two or three feet of the nest entrance, the Robin descended in a flash, snatched the food from the Pardalote's beak, and flew back to its perch. The Pardalote set off across the road and into the scrub on the other side.

However, it soon returned with a small moth—these were numerous in the area. Instead of making direct for the nest, it flew to a nearby sapling, waiting and watching the Robin. After some seconds, it made a dash for the nest and was attacked by the Robin as before. But this time the latter was not successful. The Pardalote, still in possession of the moth, flew back to the sapling, and the Robin flew to its former perch.

After repeating this performance twice, the Pardalote made a lightning dash into the burrow. We waited, and saw the attack and parry repeated. Then after manoeuvring, the Pardalote again delivered its small burden.

The Robin was still waiting in the sapling when we left.

N. D. HELLISEN

WHAT, WHERE, AND WHEN

F.N.C.V. Meetings:

Monday, April 13—"Murray River Encephalitis", by Mr. N. J. Bavaloro.

F.N.C.V. Excursions:

Sunday, March 22—Botany Group Excursion to Mount Evelyn. Take the 9.15 a.m. train from No. 1 East platform at Flinders Street, alight at Mount Evelyn. Bring two meals.

Saturday and Sunday, April 11-12—Week-end parlour-coach excursion to Tarra Valley and Bulga Park. Fare and dinner, bed and breakfast at Yarram, 44/3/-. Coach will leave Flinders Street opposite Gas Company at 8 a.m. Members will need picnic lunches for Saturday and Sunday. Bookings with Excursion Secretary. Full cost of trip should be paid by April 1.

Groups Meetings:

(8 p.m. at National Herbarium unless otherwise stated.)

Friday, March 20—Botany Group. Coloured slides of Victorian Wildflowers will be shown by Miss C. Carberry.

Wednesday, March 18—Microscopical Group.

Wednesday, April 1—Geology Group. Subject: "Water", by Mr. Baker.

Monday, April 6—Entomology and Marine Biology Group. The meeting will be held in Mr. Strong's rooms in Parliament House at 8 p.m. Enter through private entrance at south end of House.

Miscellaneous Fixtures:

Tuesday, April 7—"Protection of Nature (at Home and Abroad)", by Professor J. S. Turner. The speaker has recently returned from visits to Great Britain, South Africa and America. The lecture (illustrated) will be given in the School Hall, M.C.E.G.G.S., Anderson Street, South Yarra. Tickets will be available, at 2/6 each, at the March meeting of the F.N.C.V. or from Miss W. Waddell, 3 Denham Place, Toorak.

(The Moonba Nature Show, which opened on March 7, may be seen until March 14, in the Horticultural Society's Hall, Victoria St., Melbourne.)

—MARIE ALLENHER, Excursion Secretary
19 Hawthorn Avenue, Caulfield, S.E.7

Field-notes—"Mantle pale buff and cream. Papillae few and far between. Sole of foot lemon yellow; upper part paler, about head orange tinged. Tentacles long, red in colour distally, retractile within siphon, siphon edge frilled. Mantle surface slightly roughened."

The mantle papillae, as with other *Notocypraeids*, are few in number and in shape cylindro-conical. The shell is pure white in colour blotched dorsally with large and small pale chocolate patches and dots; on the right side the dots are deeper in tone; the base is pure white without any markings. Four extremely faint fawn bands are just discernible across the dorsum.

This specimen cannot be attributed to any of the described species of the genus *Notocypraea*. It belongs to a large series containing the species *subcarnea* Beddome, *bicolor* Gaskoin, *pipertii* Gray and *verconis* Cotton & Godfrey, but, while fitting somewhere between *subcarnea* and *bicolor*, it would be wrongly determined if given either name.

The specimen is now in the private collection of Mrs. D. I. Hartley of Malvern, Victoria.

Idiosepius notoides Berry 1921

Fourteen specimens; 6 female, the largest 37 mm. in length, and 8 males, the largest 24 mm. in length; collected at Swan Bay, Queensland, 11/5/1958; taken by means of a dip-net among *Zostera* growing in a shallow channel across a mud-flat.

Field-notes—"Colour varying from clear to dark brown but normally fawn with minute bare patches. Generally male specimens are darker in colour than females. Photopores(?) visible as minute black and orange specks, bright electric-blue spots appear occasionally. Tail white, funnel transparent. Internally greenish behind the head and at the tail. Eyes black, divided horizontally with white above and below the division. Of the hectocotylized arms the right is the shorter and is simple at the tip, being conical. The left is quite stout, a little longer than the right, the end bifurcated; the flaps are very short and stubby.

"In a jar of sea water the specimens were very active, particularly the males which swam round and round; the females spent most of the time adhered to the weed or the walls of the jar. To adhere to a piece of weed the squid moves backwards and upwards under it, and, on touching, a suction disc between the tail fins is activated and grips the weed; the arms then contract and fold together and the animal assumes its normal colour whilst pulsating rhythmically all the time. The suction disc is quite large, oval in shape and situated dorsally between and in front of the circular, narrowly-attached tail fins."

In spirits the differences in colouring between male and female specimens are still noticeable. The males are reddish-grey and the females are reddish-orange.

Burn (1957) recorded this species for the first time in Victorian waters and presented one specimen to the National Museum of Victoria and a second to the South Australian Museum. Recently however the writer noticed specimens in the first-mentioned institution which had been collected between 1880 and 1890 from various localities inside Port Phillip Bay. The fourteen specimens mentioned here are now in the National Museum of Victoria, Melbourne.

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—MARIE ALLENDER, Excursion Secretary
19 Hawthorn Avenue, Caulfield, S.E.7

The Victorian Naturalist

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PROCEEDINGS

Mr. J. R. Garnet presided, and over 100 members and friends attended at the General Meeting of the F.N.C.V. in the National Herbarium on March 16. Several interstate and country visitors were welcomed, including Mrs. Wilenden Ovenstone, Secretary of the West Australian Field Naturalists Club. Members were thanked for their assistance in setting up and supervising the Moomba Nature Show; and Mr. McInnes reported considerable interest in the live exhibits. Mr. David Woodruff asked for temporary homes for some of his lizards, until the Club's October Nature Show.

The President told of a deputation to Mr. Fraser concerning amendments to the National Parks Bill. The National Parks Association desires that only Parliament should have the right to proclaim or revoke National Parks, and they suggest that there should be a person on the National Parks Authority, selected from a naturalist society or walking club, who would be able to advise as to the suitability of areas for reservation.

Miss M. Lester was thanked for her efforts in organizing the sale to members of suitable nature books at General Meetings. The small commission which bookselling firms pay on these sales assists Club funds. The President asked if any members would be able to act as delegates for the F.N.C.V. at the A.N.Z.A.A.S conference in Perth next August.

It was reported that the Cosstick Reserve near Maryborough had been taken over by the F.N.C.V. from the donor, Mrs. Nowlan, and the transfer had been executed and lodged for registration. This reserve has a representative "goldfields flora", and it is to be protected from rabbits by wire netting. The Maryborough F.N.C. has undertaken to assist with the project.

Members were reminded that nominations for office-bearers for the ensuing Club year must be made at the April General Meeting.

Andrew A. Thornley of Geelong was elected as a Country Member of the F.N.C.V., and Nancy Brentwood of Mount Albert and Ian Paul of Princes Hill became Junior Members. The President extended them a very warm welcome to the ranks of the Club.

Mr. Quirk reported a radio reference to an application for sealing rights on Macquarie Island. It was decided that this move should be watched, and a protest lodged if necessary. There was some discussion of mortality of koalas shifted from Phillip Island, and of native fauna killed by Lands Department operations with the rabbit poison, 1080. It was generally conceded, however, that both

the Fisheries and Game Department and that of Lands were carrying out these operations intelligently towards the end of conservation of native fauna and flora.

Mr. David G. Morgan gave a most interesting and informative talk on the ecological survey, by geologists, botanists and zoologists of the McCuy Society, of Wilson's Promontory, particularly about Waterloo Bay, Mount Hunter and Corner Inlet. This was illustrated by a magnificent series of colour slides. A vote of thanks was carried by acclamation.

Mr. Garnet exhibited specimens of Funnel-web Spider and several house and garden spiders; Mr. Swaby explained the distribution and nature of the Nardoo that he had on show, and Mr. Wilson inquired as to the true nature of the ring of outgrowths in the Passion-flower which he had.

The general business concluded at about 10 p.m., when the meeting adjourned for the usual conversazione.

[*Note:* The outgrowths of the Passion-flower are within the ring of perianth segments, being part of the perianth however, and correspond to the trumpet of the daffodil or jonquil. Such a development is known as the *corona*, and, as in mediæval times the Passion-flower was thought to represent the crucifixion (hence the name), the outgrowth in this case was taken to correspond to the crown of thorns.—Editor.]

GEOLOGY DISCUSSION GROUP

With Mr. Davidson in the Chair, twenty-seven members and visitors attended the March meeting, when the main business of the evening was entitled "Geology in Colour". This was conducted by several members. Mr. McInnes presented pictures of the Club excursion to the Bogong High Plains; outstanding of which were the intruded dykes in the granodiorite and the columnar basalts. Mr. Hemmy showed a collection of pictures from many places visited as excursions: the Older Basalt at the Nobbies on Phillip Island, columnar Newer Basalt of the Campaspe River at Barfold, weathered Older Basalt above the limestone of Cave Hill near Lilydale, marine weathered lime kilns at Waratah Bay, the ash and lava beds at Emu Creek, and the construction of the spillway at Eildon Dam. Mr. Baker's contribution was a series of pictures of recent volcanic activity at the Mihara Yama volcano in one of the islands of Japan.

Mr. Blackburn showed slides relating to a coastal land-slip at Bellarine, the magnesium limestone beds at Comada, a collection of coloured minerals, and volcanic rocks from St. Albans and Strathmore as well as "The Organ Pipes" of Sydenham. Mr. Jeffrey presented pictures illustrating the rocks along the coastline of Waratah Bay, including the upturned limestones, the rugged diabase and the trilobite beds of Digger Island.

After a vote of thanks to these members, numerous exhibits were described. Mr. Cobbett dealt with minerals of asbestos, opal, pyrite, gypsum, staurolite and apatite. Mr. Blackburn described volcanic rocks from the sewerage shaft at Spotswood. Mr. Barnstow had minerals from the Pilbara mining area of Western Australia, which is operated by a party of natives. These included a crystal of beryl, blue asbestos, tin oxide, manganese oxide, and manganotantalite. Miss Burbury's exhibits were a quartz crystal from Bendigo, agate, silicified breccia, and opal from several localities. Mr. Jeffrey tabled Jurassic plant fossils from the shore platforms at Wye River; and Mrs. Salau showed chalcedony rock from Red Hill, Heathcote.

SUPPORTING MEMBERSHIP AND THE FUTURE OF THE "VICTORIAN NATURALIST"

On March 11, 1958, the body of the F.N.C.V. carried a motion "that Members be invited to become Supporting Members by paying an additional subscription of 10/- or more per year, such membership to be a private matter and to confer no extra privilege or distinction". The purpose of this was to obviate the necessity either of increasing membership subscriptions or of reducing amenities available to members. The response has been satisfactory, about £50 extra income resulted during the present Club year, and our Finance Committee predicts that there will be a small credit balance when the General Account is closed at the end of this month.

With the advent of the forthcoming Club year, the format of the *Victorian Naturalist* is to be modified, with the idea of making it acceptable to those of the general public who, though not enthusiastic naturalists, are at least passably interested in the Australian countryside and its flora and fauna.

Since the final issue of *Wild Life*, in January 1954, there has been a much-felt need for a nature magazine to take its place, and, though the *Victorian Naturalist* cannot, in a single move, assume anything like the popularity (and hence circulation) of *Wild Life*, the step which is to be taken could well prove to be the preliminary one towards the attaining of that goal.

For seventy-five years the *Naturalist* has been essentially the journal of our Club, and it is to continue to be. Nothing of its present service to members is to be reduced; it will continue to feature the monthly agenda, reports of Club and Group activities, forthcoming fixtures, etc.; but the general appearance, both outside and in, is to be improved, the size increased and the number of illustrations at least doubled.

All aspects of the matter have been examined carefully by the Club's Finance Committee and Council, and it is considered that the extra expenditure involved will eventually be offset by the returns from a greatly increased circulation. In the meantime, until the initial launching of the scheme is completed and the "new" *Victorian Naturalist* is known to the public, your Council makes a special appeal to you to consider the matter of Supporting Membership. If you are able and willing to help in this way, simply add the amount you decide upon (any additional sum from 10/- upward) when paying your normal subscription for the coming financial year.

It is probable that, as regards the furthering of our aims—the stimulation of interest in Natural History and the preservation of our fauna and flora—this project with the *Victorian Naturalist* may make 1959-60 a landmark in the annals of the F.N.C.V.

OUR NATURE SHOW

(October 5, 6, and 7, 1959)

There are several practical thinkers in this Club who wish to display exhibits of their own at the forthcoming F.N.C.V. Nature Show in the Hawthorn Town Hall. The Committee knows of some of these people and the Honorary Organizer has written asking them for news of their exhibits, but there are others from whom he would like to hear concerning exhibits they may have planned. Perhaps the latter persons require help, but do not know where to get it. The Committee will be very pleased to help in any way possible, but it will be necessary to send some details of the proposed exhibits to Mr. A. B. Court, Hon. Organizer, F.N.C.V. Nature Show, 61A Wandsworth Road, Surrey Hills, E.10, Victoria. The following questions should be answered:

1. What is the subject or theme of your display?
2. How much space do you require?
3. Do you want a wall or island site?
4. How many tables and trestles do you require?
5. Do you require any special constructional work to be carried out?
6. Are there any other points you wish to mention?
7. Do you require labels to be written?

A rough sketch of the proposed exhibit will be very valuable to the Committee, as well as answers to the above questions.

The Show is now reaching the stage where the positions of the various exhibits are being determined, and as soon as the Committee knows how much space the various groups and individuals require, the remaining sites and space will be allotted to other organizations who may wish to join in the exhibition. Therefore it is important that this series of questions be answered as soon as possible.

Are You Interested in This!

The Show Committee believes that this year's Show will be the best ever held by the F.N.C.V. A number of very good displays have been planned: some of these will be presented by Club Groups, others by individual people. No doubt there are quite a number of persons within the Club who would like to be responsible for an exhibit of their own or would like to take part in planning one. The following list of ideas is presented for those persons, and they will have the full support of the Committee. If any exhibit mentioned below appeals to you, please write to the Committee as soon as possible and every effort will be made to give you additional information if you need it and help wherever possible. The following ideas are put forward for your consideration:

1. A large display of wildflowers arranged in a mass (please note that flowers will come from gardens or from private property with the owner's permission). There are three suitable places for such a display, viz. in the foyer of the Town Hall, near the main wildflower exhibit, and on the stage. Perhaps people with a flair for decoration would like to take over this display.

2. A special display on *Epacris impressa*. As you know, this plant was recently made the official state floral emblem for Victoria. An interesting story could be built around this plant because it was first seen by a famous French explorer who was searching for a lost ship.

3. Floral perfumes. See J. H. Willis in *Vict. Nat.* 61: 131-6 (1944).

4. Plant oddities. Examples are *Drosera* spp. (Sundews) and the West Australian Pitcher Plant.

5. Camouflage in insects.

6. Lyrebird.

7. Water-birds in lakes near Melbourne

Notes to Persons Supplying Wildflowers

Several members have indicated that they will be able to supply wildflowers for the Show. Since these will form a large and important part of the exhibition, neatly written labels must be displayed with the specimens. Ticket-writing is now in progress and it will be necessary to have lists of species which can reasonably be expected to flower during early October so that this work can continue right through to the Show. All persons who are co-operating by sending specimens are urged to send these lists now. They may be forwarded to Mr. J. M. Wilson, 4 Regworth Court, Highett, S.21, Victoria, so that composite lists may be drawn up and sent to the ticket writer.

—F.N.C.V. NATURE SHOW SUB-COMMITTEE

F.N.C.V. LIBRARY RULES

1. All financial members are entitled to borrow publications.

2. A record of every loan shall be entered in the appropriate Loans Book—either the large book on the Librarian's table for all loans, or, for unbound copies of current periodicals, the smaller book on the periodical display stand in the hall used for General Meetings. The date on which a book is due for renewal or return should be entered on the slip inserted for that purpose inside the back of the book. Both these entries should be made by members, in the absence of the Librarian or when the Librarian is unable to attend to them personally.

3. The maximum period of retention of library books by borrowers without renewal is two months, after which a fine of 2/- per month is payable to the Librarian. The maximum period of any loan is six months. Current periodicals may be retained for one month only.

All members are urged to assist the Club by returning publications promptly when due; suggestions for new books, periodicals, and other publications will be welcomed.

THE GANNETS OF CAT ISLAND

By A. H. CHISHOLM

The large oceanic birds known as Gannets—an ancient name of obscure origin—are represented in Australia by four species, three of which breed on tropical islands and the other in temperate areas.

As stated by Dr. D. L. Serventy in *The Australian Encyclopaedia* (1958), the only known nesting-places of the southern species, the Australian Gannet, *Sula servator*, are at Lawrence Rock near Portland, Victoria; Pyramid Rock in western Bass Strait; Cat Island in eastern Bass Strait; and Pedra Branca and Eddystone Rock in southern Tasmania. The largest surviving colony is at Pedra Branca, where the numbers are estimated at approximately 2,000 breeding pairs.

Cat Island, most accessible of the five sites, has been most frequently visited—and, alas, its birds have been most drastically assailed. A granitic, flat-topped rock of about 100 acres, it is one of the most easterly isles of the Furneaux Group, but, as it is quite close to Flinders Island (see map in *Emu*, vol. 8, facing p. 195) and is only about 100 feet at the highest point, its shores are not as formidable as those of the other rock-sites.

Knowledge of the Cat Island gannetry dates back to January 8, 1799. It was seen on that day by the enterprising surgeon-naturalist-explorer George Bass, who with Matthew Flinders, in the 25-ton sloop *Norfolk*, had just then proved the existence of the strait that bears his name and had sailed around Tasmania. There were at the time very many birds, of various species, frequenting the cluster of islets, and because of the "confusion of noises" they made, "each using its own language" (as Flinders lightly noted), the fragments of land were termed the Babel Isles. Later, the name Babel was reserved for one of the islets—perhaps because it carries a rocky "tower"—and the others were named Cat and Storehouse respectively.

Following Bass's inspection, the Cat Island gannetry does not appear to have been seen again by a naturalist until November 1893, when a small party from the Field Naturalists Club of Victoria visited the island. On that occasion Joseph Gabriel made some useful notes—he estimated the number of nests at 2,500—and H. P. C. Ashworth took some admirable photographs. Illustrated reports by Gabriel appear in the standard works of A. J. Campbell (1900) and A. J. North (1912), and North gives also some data assembled by two Tasmanians, E. D. Atkinson and W. J. T. Armstrong, who visited the island in November 1907.

Other visits were made by various parties in following years, and quite recently a number of reports on the birds of the area, written by ornithologists who served as temporary wardens (on behalf of

the Tasmanian Government), have been published in *The Emu*.* It is because of the situation disclosed by these recent writings that I desire to extend the discussion, and at the same time to direct attention to a series of articles which, although strictly relevant to the subject, are never discussed, the reason being that they are "buried" in the files of newspapers.

These articles had their basis in a tour of Bass Strait islands made under the auspices of the Australasian Ornithologists' Union in November-December 1908. The account of that expedition appearing in *The Emu* (vol. 8, pp. 195-207), as written by S. A. White, is somewhat sketchy and rather "flat", whereas the articles to which I refer are not only informative but distinctly readable—one batch (of three) was written by a skilled naturalist-journalist, Donald Macdonald, and another group (of two) by a well-known medical man, J. W. (later Sir James) Barrett. Both series were published in the Melbourne *Argus*.

Copies of the articles in my possession are not dated, but those by Macdonald appeared soon after the return—on or about December 9, 1908—of the expedition to Melbourne, and those of Barrett were published fairly early in 1909. (None of these articles is listed in H. M. Whittell's bibliography, *The Literature of Australian Birds*, but, for that matter, neither are many other worthy articles written by Macdonald in the *Argus*.)

Barrett's discussions, it should be noted, were based on a second expedition, one which apparently was prompted by the success of the A.O.U. trip. At any rate, it began on January 1, 1909, was undertaken on the vessel used by the A.O.U. party (the *Manawatū*), and comprised a group of fifteen men, of whom ten were doctors. In this case the tour was shorter than the earlier one: the party went direct to the Furneaux Group, apparently for the purpose (a) of assisting the half-starved and ailing residents of Cape Barren Island, and (b) of seeing the Gannets on Cat Island.

Here it may be mentioned that, following a congress of the Ornithologists' Union at Launceston in November 1912, the Cat Island gannetry was again inspected, this time by a party of twelve, including some members who had been there four years earlier. Only a very brief reference to this later visit appears in *The Emu* (vol. 12, p. 161), but a detailed and well-illustrated report, "Among the birds of the Furneaux Islands", was presented by Walter Finigan (then honorary secretary of the Gould League of Bird Lovers in New South Wales), in the *Sydney Mail* in January 1913, and this was republished in a "Birdlife Supplement" to the *Public Instruction Gazette* of New South Wales in September of the same year.

Two of Macdonald's articles are of a general nature, with notes

* Also, D. L. Serventy wrote on the subject in the *Fisheries News-letter* for 1949 (pp. 12-13) and his article was reprinted in *Wild Life* in 1950 (12: 65-67).

PLATE IX



Portion of the Gannetry of Cat Island, 1912.



Photos—W. Finigan

Brooding Gannets at close range, Cat Island, 1912.

on petrels and other birds interspersed, but the third one, "Gannets of the Bass", is entirely devoted to the ornithology of Cat Island. Similarly, one of Barrett's reports is general and the other, entitled "Cat Island", is restricted to a discussion of Gannets. In each instance the observations and comments are noteworthy. Particularly is this so in the case of Macdonald, to whom the sight of the great gannetry came as "a sudden and wonderful revelation".

Discussing the birds' numbers (which S. A. White did not estimate), Macdonald says in one article that there were "from 5,000 to 7,000 birds of all ages interested in this gannetry of Cat Island", and in another article he writes: "I took a little space, counted the number of nests and birds in it, multiplied it by the whole area, considered also the young in various stages, saw the white flock fishing out at sea, and feel sure that I am under rather than over the mark in saying that there are 5,000 birds at least interested in this island home."

Barrett, making an estimate some five weeks later, wrote that the rookery was "perhaps an acre and a half in extent", and on it "were nesting about 4,000 gannets".

Finigan, who saw the rookery on November 23 (1912), and who described it as "the most wonderful sight of the whole expedition", assessed the number of "these great white birds" at about 3,000, and he judged the area covered to be about an acre.

It seems clear that Macdonald's figure included fledglings (though most nests which he saw—on or about December 5—contained either an egg or a newly-hatched chick), but it would appear that Barrett's and Finigan's estimates were restricted to adult birds.

In any event, the numbers cited contrast very drastically with the scanty populations recorded at the same gannetry about fifty years later—by Terence Cashion during January-March 1957 and by John Warham during about four months up to April 1958 (*Emu*, 58: 329 and 340).

When Cashion arrived at the island, on January 14 (1957), he saw only 16 downy young Gannets, together with the remains of 17 adults and 4 young that had been shot; and in following weeks he saw an average of 50 to 60 adults each day. Warham, on his part, gives detailed figures illustrating the heavy decline in the birds' numbers in recent years, culminating with the drab statement that only 14 birds fledged in the breeding season of 1956-57.

Imagine how these figures would horrify Sir James Barrett if he were still alive. He, an ardent conservationist, had attempted to predict the future of the Cat Island gannetry, and had supposed that it would remain stable, or perhaps increase slightly. But, of course, he was not to know that in later years, with the rookery unguarded, fishermen would descend upon the spot and slaughter the birds, adults and young alike, merely for the purpose of using the bodies as bait.

Personally, I have not seen a Bass Strait gannetry, but in 1938 I spent some hours in a famous gannetry of another Bass—an odd coincidence in names—that of the Bass Rock near the coast of East Lothian, Scotland. The number of nests there in 1931, according to a census taken by lightkeepers, was 4,247 (8,494 birds), and by 1938 the number of birds, according to the keepers' estimates, had increased by about 2,000.

These figures reveal what can be achieved by protective measures. They present a lesson and a challenge to Australia. For, certainly, the slaughter of the Gannets of Cat Island is a disgrace to this country.

PLANTS OF PALM VALLEY, CENTRAL AUSTRALIA

By G. M. CHIPFENDALE*

In view of the list of "Some Plants Collected in Palm Valley", by N. Learmonth (*Vict. Nat.* 71: 4-6, May 1954), the passing reference to several species in "A Visit to Central Australia", by C. E. Chadwick (*Ibid.* 75: 53-68), and the comments made by Annette Cummins in "A Central Australian Holiday" (*Ibid.* 74: 84-86), many field naturalists should be interested in a fairly complete list of the plants of Palm Valley.

The list is based primarily on material collected by the author during a number of visits to the Valley. A set of this is now in the Herbarium of the Northern Territory at Alice Springs, with duplicates in the State Herbaria. Also, specimens have been donated by several botanists of the C.S.I.R.O.

Ernest Giles first discovered the Valley, in 1872, and in his diary he wrote, "The flowers alone would have induced me to name this Glen Flora, but having found in it also so many of the stately palm trees, I have called it the Glen of Palms." The name seems to have been changed to Palm Valley by popular usage.

Giles first, and later R. Tate (1894) and the Rev. H. Kempe from Hermannsburg, were the early collectors in the Valley, but their combined total of species recorded in literature is only 53. The following list, which includes records from all these sources, comprises 200 species.

Tate was apparently disappointed that "away from the margin of the water-holes, everything was as dry as usual", and he found "none of the damp/luxuriance" which he had hoped might be there! This comment is most apt, for the Valley can indeed be very dry, and the members of the Horn Expedition were really fortunate that there were good pools of water during their visit. As these are dependent on rainfall, they are certainly not permanent.

The plants collected by the early explorers are an excellent sample of the flora, and, bearing in mind the methods of transport and the

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long periods spent in the bush, it is amazing how much material they brought back. Only one major error has become apparent from an examination of some of these early specimens from Palm Valley. Giles' record of *Ficus orbicularis* was based on two detached leaves which are almost certainly of *Canthium latifolium*. Changes made by Tate in the list of plants of Central Australia were mostly due to later, more complete knowledge of some species.

The vegetation of Palm Valley is made up mostly of the common shrubs of the Central Australian mountain range systems, with the addition of the palm *Livistonia mariae*, unique to the Valley, and *Macrozamia macdonnellii*, a Cycad which is also found in other parts of the Macdonnell and the George Gill Ranges.

Most field naturalists would understand the suggestion that Palm Valley is a reclusium—that is, an area into which remnants of a past flora have become restricted. The evidence strongly supports this theory. When this list was first compiled, an attempt was made to determine the range of certain apparently rare species. It seems that some which were thought to occur only in a single locality in Central Australia actually occur elsewhere. There could be a much better appraisal of past flora if the whole of this range area of Central Australia could be examined as one unit.

The following table sets out the species populations of the main habitats in Palm Valley and indicates where the plants rare in the area are to be found:

Moist sand	29 species, 16 of which are rare
Pools	9 " 8 " " " "
Shaded slopes	8 " 8 " " " "
Open slopes	61 " 5 " " " "
Valley floor	108 " 9 " " " "

It is seen that 32 of the 46 rare species occur only in sheltered habitats. Of them 13 are more or less cosmopolitan, 10 are found only near water or soakage areas in arid parts of Australia, and four are found in Australian arid areas not necessarily near water.

List of Plants of Palm Valley (200 spp.)

Aspleniaceae

Pleurosorus rutifolius (R.Br.) For.—Small fern under rock shelves on hillside.

Marsileaceae

Marsilea drummondii A.Br.—In moist sand around rock pools.

Polypodiaceae

Cheilanthes lasiophylla Pic.-Scr.—Under rock ledges on hillside.

sieberi Kuntze—Ditto.

tenuifolia (Burn.f.) Swartz—Ditto.

Cycadaceae

Macrozamia macdonnellii F. Muell.—Mostly on shaded north walls of gorge;
rare.

Cupressaceae

Callitris hugelii (Carr.) Franco—On rocky slopes of valley; rare.

Typhaceae

Typha angustifolia L.—In rock pools; rare.

Potamogetonaceae

Potamogeton tricarinatus A. Bennett—In rock pools; rare.

Naiadaceae

Naias major All.—Submerged waterplant; rare.

Scheuchzeriaceae

Triglochin calcitrapa Hook. On wet sand near waterholes.

centrocarpa Hook.—After good rains on small banks of wet sand or near waterholes.

hexagona J. M. Black—Small herb in moist sand; rare.

Gramineae

Aristida nitidula (Hemr.) S. T. Blake—In sand on rocky areas.

Bothriochloa ewartiana (Domin.) C. E. Hubbard—Near waterholes on rocky valley floor.

Cymbopogon exaltatus (R.Br.) Domin.—In crevices of rocky valley floor.

Dactyloctenium radulans (R.Br.) Beauv.—Annual, in sandy soil.

Diplachne fusca (L.) Beauv.—In sand in small rockholes; rare.

parviflora (R.Br.) Benth.—Tall grass in sandy moist places, and in rock crevices; rare.

Emeapogon lindleyanus (Domin.) C. E. Hubbard—Tufted, in rock crevices.

pubescens (Domin.) N. T. Burbidge—Tufted, on rocks.

Eragrostis dielsii Pilger—Annual, on wet sand.

falcata Gand.—Perennial, in sand.

lacunaria F. Muell. ex Benth.—In sand on rocks.

Friachne mucronata R.Br.—On rocky hillsides.

Eulalia fulva (R.Br.) O. Kuntze—In moist depressions.

Leptochloa digitata (R.Br.) Domin—Tall, at edge of rock pool.

Paspalidium constrictum (Domin.) C. E. Hubbard—In sand near water; rare.

Phragmites karka (Retz.) Trin. ex Steud.—Tall, dense, in sand near waterholes; rare.

Setaria dielsii Herrm.—Around rock pools.

Themeda australis (R.Br.) Stapf.—In sand.

Triodia pungens R.Br.—On hillsides.

Cyperaceae

Cyperus aristatus Roth.—Small sedge near water; rare.

gymnocaulos Hook.—Tall sedge near water; rare.

Fleocharis geniculata (L.) R. & S.—Sedge, near waterhole; rare.

Scirpus littoralis Schrad.—Tall, near waterhole; rare.

maritimus L.—Tall, near waterhole; rare.

Palmae

Livistona mariae F. Muell.—Unique to Palm Valley.

Centrolepidaceae

Centrolepis polygyna (R.Br.) Hieron—Small annual in wet sand; rare.

Liliaceae

Lomandra aff. *dura*—On rock slopes and in watercourse off main valley; rare.

Moraceae

Ficus platypoda A. Cunn.—Dense tree on rocks.

Urticaceae

Parietaria debilis Forst.f.—Delicate annual in shaded pockets on hillside; rare.

Proteaceae

Grevillea junceifolia Hook.—Giles' record only, and possibly not within the actual valley.

Grevillea striata R.Br.—Tree, rare on valley floor,
Grevillea wickhamii Meissn.—Shrub, mostly on rocky slopes.

Hakea lorea (R.Br.) R.Br.—Small tree, on valley floor.
Hakea intermedia x *lorea*—Small tree, on valley floor.

Loranthaceae

Amycma gibberula (Tate) Danser—Parasitic on *Grevillea wickhamii*.

Diplatia maidenii (Blakely) Danser—Parasitic on *Acacia kempeana*.

Lysiana exocarpi (Rehr. ex Schlecht.) Tiegh.—Parasitic on *Callitris hugelii*, *Melaleuca glomerata* and *Ficus platypoda*.

Santalaceae

Santalum lanceolatum R.Br.—Shrub on rocky areas.

Polygonaceae

Polygonum attenuatum R.Br.—Herb in wet sand; rare.

Rumex vesicarius L.—Recorded by Learmonth; introduced only, and rare in the valley.

Chenopodiaceae

Atriplex muelleri Benth.—Herb, in moist sand; rare.

Atriplex nummularia Lindl.—Shrub, on valley floor.

Dysphania plantaginella F. Muell.—Small annual; rare, in wet sand.

Enchylaena tomentosa R.Br.—Subshrub, semi-succulent,

Kochia tomentosa. (Moq.) F. Muell.—Subshrub, on rocky ground.

Rhagodia nutans R.Br.—Subshrub, in sandbank.

Rhagodia parabolica R.Br.—Straggling shrub in sandbank; rare.

Rhagodia spinescens R.Br.—Shrub on rocky valley floor.

Salsola kali L.—Annual, on valley floor.

Amaranthaceae

Achyranthes aspera L.—Subshrub, on creek bank and in rock crevices.

Alternanthera nana R.Br.—Small herb near rocks or in creek sand.

Ptilotus lincantus (R.Br.) Poir.—Perennial, on rocky slopes.

Ptilotus nobilis (Lindl.) F. Muell.—On rocky slopes.

Ptilotus obovatus (Gaud.) F. Muell.—Common subshrub throughout.

Nyctaginaceae

Boerhavia diffusa L.—Common prostrate herb.

Phytolaccaceae

Cyrostemon ramulosus Desf.—Giles record only; usually a shrub in deep red sands.

Portulacaceae

Calandrinia spergularina F. Muell.—Prostrate herb in moist sand; rare.

Portulaca oleracea L.—Common succulent herb.

Caryophyllaceae

Polycarpha corymbosa (L.) Lam.—Rare, erect wiry herb.

Cruciferae

- Lepidium muelleri-ferdinandi* Thell.—Small herb, in rock crevices.
oxytrichum Sprague—Erect herb, common in wet sandbanks.

Capparidaceae

- Capparis spinosa* L.—Dense sprawling spiny shrub, on rocky ground.
Cleome viscosa L.—Annual, in sand

Leguminosae

- Crotalaria dissitiflora* Benth.—Perennial, in sand.
strehlowii E. Pritz.—Perennial, in river sand.
trifoliatrum Willd.—Infrequent herb, on rocky valley floor.
Gastrolobium grandiflorum F. Muell.—Shrub on rocky valley floor; rare.
Glycine sericea (F. Muell.) Benth.—Climber on other shrubs.
Indigofera basedowii E. Pritz.—Small shrub, on rocky ground.
brevidens Benth. var. *uncinata* Benth.—Subshrub, on rocky ground.
leucotricha E. Pritz.—Grey subshrub on rocky slopes.
viscosa Lam.—Herb, in sand, on flat rock.
Isotropis atropurpurea F. Muell.—Dwarf shrub, on stony ground.
Lotus coctineus Schlecht.—In wet sand; rare.
Psoralea patens Lindl.—In sand, on rock.

Mimosaceae

- Acacia farnesiana* Willd.—Spiny shrub, in creek soil.
kempeana F. Muell.—Common shrub on hills and on rocky ground.
ligulata A. Cum. ex Benth.—In stony watercourse.
spondylophylla F. Muell.—Spreading shrub on stony hills.
strongylophylla F. Muell.—Spiny shrub in stony sandy soil on valley floor.
tetragonophylla F. Muell.—Spreading small tree, on rocky slopes.
aff. duratoxylon—Tree, in stony creek.
victoriae Benth.—On slopes and valley floor.

Caesalpiniaceae

- Cassia artemisioides* Gaud.—Grey shrub in sandy valley and on rocky slopes.
desolata F. Muell.—Shrub on stony slopes.
desolata F. Muell. var. *involverata* J. M. Black—Grey shrub on rocky slopes.
eremophila A. Cum.—Shrub on slopes and in sandy valley.
eremophila A. Cum. var. *zygophylla* (Benth.) Benth.—Shrub on slopes and in valley.
glutinosa DC.—Viscid shrub on stony slopes.
pleurocarpa F. Muell.—Perennial, usually in sand.
venusta F. Muell.—Usually near base of rocky slopes.
Petalostylis labicheoides R.Br.—Subshrub, in sand, or on rocky soil.

Oxalidaceae

- Oxalis corniculata* L.—Herb in soil pockets on rocky slopes.

Geraniaceae

- Erodium aureum* Carolin.—Prostrate herb in sand on rocky slopes.

Zygophyllaceae

- Tribulus astrocarpus* F. Muell.—Prostrate herb, in sand.
terrestris L.—Common prostrate annual on valley floor.
Zygophyllum ammophilum F. Muell.—Common herb, in sand.
apiculatum F. Muell.—Procumbent succulent herb, in sand.

Euphorbiaceae

- Euphorbia australis* Boiss.—Perennial herb, on rocky hillside.
coghlanii F. M. Bail.—Succulent perennial herb, in cracks in rock and in sand.
eremophila A. Cunn.—Succulent herb in sand.

Sapindaceae

- Atalaya hemiglauca* (F. Muell.) F. Muell. ex Benth.—Tree, mostly on rocky slopes.
Dodonaea viscosa (L.) Jacq. var *spathulata* (Sm.) Benth.—Shrub on rocky slopes.
Heterodendrum oleifolium Desf.—Shrub or tree in dense local communities on rocky valley floor.

Rhamnaceae

- Spyridium spathulatum* (F. Muell.) F. Muell. ex Benth.—Shrub, probably on slopes.

Tiliaceae

- Corchorus sidioides* F. Muell.—Perennial in sand on rocky floor.

Malvaceae

- Abutilon fraseri* (Hook.) Hook. ex Walp.—Subshrub in rock crevices.
leucopetalum F. Muell.—Shrubby, in sand at base of rocky hills.
Hibiscus intraterraneus J. M. Black—Shrub on sandbank.
Lavatera plebeia Sims.—Herb, in sand in valley floor.
Malvastrum spicatum (L.) A. Gray—Subshrub, in sand on rocks.
Sida cryphiopetala F. Muell.—On rocky hillsides and on rocks in valley floor
fibulifera Lindl.—Dwarf shrub, on rocky ground.
rhombifolia L. var. *incana* Benth.—Subshrub, in sandy soil in valley.

Sterculiaceae

- Rulingia magniflora* F. Muell.—Small shrub, in sand on rocky valley floor; rare.
Waltheria indica L.—Subshrub, on valley floor.

Dilleniaceae

- Hibbertia glaberrima* F. Muell.—Shrub, on rocky slopes; rare.

Violaceae

- Hybanthus emmenaspermus* (L.) F. Muell.—Dwarf shrub, on slopes and on valley floor.

Thymelaeaceae

- Pimelea* sp.—Shrub on rocky slopes of smaller chasm; rare.

Lythraceae

- Armantha multiflora* Roxb.—Annual in wet sand; rare.

Myrtaceae

- Baeckea polystemona* F. Muell.—Shrub, on shaded rock walls; rare.
Eucalyptus camaldulensis Dehnh.—Tall tree, on valley floor.
intertexta R. T. Baker.—Tall tree, on rocky slopes.
papuana F. Muell.—Tall tree, on rocky slopes mainly.
sessilis (Maiden) Blakely—Mallee, on rocky slopes; rare.
terminalis F. Muell.—Tall tree, on slopes and rarely on valley floor.
Melaleuca glomerata F. Muell.—Tall shrub, common on sandy valley floor.
linariifolia Sm.—Shrub in soil pockets on rocks.

Haloragidaceae

Haloragis gosseii F. Muell.—Herb, usually in deep sandy areas.

Myriophyllum verrucosum Lindl.—Aquatic, in rock pools; rare.

Umbelliferae

Daucus glochidiatus (Lab.) Fisch. Mey. et Lall.—Annual, on wet sand.

Hydrocotyle trachycarpa F. Muell.—Small annual, low on shaded hillside.

Trachymene glaucifolia (F. Muell.) Benth.—Herb, common in sand in main valley floor.

Primulaceae

Samolus repens Pers. var.—Herb, in river sand; rare.

Oleaceae

Jasminum lineare R.Br.—Shrub, on rocky slopes.

Apocynaceae

Carissa lanceolata R.Br.—Dense spiny shrub on valley floor.

Asclepiadaceae

Sarcostemma australe R.Br.—Dense perennial with latex, on rocky slopes.

Convolvulaceae

Bonamia rosea (F. Muell.) Hall. f.—Dwarf shrub, usually on lateritic sands.

Evolvulus alsinoides L. var.—Procumbent herb, on hillside.

Ipomoea aff. *plebeja*—Trailing herb near rocks on valley floor.

Boraginaceae

Cynoglossum australe R.Br. var. *drummondii* Brand.—Annual in wet sand.

Halpania cyanea Lindl.—Dwarf shrub, usually on rock slopes.

Trichodesma zeylanicum (Burm. f.) R.Br.—Perennial herb, in sand on valley floor and on hills.

Verbenaceae

Dicrastylis gilesii F. Muell.—Grey shrub on rocky slopes.

Labiatae

Plectranthus sp.—Perennial, on shaded lower rocky slopes; rare.

Prostanthera baxteri A. Cunn. var. *sericea* J. M. Black—Shrub on hillsides only.

striatiflora F. Muell.—Shrub, on rocky slopes mainly.

Teucrium grandiusculum F. Muell. et Tate—Subshrub, on sandbank; rare.

Solanaceae

Datura leichhardtii F. Muell.—Strong annual, in creek sand.

Nicotiana excelsior J. M. Black—Tall herb, on rocky slopes.

velutina H. M. Wheeler—Infrequent, on wet sand.

Solanum ellipticum R.Br.—Perennial, on slopes and on valley floor.

quadriloculatum F. Muell.—Ditto.

Scrophulariaceae

Stemodia viscosa Roxb.—Perennial in rock crevices and in wet sand on valley floor; rare.

Bignoniaceae

Pandorea doratoxyloa J. M. Black—Shrub on rocky slopes and walls.

Myoporaceae

Myoporum montanum R.Br.—Shrub, on rocky sides of valley and in sandy areas on valley floor.

Myoporaceae (Continued)

- Eremophila christopheri* F. Muell.—Shrub, on lower rocky slopes.
freelingii F. Muell.—Shrub, on rocky slopes only.
goodwinii F. Muell.—Shrub on lower slopes or on rocky ground.
latrobei F. Muell.—Shrub, mainly on rocky slopes.
longifolia (R.Br.) F. Muell.—Tall shrub, mostly in sand at base of rocks.

Rubiaceae

- Canthium attenuatum* R. Br. ex Benth.—Tall shrub or tree on rocky ground in valley; rare.
latifolium F. Muell. ex Benth.—Tall shrub on rocky ground.

Cucurbitaceae

- Melothria maderaspatana* (L.) Cogn.—Scrambler or vine, on valley floor.

Campanulaceae

- Isotoma petraea* F. Muell.—Perennial herb, at base of rocks; rare.

Goodeniaceae

- Scaevola ovalifolia* R.Br.—Perennial, usually in sandy loam.

Brunoniaceae

- Brunonia australis* Sm.—Small herb, in sand.

Compositae

- Bidens bipinnatus* L.—Herb, in sand on valley floor; rare.
Brachycome blackii G. L. Davies—Perennial on shaded lower rock slopes; rare.
Calocephalus platycephalus (F. Muell.) Benth.—Annual, on sandy valley floor.
Calotis hispidula F. Muell.—Common annual on slopes and on valley floor.
latiuscula F. Muell. et Tate—Annual, in creek sand.
Helichrysum bracteatum (Vent.) Andr.—Annual daisy in sand.
thomsonii F. Muell.—Perennial herb, usually high on rock walls; rare.
Helipterum florihundum DC.—Annual, mainly in sand.
tielkensis F. Muell.—Annual, in sand on valley floor.
Myrsocephalus stuartii (F. Muell. et Sond.) Benth.—Annual, in sand only.
Pluchea rubelliflora (F. Muell.) Druce—Perennial herb, under rock shelf.
squarrosa Benth.—Perennial herb.
Pterigeron odoratus (F. Muell.) Benth.—Herb, in sand.
Pterocaulon sphacelatum (Lab.) F. Muell.—Herb, in sand.
Senecio gregorii F. Muell.—Fleshy annual in sand on valley floor.
lautus Sol.—Annual in sand on valley floor.
Sonchus uleraceus L.—Annual, in creek sand mainly.
Vittadinia scabra DC.—Herb, rare on sand on flat rocks.
Wedelia verbesinoides F. Muell. ex Benth.—Subshrub, on rocky ground on slopes and valley floor.

REFERENCES

- Giles, E. (1889)—*Australia Twice Traversed*.
 Kempe, H. (1879-80)—Plants Indigenous to the Neighbourhood of Hermannsburg. *Trans. Roy. Soc. S. Aust.* 3: 129-137.
 ———, H. (1881-2)—*Ibid.* 5: 19-23.
 Tate, R. (1896)—*Report of The Horn Expedition to Central Australia; Botany*.

REVIEW OF SOME RECENT BIRD LITERATURE

By N. A. WARFIELD

During past months several publications have appeared on the subject of Australian birds. In the main, these are new editions of books already familiar to ornithologists, in which connection one might comment that the appearance of such is an indication that preceding editions proved popular.

It was less than two years ago, in the *Victorian Naturalist* of June 1957, that the fourth edition of A. H. Chisholm's *BIRD WONDERS OF AUSTRALIA* was reviewed. Now the publishers, Angus & Robertson of Sydney, have forwarded a review copy of the fifth edition. This contains additional material on such subjects as birds "anting" themselves, the leaf-stitching of *Cisticola*, the Fantail-Warbler, and the habit of some birds of building nests near those of wasps. *Bird Wonders of Australia* is certainly a "best-seller": it runs to 240 pages, plus 36 pages of photographic reproductions and a frontispiece in colour. The price is unchanged at 27/6.

TASMANIAN BIRDS, by Michael Sharland, was published first in 1945, and the new edition is a greatly improved production. A stiff cover has replaced the somewhat unsatisfactory one of the previous volume, and the new book, though much bulkier, is still of convenient pocket size. Michael Sharland, who is now Superintendent of Scenic Reserves and National Parks in Tasmania, has for many years been intensely interested in Natural History, particularly of the Island State. This factor, and his journalistic training, have equipped him admirably for the authorship of a nature book for field use. The publication deals individually with all the land and sea birds known to occur in or about Tasmania, it comprises 175 pages of text matter, 12 of half-tone reproductions and a coloured frontispiece. The book is priced at 21/- and can be thoroughly recommended.

The ninth edition of J. A. Leach's *AUSTRALIAN BIRD BOOK* has been on our bookshelves for several months. The title first appeared in 1911, and over the ensuing sixteen years it ran to seven editions. Its author died in 1929. It was an ideal volume, of pocket size, comprehensive of the birds of Victoria—with a fund of data about each species, everyone of them illustrated in black-and-white and with most common ones in colour, too.

Charles Barrett edited the eighth edition. He added details of all extra-Victorian birds known in the Commonwealth, and the half-tone plates were omitted. In many ways this was not as useful, at least to Victorians, as the earlier editions had been. The lack of most of the original illustrations, coupled with the greater number of species dealt with in the text, made the task of identification rather difficult.

For some years, the late P. Crosbie Morrison had worked on the revision and rewriting of this book, and the ninth edition appeared shortly after his death. He redrafted the text matter of a little more than half the volume—the large order of Perching Birds remains more or less as Leach and Barrett had it—and we are now confronted, when scanning the pages, with handy headings such as "Gulls, Terns and Shorebirds", "More Shorebirds, The Waders", "The Duck Family", and so on.

Many of the present illustrations certainly provide the key to field identification of the species they represent; but alas, this cannot be said of all of them. It is gratifying to see the Lyrebird with its tail in a normal display position at last, but it is somewhat of a jolt to note that both the cuckoos on the same page are standing up on their legs—as individuals of this group never do! One looks askance, too, at, for instance, the colours of the head of the Fairy Martin, the back and cheeks of the Grey Thrush, and the crown of the Tawny-crowned Honeyeater. One notes the reddish brow of the White-throated Treecreeper, which bird, like the Crescent Honeyeater, is down on the ground!

And it is certain that nobody will ever identify in the bush the Helmeted Honeyeater that is illustrated. As colour reproduction is so costly, it is to be regretted that these ones were not made of an appropriately high standard.

Otherwise, the book is excellent and is the only really adequate field guide available for the average person interested in identifying and learning something of the birds to be seen about the Australian countryside.

The publishers of *An Australian Bird Book* are Whitecombe & Tombs; it measures 7½ by 5 inches, contains 224 pages, and it is priced at 32/6.

The Bird Observers Club, Melbourne, published a second edition of H. T. Cordon's GUIDE TO THE HAWKS OF AUSTRALIA about a year ago. The booklet appeared first in 1949, and the more recent issue has two useful additional pages of illustrations. The author is Curator of Birds at the South Australian Museum and he has edited the *South Australian Ornithologist* for many years. It is his 24 accurate drawings of hawks in flight—from beneath, as one usually sees them—that makes the *Guide to the Hawks* a "must" for those interested in birds.

Also, the B.O.C. has published the first number of the *Australian Bird Watcher*. This has been edited by Roy P. Cooper, and it is intended that it will be issued at intervals of some months as a permanent periodical. The major articles are on Mountain Thrush, Common Bronzewing, Wedge-tailed Eagle, White-winged Chough and Bird Banding. There are three good quality illustrations and though the size is not large, one cannot but commend it as an example of pioneering by a very progressive natural history club. The price is 5/-.

The B.O.C. publications are obtainable from the Hon. Assistant Secretary of that Club, 10 Nicholson Street, Hawthorn, E.3, Victoria.

BLUE CICADAS

The National Museum of Victoria was fortunate in receiving a few weeks ago, two "blue" colour varieties of the common Green Monday Cicada (*Cyclochila australisica* Don.) Until nine years ago the story of the finding of a "Blue Cicada" was considered to be a myth; however, a very interesting record came to light in 1950 when a blue colour variety of the Large Bladder Cicada (*Cytosoma saundersi* West.) was discovered near Montville on the Blackall Range in southern Queensland. Its discovery was reported in the Nature Notes in the Queensland *Chronicle* of July 25, 1950, and I cannot do better than quote, *inter alia*, the facts as set out in that article.

Mr. Cedric Deane (late of Melbourne) who is the Curator of the Rotlley Entomological Museum at Montville, Queensland, received a knock at his door one day, and a nearby neighbour, in the person of Mr. Archer Broughton, was standing at the threshold holding a jar in which was a beautiful blue specimen of the Large Bladder Cicada. Mr. Deane was greatly astonished to see such a thing and could hardly believe his eyes having considered that the stories he had heard in the past about people finding blue cicadas were purely mythical. The specimen had been captured about two and a half miles from Mr. Deane's property, and all efforts were made to keep the previous specimen alive in order to see if it would retain its blue colour. The colour persisted even after it died, and has remained ever since.

Mr. Deane recently sent me a copy of the article in the *Chronicle* because he knew that I am very interested in Australian cicadas, and within a fortnight of receiving it, a blue specimen—a female—of our common Green Monday was sent to the Museum by a lady from South Yarra. Within a few days another specimen, also a female, was received from a boy living at Armadale!

When the Queensland specimen was received by Mr. Deane, a letter was promptly sent to Mr. Anthony Musgrave, the Curator of Entomology at the

Australian Museum, Sydney, announcing the capture of the blue colour variety of the Large Bladder Cicada. Mr. Musgrave's reply contained the following remark: "We have no examples of this insect in our collections, and I have not found any reference to a blue phase in literature." Yellow colour varieties of the Bladder Cicada and our own Green Monday are not uncommon, and there is a very pretty variety of our species in which the ground colour is yellowish-brown, the head and thorax are marked with black, and the dorsal surface of the abdomen is black.

Our two blue specimens are normal in size, and the entire body, including the femora and roxae of the legs and veins of the wings, is a beautiful turquoise blue. The tibiae and tarsi are brown and the tips of the terminal claws black. The ocelli in normal specimens are red-vitreous, but in the blue specimens almost clear vitreous slightly tinged yellowish-blue.

The present summer has been, and still is, a good "cicada season"; about every seven years *C. australasiae* appears throughout southern Victoria in exceptional numbers. This has led observers to believe that the life cycle of this insect occupies seven years, but this has yet to be proved. It has been established, however, that the life cycle of one North American species covers a period of seventeen years, yet the adult insects of both the American and our own species live for only about three weeks.

A. N. BURNS, Curator of Insects
National Museum of Victoria

BOTANY GROUP

At the meeting of this Group on February 13, Mr. A. J. Swaby gave a talk entitled "The Structure of a Tree". This dealt with the structure and functions of roots, stems, leaves and flowers. A series of photographic slides, kindly loaned by the Burnley School of Horticulture, assisted considerably in clarifying the text of the lecture.

On March 20, Miss Colline Carberry showed a series of colour slides of Victorian flora, dealing particularly with the plants of the northern Mallee and of the auriferous hills about Taradale in central Victoria.

MICROSCOPICAL GROUP

Fourteen members were present at the Group Meeting on March 18, when Mr. R. Lukey addressed the Group on the subject of Moulds and Fungi. By means of a practical demonstration, he showed how moulds were grown in sterile tubes, then stained and mounted for microscopical examination.

For the Group Meeting on April 15, members are requested to bring their instruments for use in exhibiting crystal mounts. For details, see under "What, Where, and When".

LARGE-BILLED SCRUB-WREN RECORD

Referring to the article on this bird, in the February issue of this journal (*Vict. Nat.* 75: 153-8), John L. McKean points out that no cognizance was given to one additional published record of the species. The bird is reported as having been seen, by members of the Bird Observers Club, at Fernshaw (Ref. *The Bird Observer*, No. 310—September 1957). This locality is in the Yarra River valley, about six miles south-east of Toolangi, one of the places from which the species had been reported previously.

—N. A. WAKEFIELD

ERRATUM

In *Vict. Nat.* 75: 146, line 33, for "Jean Matheson" read "Elizabeth M. Matheson".

BOOKS FOR SALE

The following are available for purchase:

Victorian Naturalist—Vols. 17 to 57, individually bound, spine lettered.

Vols. 19 to 74, variously bound or unbound.

Vols. 2, 7, 9, 16 and 34, each bound.

Southern Science Record—Vol. I, Nos. 1, 3, 4, 5, 7.

Wombat—Vol. II, Nos. 2, 5; Vol. III, No. 3; Vol. IV, No. 4.

Geelong Naturalist—First Series: Vol. III, No. 1; Vol. IV, No. 10; Vol. V, Nos. 1, 3, 4; Vol. VI, Nos. 1, 2, 3, 4.

Further details may be obtained from the Honorary Editor.

MUSICAL ANALYSIS OF THE LYREBIRD'S SONG

In K. C. Halafoff's article of this title in the preceding issue of the *Vict. Nat.* (March, 1959), the following corrections should be made:

Page 170—In the text-figure, the sign $\frac{1}{4}$ should precede the fifth bar of "Stanza"; the second note of the first version of "Rosella's Triple Bell" should be an semiquaver, not a quaver; and the first note of the first Pilot-bird call should be a quaver, not a crotchet.

Page 172, line 30—Read "melody" instead of "narrative".

WHAT, WHERE AND WHEN

F.N.C.V. Meetings:

Monday, May 11—"Reptiles", by E. Rotherham.

F.N.C.V. Excursions:

Sunday, April 19—Begley's Bridge, Kallista. Leader: Mr. Fairhall. Take 8.50 a.m. train to Ferntree Gully, then bus to Begley's Bridge. Bring one meal.

Saturday, May 2—Studley Park. Leader: Mrs. Osborne. Meet at Hawthorn Bridge at 2.30 p.m.

Sunday, May 10—Geology Group excursion to the Anakies. Leader: Miss Carolan. Travel details at Group Meeting.

Group Meetings:

(8 p.m. at National Herbarium, unless otherwise stated.)

Wednesday, April 15—Microscopical Group. "Crystals Under the Microscope—How to Grow and Mount Them", by Dr. Wishart and Mr. P. Genery. Mr. Middleton will project slides with Polarizing projector.

Friday, April 17—Botany Group. Subject: Bushland Films of New South Wales. Speaker: Mr. Tinckham.

Monday, May 4—Entomology and Marine Biology Group. The meeting will be held in Mr. Strong's rooms in Parliament House. Enter through private entrance at south end of House.

Wednesday, May 6—Geology Group. Subject: Rock Textures. Speaker: Mr. D. McLines.

Preliminary Notice:

Sunday, May 31—Parlour-coach excursion to Point Henry and the Eastern Park Nursery at Geelong. Coach leaves Batman Avenue at 9 a.m. Fare, 16/-. Bookings with excursion secretary. Bring two meals.

—MARIE ALLENDER, Excursion Secretary
19 Hawthorn Avenue, Caulfield, S.E.7

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