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PROCEEDINGS

About 120 members and friends were welcomed by the President, Mr. Baker, to the General Meeting held in the National Herbarium on April 4. Mrs. Margaret Fletcher and Mr. E. R. Allan were elected as Ordinary Members of the F.N.C.V. and, in welcoming them to the ranks of the Club, the Chairman remarked that Mrs. Fletcher was a niece of the late Donald Macdonald.

The speaker for the evening, Mr. Graham Pizzey, was then introduced, and he treated the gathering to an excellent series of 35 mm. slides, many in colour, dealing with Victorian birds. Conspicuous amongst them were many unusual pictures of the Wedge-tailed Eagle taken at Werribee Gorge during the nesting season, and of Gannets at the now sadly depleted rookery at Cat Island in Bass Strait. A vote of thanks was moved by Mr. E. S. Hanks and seconded by Mr. Crosbie Morrison, the latter remarking that many hitherto unknown aspects were shown in the pictures of the eagles.

Among the exhibits was material of *Laportia gigas*, the Giant Stinging Tree, shown by Mr. K. Atkins from the Melbourne Botanic Gardens. The species is common in scrublands of eastern Queensland and New South Wales.

The meeting was adjourned at 10.15 p.m. for the usual conversazione and examination of exhibits.

BACK NUMBERS OF "NATURALIST" URGENTLY NEEDED

The F.N.C.V. Council wishes to make up for sale a number of sets of *The Victorian Naturalist*. For this purpose copies of the following are urgently needed:

Vol. I—Nos. 2, 3; Vol. II—3-12; Vol. III—2-4, 6-10; Vol. IV—1-4, 6, 8, 10; Vol. V—1, 2, 4, 6, 8, 9; Vol. VII—1-4, 6-8, 10-12; Vol. IX—1-12; Vol. XX—11; Vol. XXXII—1, 2, 5; Vol. XXXIII—8, 9, 11, 12; Vol. XXXVII—10, 11; Vol. XLI—2, 4; Vol. XLII—2, 8, 12; Vol. XLIII—1-4, 7, 10; Vol. L—10, 12; Vol. LI—1; Vol. 61—7; Vol. 62—9-12; Vol. 63—1; Vol. 64—2, 3, 5, 7, 8.

If Club members or other readers of the journal have any of these numbers and no longer require them, the Council would be greatly favoured to have them returned, either as a gift or at half the original price. Such returns may be made either in person (at Club Meetings) or by post to "Hon. Editor, *Victorian Naturalist*, P.O. Box 21, Noble Park, Victoria". The return of any other copies of *The Victorian Naturalist*, no longer needed by their holders, would be appreciated by the Council; and arrangements can be made for large parcels of such to be picked up from donors living in the Melbourne area.

PORT DAVEY, SOUTH-WEST TASMANIA

By Mervyn Davis, Black Rock.

Three hundred and twelve years had elapsed between Abel Tasman's approach to Tasmania's southern shores under sail in 1642 and our descent on to Cox Bight Beach in an Auster aircraft, piloted by Lloyd Jones, during March of last year.

South-West Tasmania is an approximate area between Macquarie Harbour on the West Coast and Recherche Bay on the South Coast. It is bounded from Macquarie Harbour towards Adamsfield and down the eastern side of the Hartz Mountains to Ramsgate. This region is still remote to all, but accessible to some by water, land or air. From the eastern shelter of Recherche Bay to the haven of Port Davey, the sailor from Hobart faces the hazard of the South-West Cape, lying in the path of the Roaring Forties. By land, early survey tracks are open to the experienced walker, usually with aid from sea or air. By air, a skilled pilot may land and take off on beaches at Cox Bight and Kelly's Basin, but only under favourable weather conditions.

The whaling industry first brought settlement to Port Davey. Later the Huon Pine industry at Port Davey and tin mining at Cox Bight, Moulter's Cove and Moth Creek further increased the fluctuating population. The coast line and adjacent islands are mapped. The Fisheries and Mines Departments have undertaken surveys. But today, all that remain of past activities are a few ruins, some scattered reports, and the sketch map of South-West Tasmania, issued by the Mines Department in February 1953. Three of the reports have been published in this journal for the years 1875, 1927 and 1940.

It is a long time since Tasman passed by, and still only eight people live in this area of southern Australia. Three of them wrest a living from it; one from the sea, and two from the earth. The whales pass by travelling west, and the Huon Pines are re-established. The aboriginal middens, the ship wrecks and ruins tell their silent story, while the romance of life there today echoes the romance of the past.

In all this magnificent area of mountain ranges and extensive waterways there are only two permanent dwellings. One, a small lined, timbered house on Bond Bay, off Port Davey proper, is the home of a crayfisher, Mr. Clyde Clayton, and his wife, who spend much of their time aboard their boat, the *Arlie D.* The second settlement, on Moth Creek, off Melaleuca Lagoon, at the eastern end of Port Davey beyond Bathurst Harbour, is more extensive. This is the home of a tin miner, Mr. Dennis King, his wife and two baby daughters, and his father, Mr. Charles King. In a nearby hut lives another tin miner, Siguard (Fred) Edwardsen, after whom Edwardsen Creek and Norway Range were named when

he was a member of geological survey parties about 1933-4 and 1936.

The Kings' house on Moth Creek, known as "Melaleuca", resembles a miniature aircraft hangar. The roof is curved for protection from the high winds, and the whole building is set into the bank for protection from the south-west. They have refrigeration, electric light and hot water. Their mail, fresh meat, butter, etc., are dropped by plane. They have a sailing cruiser fitted with a powerful diesel engine, and a large petrol-driven dinghy. Wood fuel is carted by water from the Bathurst Harbour area, and peat is cut from the button-grass plain about the settlement, where *Baeckia leptocaulis* is well represented. There are two diesel engines at the mine workings, one 20 horse-power and the other 40. In late March of 1954 a caterpillar tractor was landed from the *Taorah* at the Bathurst Harbour end of Melaleuca Inlet to facilitate Mr. King's tin mining activities. This is the first piece of movable machinery in South-West Tasmania.

Both settlements have wireless receiver-transmitter sets based on Hobart Radio, as do most outlying settlements as well as small craft around the Tasmanian coast. The Claytons keep temperature readings when on land, and Mr. King maintains a meteorological station. Weather seems always to be threatening from somewhere, and one's weather eye is ever lifted. The barometer completely dominates life in South-West Tasmania. Having a shorter land passage from the west, the weather at Bond Bay is milder than that at Melaleuca settlement. In the latter case, winds encounter the South-West Cape Range, causing a high rainfall area on the eastern side of this barrier. The whole area has a high rainfall, Melaleuca up to 80 inches per annum. With the upper Davey River, and an area south of Macquarie Harbour, this is the highest in South-West Tasmania. The South-West Cape, Melaleuca settlement and Mt. Counsel to the east are subjected to gales attaining 90 miles per hour.

Quartzite predominates in the outcrops of the area, Point Eric, in the centre of Cox Bight, being the only visible granitic formation. Some mountains show sandstone formations, mainly on the eastern slopes. There is a diabase capping on the higher mountains such as Anne, Snowy's, Picton's, Pinder's Peak and Precipitous Bluff. As we flew over the area Mr. Jones pointed out that the New River has ceased to flow from the pool below the falls to the New River Lagoon. He presumes that the stream now follows an underground course through the underlying limestone formation, as the lagoon level is unchanged. This alteration occurred within six months prior to our visit in March.

Mountain ranges seen from waterways and the air carry no large shrubs or trees except in the sheltered gullies between the spurs. Eastern slopes are most sheltered from the prevailing north

to north-west winds, although the presence of forests in gullies with a westerly aspect is considered to be due to better soil conditions. Dennis King suggests that these timbered areas occur where clay slates are present on the surface, and possibly further mineral material is becoming available by leaching from the underlying rock. Quite abrupt cessation of the forest occurs within a small distance, about 20 feet. Good examples can be seen at Crossing River Valley. There are large areas of black schist which bear associations similar to those on quartzite.

Vegetation on the quartzite of South-West Cape is prostrated and toughened under the influence of wind. Trees normally 15 feet high are reduced to ten inches above the ground, following any shelter in rock crevices on crests of South-West Cape. Soil at water level is bound by *Poa poaeformis*, and the upward razor edge of the Point for some hundreds of yards, at length surmounted by a round knob, is clothed with gnarled prostrate *Leptospermum sericeum*, locally called "Manuka".

The button-grass (*Gymnoschoenus sphaerocephalus*) association reaches a climax of development in South-West Tasmania, and extends from alpine conditions above 2,000 feet to sea level, in the latter case usually fringed with *Melaleuca*, *Eucalyptus* and *Leptospermum*. Many of the same species occur throughout this altitude line, but a high degree of habit variation occurs at different levels.

The only rabbits west of the Iron Bound Range are on Breaksea Island, where the whalers released them for food. The country is too wet and mountainous, and Mr. Edwardsen says that those remaining on the island are stunted and struggling for survival. Large mutton-bird rookeries are established on Breaksea Island.

It is hoped that this preliminary information of conditions there today will be followed later by a more detailed account of past and present life in the area, together with some account of the flora from Cox Bight to Payne Bay, Port Davey, by Mr. J. H. Willis, from material housed at the National Herbarium of Victoria, including my collections during Mrs. Ray Gabriel's and my eleven-day visit.

SYSTEMATIC NOTES ON VICTORIAN MOSSES — 5

By J. H. Willis, National Herbarium of Victoria

I.—Two Hitherto Undescribed Species

TREMATODON ALPINUS J. H. Willis:

Species nova in subgenere-*Eutrematodante* et Sect. Bba (Brotherusii, 1924) inserenda—ob collum, quod quam theca vix longius est—sed unica in statura minuta atque peristomii dentibus fragilibus irregulariter furcatis.

Plantæ gregariæ, pusillæ (in altitudine tota quam 6 mm. breviores), in terra humida saepe subulosa alpium crescentes. *Caules* graciles, circiter 2 mm. longi. *Folia* humida erecto-patentia (sicca irregulariter subtortuosa), circ. 1.5 mm. longa, obsparsulata, basin versus lata (0.2-0.4 mm.), tum ad circ. 0.5 mm. e cauli in subulam raptim angustata, ad apicem ipsum obtuse dentata; folia perichætialia similia sed subulis brevioribus. *Costa* prominens, ca. 45 mic. lata, subulam omnino implens. *Cellulæ* laminæ basin versus circ. 60 mic. longæ anguste rectangulares hyalinæ (cellulæ alares haud diversæ), laminæ ad marginem superum subquadratæ circ. 10 mic. latæ. *Seta* 1.5-2 mm. longa, sensim flexuosa vel subarcuata, comparate robusta, lævis. *Theca* deoperculata circ. 1.5 mm. longa (collum comprehendens), 0.3-0.4 mm. lata, suberecta vel parce arcuata, lævis, luteoli et circum ostium rufescens; pars fertilis 0.5-0.8 mm. longa, subtus in collum æquilongum raptim angustata. *Peristomii dentes* fragiles, fugientes, circ. 150 mic. longi, irregulariter 1- vel 2-ramosi, interdum 3-furcati, perminute papillari, annuli cellulæ conspicuæ circ. 10 mic. latæ, subangulatæ. *Operculum* circ. 0.7 mm. longum, conico-rostratum (rostrum sæpe longum, obliquum), luteolum et circum basin rufescens. *Calyptra* etiam circ. 0.7 mm. longum, cucullato-mitriformis. *Sporæ* comparate magnæ, 24-30 mic. diam., fulvæ, manifeste conferte verruculosæ.

VICTORIA: Bogong High Plains—at ± head of Middle Creek N.E. of Mt. Cope, growing in "hanging" sphagnum bog amongst wet granitic boulders with *Celmisia sericophylla*, ca. 5600 ft. (*Coryl Skewes*, 21 Jan. 1952—Type, No. 200 W. in Herbaria MEL, G. O. K. Sainsbury, E. B. Bartram, D. G. Catcheside, Coryl Skewes, and the author); Bogong High Plains—on bare damp earth between basalt rocks about 1 mile S.E. of Mt. Jim, ca. 5700 ft. (*J. H. Willis*, 1 Feb. 1949—No. 83 W. in Herb. MEL, author and G. O. K. Sainsbury)

NEW SOUTH WALES: Mt. Kosciusko amongst *Poliopilum australe* on wet sandy soil (*W. Forsyth*, No. 189, Jan. 1899—Type "*T. pygmæus* Broth. *nomen nudum*, in Herb. NSW).

This moss was recorded by me, but without description, in *Vict. Nat. 68*: 157 (Jan. 1952). Since then, good material has been collected by Miss Coryl Skewes on the Bogong High Plains, making possible the formal diagnosis (as given above). I had been inclined at first to take up Brotherus's *nomen nudum*, published by A. Burges in *Proc. Linn. Soc. N.S.W. 57*: 240 (1932); but the Mt. Kosciusko collection upon which the binomial "*T. pygmæus*" was based, is unsatisfactory for type material. Moreover, the epithet "*pygmæus*" is not particularly apt in a genus of 68 species (acc. Brotherus, 1924) among which such names as *T. humilis*, *T. pygmæolus* and *T. tenellus* are already in use. There are no epithets at present signifying an alpine habitat, so *T. alpinus* has been chosen as appropriate and simple.

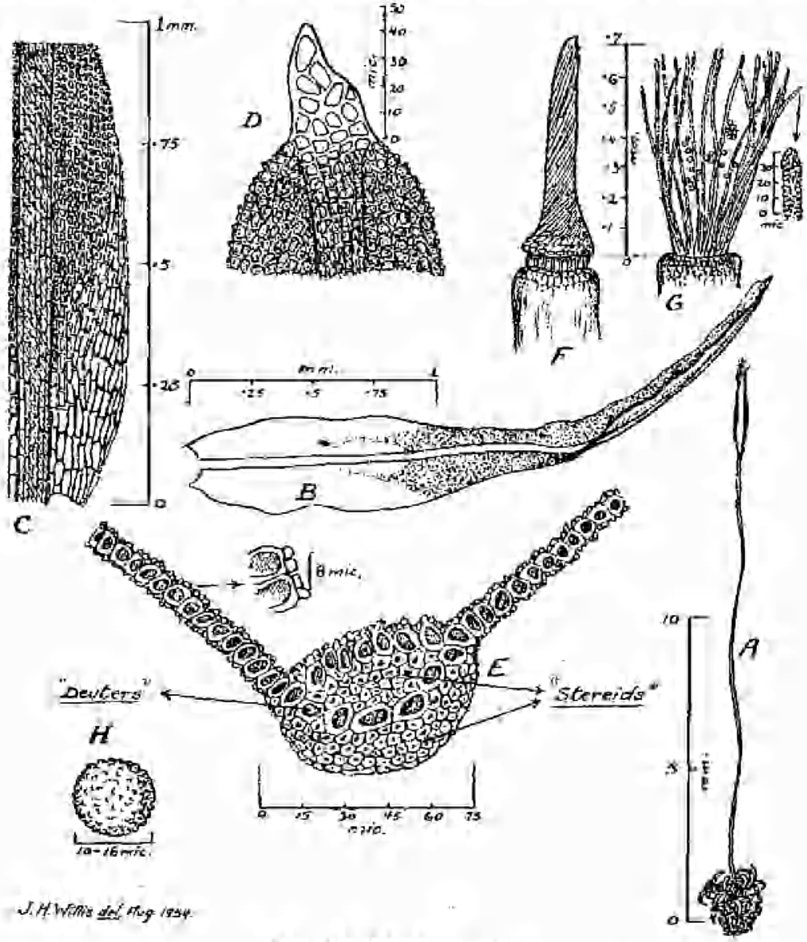
The new species has no close congeners, but belongs to Brotherus's (1924) section Bba of the subgenus *Eutrematodon*, i.e. with a thecal neck scarcely any longer than the capsule itself. As far as we know, it is unique in this group by reason of its minute size (less than 6 mm.) and very fragile, irregularly forked peristome teeth. [*See* illustration on page 10, figures I to N.]

In the *Victorian Naturalist 68*: 157 (Jan. 1952) I recorded also the occurrence of an unknown *Trematodon* species on the Baw Baws. Dr. R. Melville collected the same moss near "The Hump" on Mt. Buffalo at about 4,600 ft. (No. 2653, 31 Dec. 1952), but the fruits are very immature. It is close to *T. suberectus* Mitt. and may represent a small form of that New Zealand species—without ripe capsules in good condition one could not venture a positive opinion.

TORTELLA DAKINII J. H. Willis;

Species nova ex affinitate *T. cirrhatæ* (Hampe) Broth. et *T. knightii* (Mitt.) Broth., sed ab utraque foliis multo minus acuminatis, thecis angustioribus (circiter 3 x 0.3 mm.), sporis parce majoribus (circ. 13 mic.) differt.

Plantæ dense gregariæ, in rupibus (Silurium) duris umbrosis. Caules erecti, circiter 1 cm. alti. *Folia* humida erecto-patentia, carinata, paulum concava (sicca involuta contorta, superioribus juvenibus fortiter cirratis), circ. 3 mm. longa, basin versus usque ad 0.3 mm. lata, anguste lineària vel lineari-lanceolata, apice subacuta vel obtuso-mucronata, marginibus planis integris; folia perichætialia similia, sed paulum breviora latioraque. *Costa* valida, breviter excurrens, circ. 60-70 mic. lata, secus superficiem dorsalem carinam lævem conspicuam formans; costæ sectio transversa cellulas parvas incrassatas ("*stereids*") in fasciis duobus exhibens, fascia ventrali ab annulo circ. 15



Tortella dakinii sp. nov.

A—Fruiting plant to scale. *B*—Form of an average leaf. *C*—Areolation at leaf base, with transition to small papillate cells. *D*—Apex of leaf. *E*—Transverse section of nerve. *F*—Summit of capsule, with operculum about to fall. *G*—Peristome. *H*—Spore.

cellularum magnarum laxarum ("*dentes*") inclusa. *Cellulæ* inferiores læves, pellucidæ, rectangulares, circ. 50 mic. longæ, ad basin folii aream hyalinam V-formem constituentes, ad circ. 0.75 mm. super basin in cellulas parvas (circ. 6 mic. latas) subquadratas obscuras perpapillatas mutantes; papillæ conspicuæ, obtusæ, 2-4 per cellulam; costa apice excurrens cellulis pellucidis circ. 10 mic. latis. *Seta* pergracilis, 1.3-2 cm. longa, nitida, rufescens. *Theca* deoperculata 2-2.5 mm. longa, 0.2-0.3 mm. lata, anguste cylindrata, ad ostium paulum contracta, erecta, lævis, castaneo-brunnea. *Peristomii dentes* erecti, subfiliformes, circ. 0.7 mm. longi, indistincte 2-flexi, pallide salmonicolores, minute papillosi, ad apices obtusi. *Operculum* erectum, anguste conico rostratum, circ. 0.7 mm. longum, ad apicem subobtusum. *Calyptra* anguste mitriformis, theca subæquilonga. *Sporæ* 10-16 mic. diam., parce sed distincte verruculosæ.

VICTORIA: Pound Bend, Warrandyte on shaded Silerian rocks of steep cliffs along Yarra River (*E. Dakin*, 19 Nov. 1951—TYPE, No. 170W, in Herbaria MEL, G. O. K. Sainsbury, E. B. Bartram, E. Dakin D. G. Catcheside, Coryl Skewes, and the author).

An autoicous moss, related to *Tortella cirrhata* (Hampe) Broth. of limestone formations across southern Australia and to *T. knightii* (Mitt.) Broth. of New Zealand and New South Wales, it differs from both in the far less tapering leaves, narrower capsules (about 3 x 0·3 mm.) and rather larger spores which average about 13 mic. in diameter. *T. cirrhata* differs also from the new species in its more contorted foliage (when dry) and darker, red peristome teeth with long-tapered apices. *T. knightii* has the pallid salmon-pink teeth with blunt apices of the new species, but they are even more slender and distinctly once or twice spirally twisted at maturity, while the hyaline V-shaped area at the leaf-base is more abruptly defined.

T. dakinii is known only by the single type collection, but there is ample material of it in good fruiting condition—a necessity for recognition of most species in this difficult genus. Both Messrs. G. O. K. Sainsbury, N.Z. (3/12/1951) and E. B. Bartram of Pennsylvania (26/1/1952), to whom I submitted examples, could not match the plant with any species known to them and suggested that I publish it as a novelty. The accompanying diagram indicates all important features of *T. dakinii*, so it is not considered necessary to supplement the Latin diagnosis with any detailed description in English.

With its elongated, bright brown capsules and salmon-coloured peristome brush, the new moss is a handsome object and a noteworthy addition to the bryological flora of the State. I have named it after the discoverer, Mr. Edward Dakin, as a tribute to his untiring energy in collecting mosses; an enthusiastic member of the Victorian Field Naturalists Club since 1918, Mr. Dakin has botanized over much of the eastern highlands, adding materially to our knowledge of the bryophyte flora, and he has prepared a detailed list of mosses found in the vicinity of Warrandyte.

II.—A New Combination

DITRICHUM RUFO-AUREUM (*Hampe*) *J. H. Willis* comb. nov.

Angstræmia rufo-aurea Hampe in *Linnæa 30*: 627 (1860)—Vic. type. *Dicranella rufo-aurea* (Hampe) Jæg. in *Ber. St. Gallen Naturw. Ges.*: 379 (1872).

VICTORIA: Cobboras Mts.—on porphyritic rocks near the summit, 5,000 ft. (*F. Mueller*, Jan. 1854—TYPE, in Herb. BM, MEL.); Bogong High Plains—intermingled with *Conostomum pusillum* in a "hanging" sphagnum bog at a head of Middle Creek N.E. of Mt. Cope, ca. 5,600 ft. (*Coryl Skewes*, 21 Jan. 1952—with immature capsules); Mt. Buller fruiting abundantly in a hillside sphagnum bog at "The Springs", on wet shaded earth at edge of tree-line, ca. 5,500 ft. (*J. H. Willis* and Dr. *R. Melville*, 9 Mar. 1953—in Herb. MEL, K No. 3276, and author).

NEW ZEALAND: Styx River, Rock and Pillar Range, Central Otago, South Island (*G. M. O'Malley*, 29 Dec. 1951—Herb. G. O. K. Sainsbury No. 16352, and author).

This alpine species, until now known only by the type collection (Cobboras Mts., Vic.), bears an unfortunate epithet. In colour it is lively green, not "reddish-gold" (except perhaps in the dead basal leaves) and one concludes that the original description was based upon discoloured material. Since Jaeger transferred it to the genus *Dicranella* in 1872, succeeding bryologists have been content to let it so remain the habit strongly suggested *Dicranella*, albeit capsules were immature in the type and no peristome details were given in Hampe's diagnosis. Miss Cotyl Skewes made the second Australian collection of this little hair-like moss on the Bogong High Plains—50 miles west of the type area—in January 1952, but again fruits were too immature to show peristome structure. On 9th March 1953, in company with Dr. Ronald Melville (of Royal Botanic Gardens, Kew), I found excellent fruiting material at Mt Buller, and, for the first time, an examination of the peristome became possible. The teeth were found to be amber-brownish, conspicuously and sharply papillate, and *irregularly perforated*—clearly those of a *Ditrichum*, and not of a *Dicranella*.

I am much indebted to Mr. G. O. K. Sainsbury (Wairoa, N.Z.) for pointing out the true affinities of the plant and encouraging me (29/5/1953) to make the necessary new combination under *Ditrichum*. At the same time, Mr. Sainsbury was enabled to solve the mystery of a recent (1951) collection from the Central Otago district, southern New Zealand, which had been put aside as dubiously referable to *Ditrichum calcareum* (R. Br. ter.) Broth. He shared part of the collection with me, and we both agree that it cannot be separated specifically from *D. rufo-aureum*. Spores in the New Zealand material are brown, faintly dimpled and slightly larger (16-20 mic.) than in the Australian plant where they average about 15 mic. With such a widely extended geographical range, *D. rufo-aureum* is sure to occur in the alps of south-eastern New South Wales* and most probably will be found also on Tasmanian mountains. In Victoria it appears to be restricted to sphagnum beds at high altitudes, and Watts & Whitelegge's statement [*Supplement to Proc. Linn. Soc. N.S.W.*: 39 (1902)] that it occurs also "on the limestone at lower levels"—presumably along Limestone Creek north of the Cobboras—is open to question; I have not seen the collections of "F. v. M., Stirling et al." to which reference is made.

The removal of this species from *Dicranella* leaves the Victorian moss flora without a known representative of that genus, although six species are presumed to occur in New South Wales (more have been recorded) and seven are in New Zealand. I have prepared scale drawings to show essential features of *Ditrichum rufo-aureum* which has never been depicted before. [*See* accompanying full-page illustration, figures O to U.]

* A recent (ca. Feb. 1954) mixed collection of bryophytes from moist stream banks in the Guthega Reservoir area, about 5 miles east of Mt. Twynam (Kosciusko plateau) and at some 5,200 ft. altitude, contained barren material that agrees vegetatively with *D. rufo-aureum*, this was placed at the disposal of the author by the Snowy Mountains Hydro-electric Authority under No. 1962, and it is to be hoped that capsules will be found in the area to substantiate this tentative record of the species for New South Wales.

III.—A *Bryum* New to Victoria and South Australia

BRYUM SUBCURVICOLLUM Broth. in *Proc. Linn. Soc. N.S.W.* 41: 590 (1916).

NEW SOUTH WALES: Apsley Falls, 10 miles E. of Walcha—on slate formation (*W. Forsyth*, No. 749, Oct. 1900—TYPE, in Herb. NSW).

VICTORIA: Gorge of Lower Glenelg River—forming large mounds around springs in the limestone cliffs at "Eaglehawk Bend", growing with *Cratoneuropsis relaxa* and *Distichophyllum microcarpum* and often heavily encrusted with lime (*J. H. Willis*, No. 126W, Oct. 1948—Herb. MEL, G. O. K. Sainsbury, E. B. Bartram, and author); "Dripping Rock" in same area (*Cliff. Beauglehole*, No. 3000, Jan. 1952—Herb. MEL, C. Beauglehole, and author), Swan Lake Falls, N.W. of Portland (*Cliff. Beauglehole*, Mar. 1950); Cape Schanck, Mornington Peninsula—under grove of *Melaleuca pubescens* just east of lighthouse, against running water from spring in limestone cliff (*J. H. Willis*, Feb. 1952—Herb. author).

SOUTH AUSTRALIA: Spear Creek, Flinders Range, N. of Horrock's Pass—barren specimens on wet rocks in the calcareous stream (*D. G. Catcheside*, No. 53.252, Aug. 1953—Herb. D. G. Catcheside, and author); Hindmarsh Valley Falls—barren samples on travertine under the main fall (*D. G. Catcheside*, Nos. 54.322 and 54.326, Dec. 1954).

Mr. Sainsbury, who made an exhaustive study of my Lower Glenelg collection, No. 126W., indicated its close affinity to (yet distinctiveness from) *B. curvicollum* Mitt.—a not uncommon moss in New Zealand, but as yet unknown by any Victorian specimen. Through the courtesy of Mr. R. H. Anderson (Chief Botanist at the National Herbarium, Sydney) I was able to borrow and examine the type collection of *B. subcurvicollum* Broth. from north-eastern New South Wales. It accords very satisfactorily in all essential details with No. 126W., and Mr. Sainsbury agrees with me that our Victorian material should be referred to this species. The same moss occurs also at Cape Schanck, Vic., at Hindmarsh Valley Falls, S. Aust., and at Spear Creek in the Flinders Range, S. Aust.—associated in each instance with springs in highly calcareous terrain. The range of the species is thus greatly extended from the single known and type occurrence near Walcha, N.S.W., viz., by 800-900 miles south-westerly (Glenelg River) and westerly (Flinders Range). Future records may be anticipated from intervening and other tracts of well-watered limestone country.

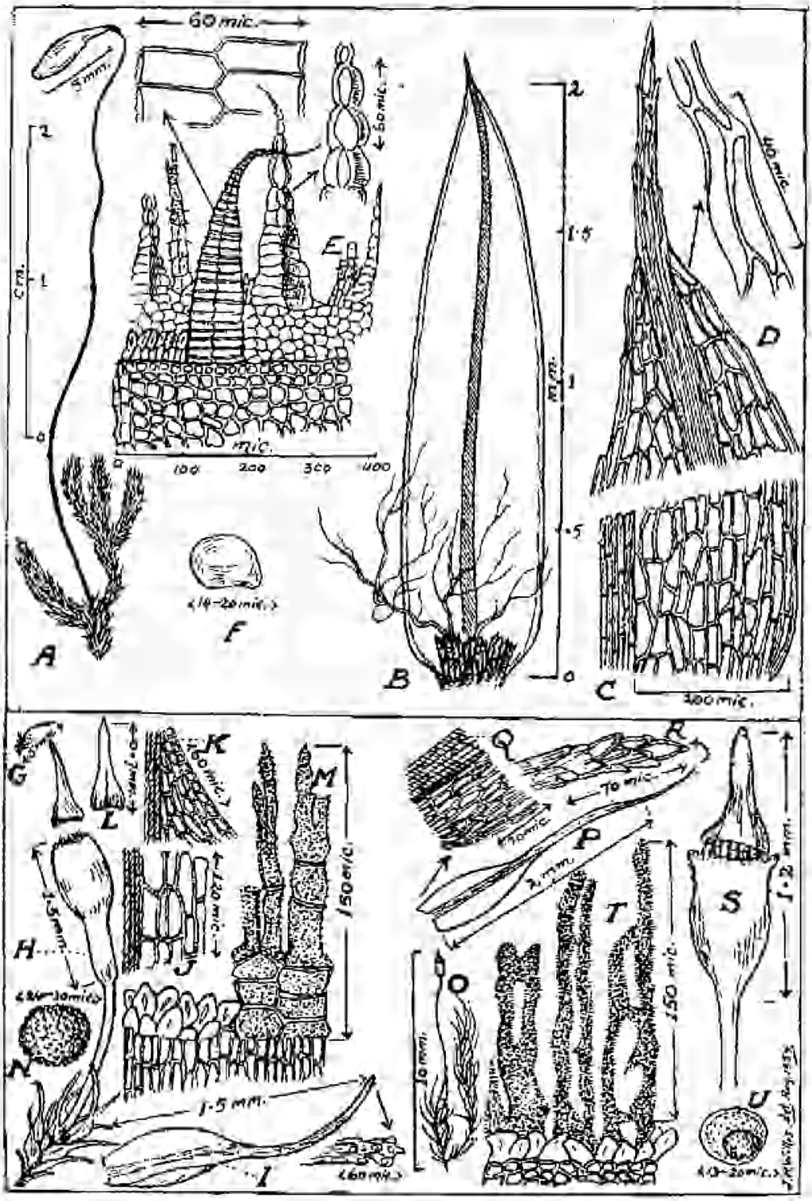
B. subcurvicollum is closely related to *B. curvicollum*, but differs in the usually long-excurrent nerves—not only in leaves of the fertile stems, but also in those of the long innovations—the constantly bordered leaf margins and generally more robust habit. Since this large, handsome, dioicous *Bryum*, with rigidly erect imbricate leaves, has never been illustrated previously, I have indicated its important features on the accompanying full-page series of drawings, figures A to F.

IV.—An Introduced Moss, Previously Unknown in Victoria

BRACHYTHECIUM ALBICANS (*Hedw.*) *Br. & Sch.*, 1853:

145 Noble Street, Geelong—a pest, replacing good turf in a lawn, and doubtless introduced (*W. J. Torr*, 3rd Jan. 1955—*det.* G. O. K. Sainsbury, 13/1/1955, from No. 271W. in Herb. author).

Mosses being capable of rejuvenation after prolonged periods of dormancy and their spores being so minute and easily transported, it is singular that only a very few alien species have become naturalized in Australia. *Barbula unguiculata* Hedw. is now recorded from lawns in a Melbourne suburb [see *Vict. Nat.* 71: 159 (Feb. 1955)], and L. Rodway (1912) recorded it from "on the ground, New Town", Tas., but G. O. K. Sainsbury (1953) queries this latter determination; *Aloina ambigua* (Br. & Sch.) Limpr. has appeared on a roadside bank near Marion, Adelaide, S.A. (Prof. D. G. Catcheside, July 1952), while *Eurhynchium prælongum* (Hedw.) Hobk. was recently found at Lymington on the Huon River, 45 miles S.W.



Details of Victorian Moss Novelties

(For key, see foot of opposite page.)

of Hobart, Tas. (Tasmanian Dept. Agriculture, Nov. 1951)—all boreal species, and the last also naturalized in New Zealand. The most recent and interesting example for Victoria is *Brachythecium albicans*, widespread on dryish sandy ground and in grassy places almost throughout the Northern Hemisphere. This plant is known also from several parts of New Zealand—chiefly in lawns or artificial pastures and almost certainly introduced, but Mr. Sainsbury found it to be also truly indigenous on the Tasman Glacier. W. Martin (1946) records it from Tasmania and Antarctica, upon what authority I do not know, but this Geelong occurrence is apparently the first one noted on the Australian mainland. *B. albicans* departs from the other, indigenous Victorian species in its slender myosuroid shoots (very little branched) and closely imbricate, erect, more or less plicate leaves.

V.—A Correction to Victorian Records of *Cratoneuropsis*

In the *Victorian Naturalist 68* 152 (Jan. 1952), all but the first two records—Mt. Disappointment and Omeo—which I gave for *Cratoneuropsis decussata* (Hk. f. & W.) Fleisch. should be transferred to the closely allied species *C. relaxa* (Hk. f. & W.) Fleisch., which differs in its less crowded branches, larger spreading leaves (*not* sharply and constantly decurved as in *C. decussata*). That is, all west Victorian material of the genus (including that from calcareous cliffs along the Lower Glenelg River and tributaries) is referable to *C. relaxa*, as are the three known South Australian collections—from Hindmarsh Valley Falls (D. G. Catcheside, Sept. 1953 and Dec. 1954) and Little Para River (O. Tepper, 1888). H. N. Dixon aptly remarked in his *Studies* on New Zealand mosses, p. 320 (1929), that the two species "are by no means always easy to separate". I have gathered typical *C. decussata* from swamps adjoining the north-west corner of Wilson Promontory National Park, near the northern end of the Vereker Range (Dec. 1951), and in Melbourne Herbarium there is a genuine example from King Island, Bass Strait (collected about 1870 by A. Neate); this would seem to be the only Tasmanian collection at present available in Australia, although J. D. Hooker's *Flora Tasmaniæ* (1858) cites one—under *Hypnum decussatum*—from a bog near the Derwent River at New Norfolk (A. Oldfield, No. 91). L. Rodway, in his *Tasmanian Bryophyta* (1914), has cast doubt on the Hookerian record as "possibly an erroneous identification", but he admits *C. relaxa*—from Forth River Falls. The only recorded locality for both species in New South Wales is Yarrangobilly Caves in the far south-east, where Rev. W. W. Watts made several collections of each in January 1906. Professor D. G. Catcheside, of Adelaide, in a recent letter (20/4/1955) to the author, expresses the opinion that there is really no clear-cut morphological distinction between the two, and that it would be preferable to regard them as ecotypes of a single species. The original figures (T.90: 1 and 2) in J. D. Hooker's *Flora Novæ-Zelandiæ 2* (1854) certainly look very similar; but I would not care to fuse these entities without examining the type specimens—all from the North Island, N.Z.

KEY TO ILLUSTRATION ON PAGE 10

Bryum subcuspicollum Broth.—*A*. Fruiting plant to scale; *B*. Form of an average leaf; *C*. Areolation at leaf base; *D*. Areolation at apex of leaf and excurrent nerve; *E*. Peristome details—annulus, outer and inner teeth, and processes of endostome; *F*. Spore.

Trematodon alpinus J. H. Willis *sp. nov.*—*G*. Fruiting plant (nat. size); *H*. Capsule; *I*. Form of average leaf, with tip enlarged; *J*. Areolation at leaf base; *K*. Areolation at summit of lamina; *L*. Calyptra; *M*. Peristome, with some cells of annulus on left-hand side; *N*. Spore.

Ditrichum rufo-aureum (Hampe) J. H. Willis *comb. nov.*—*O*. Fruiting plant to scale; *P*. Form of average leaf; *Q*. Areolation at leaf base; *R*. Cells of leaf tip; *S*. Capsule and operculum; *T*. Peristome, 16 perforated teeth; *U*. Spore.

INSECT VISITORS TO MELBOURNE

By A. N. Burns, M.Sc., F.R.E.S.*

The comparatively long and warm summer has been favourable for the appearance of several quite interesting species of insects not frequently seen near Melbourne. Normally such species are visitors from New South Wales, but with the continued mild weather over the past two months, several of them have been noted to be breeding near Melbourne this autumn.

During the latter part of January and early February, many specimens of the "Wanderer" or "Monarch" butterfly (*Danaida plexippus* Linn.) were seen flying in suburban gardens. Their appearance was soon followed by the advent of numerous larvae in gardens where the Swan plant (*Gomphocarpus fruticosus*) was growing. At the present time the adult butterflies are emerging from these larvae, and again we see these large and showy insects flying in our parks and gardens. A few examples of the "Lesser Wanderer" (*Danaida chrysippus petilia* Stoll.) have also been observed over the past couple of weeks. Odd specimens have even been seen flying in the streets of Melbourne!

Another rather rare visitor to Melbourne is the Chequered Swallowtail butterfly (*Papilio demoleus sthenelus* Macl.). This large and pretty species favours us with visitors only every few years. Normally it occurs more plentifully in the drier interior than near the coast, and it is common in New South Wales and Queensland. It flies rapidly and strongly, and it is difficult to capture; most of the specimens that we receive here are frayed and worn. This summer has apparently been favourable enough to enable *P. sthenelus* to breed in Victoria, for the writer captured a perfect specimen at Blackburn during the Easter holidays. This specimen was in such fine condition that it could not have flown far long nor over any great distance. The larvae feed on Citrus, Wild Lime (in the dry areas), and in Queensland on a wild Salvia-like plant with blue flowers. This butterfly has a rather remarkable distribution, being found in all States of the mainland of Australia, and throughout the Oriental region as far west as Persia.

During the past week or so specimens of the pretty little Small Grass Yellow (*Terias smilax Don.*) have been noted in Melbourne suburbs. This little butterfly does not visit us every year, and it is only every few years when favourable conditions exist that we see it. The wings are bright canary yellow with the apices of the forewings black, so it is a very conspicuous insect when fluttering close to the ground as it usually does. Its flight is rather weak, but it has the ability to dodge in a remarkable manner if pursued. Specimens taken by the writer during the last few days (at Blackburn) have been in perfect condition, which suggests that they bred in Victoria. The larvae have been bred on several species of Cassia (*Leguminosae*).

Yet another interesting Lepidoptera record for Melbourne is the large numbers of the Crimson Speckled Footman Moth (*Utethesia pulchella* Linn.) that are about in gardens just now. This pretty moth has an expanse of just over an inch across the wings, the forewings are creamy white with black and crimson spots, and the hindwings milky white with black edges. *U. pulchella* has a very wide range of distribution over practically all the warmer parts of the Old World. Rarely it occurs even in England! It is very abundant in Queensland and New South Wales but sporadic in Victoria. In the southern parts of this State only odd specimens are met with at fairly long intervals of time. This autumn it is breeding in large numbers in the writer's garden at Blackburn, where it is so plentiful that often ten or a dozen specimens may be seen at one

*Curator of Insects, National Museum of Victoria.

time. The larva is dark grey with a whitish stripe on the back and reddish markings on the sides of the body. It feeds on a number of different weeds and some garden plants. Various species of *Plantago* (Plantain), Heliotrope, and several Compositae are most favoured. Reports have just come to hand from several country districts along the Murray that this moth is everywhere in hundreds, so its distribution in Victoria this autumn is probably State-wide.

A little over a week ago my attention was drawn to an observation made by an entomologist living near Malvern, that he had seen and captured a specimen of the "Common Migrant", *Catopsilia pyranthe pythias* Whs. & Lyell. This almost pure white butterfly (especially the male) is common in the inland districts of northern New South Wales, in Queensland, and in northern Australia. Beyond Australia it has a very wide range, as far as India.

A couple of days after this observation, the writer captured a perfect male specimen at Blackburn. This naturally led to keeping a close watch for further specimens; four were observed, and a further perfect male captured two days after the first capture. All the specimens noted were males.

The writer has collected and studied Lepidoptera for many years, and these are the only live specimens he has seen in Victoria for 37 years! Two Victorian specimens, both males, in the Lyell collection at the National Museum, came from Riddell (May 1920) and Gisborne (June 1904) respectively. A few other Victorian specimens are on record, and Waterhouse states, in "What Butterfly is That?", that the species is only an occasional visitor to our State.

The larvae feed on various species of Cassia; and this summer, being so long and mild, has evidently been favourable to the species extending its range further southwards than usual.

HAKEAS AS GARDEN PLANTS

By A. E. BROOKS

The well-known Pincushion Hakea (*H. laurina*) makes a good garden plant, reaching the stature of a large shrub or small tree within about three years. However, it has not proved so successful as a street tree or for positions as exposed as might be desired because its substantial head of foliage is not balanced by a sufficiently extensive root system. Its lovely flower clusters consisting of red "cushions" and yellow "pins" are produced in autumn over a period of several weeks. They are particularly attractive when the "pins" are just unfolding.

The Sea-urchin Hakea (*H. petiolaris*) with broad, greyish, prominently veined leaves is not as well known as the Pincushion Hakea, but it grows just as rapidly and does well around Melbourne, at least in sandy soil. The branches are somewhat tangled, but the beautiful pincushion flowers, purple with cream-coloured styles, compensate for any deficiencies on the part of the foliage.

The most beautiful member of the genus is undoubtedly the Grass-leaf Hakea (*H. multilineata*), which has long leaves with many lines or veins running their full length. In spring, this plant becomes a beautiful sight with long spikes of red flowers. Like the two preceding species and many other attractive hakeas, it is a native of Western Australia. It is known to do well in Adelaide and near Horsham, but is almost unknown in gardens around Melbourne. However, several plants are now doing well in the writer's garden, having come safely through their first Melbourne winter. Reports that seedlings of this species are difficult to transplant and that the plants must have a dry situation do not appear to be substantiated. No difficulty was experienced in transferring the seedlings into pots or from there into the garden. One plant which was dug up from

the garden, planted in a large tin and watered every day for several weeks has thriven exceedingly well.

The Purple-flowered Hakea (*H. purpurea*), with divided leaves and long stems of bright red flowers, is another beautiful species. It is of smaller stature than those already mentioned and does not exceed more than about four feet in height. Of similar stature is the Candle-spike Hakea (*H. rascifolia*). It has cream spikes of flowers and spiny leaves.

Of the eastern species, the Silky Hakea (*H. sericea*) has an extremely long flowering season, and the pink form is particularly lovely. Silky Hakea has small flowers borne in profusion but it has also the disadvantage of many other hakeas in its sharp pointed "needles". This makes it unsuitable as a cut flower and is a feature not appreciated by those who inadvertently push against a plant.

There must be many other hakeas which would make good garden subjects, but I must plead ignorance of many of the hundred and twenty or more members of this purely Australian genus.

ORCHID NOTES FROM NEW SOUTH WALES AND QUEENSLAND

By the Rev. H. M. R. RUPP

Cryptostylis hunteriana: The late W. H. Nicholls described this leafless terrestrial in this journal, Vol. 54 (1938), p. 182. It was found in the extreme east of Victoria, where it was apparently rare; and it has not been found elsewhere[1] until recently, when the Rev. B. W. Lowery, S.J., and Mr. A. W. Dockrill discovered it growing along the south-eastern shores of Broken Bay in New South Wales, some 600 miles north of the type locality. Quite a number of plants were seen. Some doubt having been expressed about the constancy of "leaflessness" as a character of the species[2] it may be well to mention that all the plants seen at West Head on Broken Bay were leafless. *C. hunteriana* should now be sought along the South Coast areas of New South Wales.

From north Queensland information comes of at least two new orchid species, and of another which is certainly new for Australia, viz., J. J. Smith's *Dendrobium glabrum* (described and figured in his *Nova Guinea*, Vol. VIII). Mr. S. F. St. Cloud has found this beautiful little species in two localities of the Cairns area. At first he was disposed to regard it as an undescribed species of *Cadetia*; but it agrees too closely with Smith's figures. Unfortunately the flowers are very fugacious. In the current issue of the *North Queensland Naturalist* Mr. St. Cloud describes and figures a new *Dendrobium* allied to *D. teretifolium* (*D. bosevanum*). In the same journal Mr. A. W. Dockrill has a new *Pterostylis* from the Ravenshoe district on the Atherton tableland (*P. carinata*), discovered by Messrs. W. W. Abell and W. G. McPherson. In the same locality these collectors have found *Acianthus implexicaulis*, previously known only in southern Queensland, and very rare there. It is the first species of *Acianthus* to be recorded for northern parts of the State.

Perhaps the most important "find" in north Queensland has been that of Fitzgerald's long-missing *Cymbidium gomphocarpum*. This was discovered by Mrs. P. R. Messmer in a bush-house at the foot of the Bellenden Ker Range, where the plant was obtained. As Mrs. Messmer is preparing a full account of the matter, it must suffice here to announce the discovery.

1. Actually, some minor extensions of the known range of this orchid have been made in the interim, the most recent of which was about 40 miles to the east of the type locality. (See *Vict. Nat.* 67: 168—December 1950, and 70: 28—June 1953.)

2. The late Mrs. Edith Coleman caused this species to produce a small leaf, by cultivating a plant in artificial conditions and using a plant-growth hormone. (See *Vict. Nat.* LVI: 48—July 1939.)

—Editor.

TWO REVIEWS

Phenology—The study of the seasons. An address by Dr. C. B. Williams, F.R.S., to the Assembly of Corresponding Societies at the Oxford meeting of the British Association for the Advancement of Science, 1954. [*The Advancement of Science, XI* (43), pp. 267-272.]

Some months ago the F.N.C.V. was privileged to listen to an inspiring address by Mr. P. Crosbie Morrison. It was a plea to make our biological hobbies more valuable, not only to ourselves but to posterity, by pursuing them more deeply and more scientifically. Dr. Williams' address is an elaboration of the same theme, and is concerned with that ever absorbing interest, the changing seasons, and the budding and blossoming, mating and hatching, hibernating and migrations that they call forth.

It is of intense interest to anyone who has lived in Europe and understands the deep feeling with which the first signs of spring are noted, but it should also interest Australians, and particularly Victorians, in whom similar feelings may arise as the first wattle blossoms appear in the bush or the early prunus in the city.

One of the most interesting parts of the address concerns a family of Marshams, living in a Norfolk village. Successive generations of this family, from Robert in 1736 to Margery in 1926, have observed the first flowering of the snowdrop, the leafing of deciduous trees, the return of migrant birds and the nesting of rooks. For almost 200 years this family of naturalists has kept records, and in 1926 Margery Marsham published them in the Journal of the Meteorological Society.

This delightful address is recorded in the journal of the British Association for the Advancement of Science, a copy of which is now in the library of the F.N.C.V.

Reason and Fallacy in the Study of Fossil Man. An address by Professor W. E. le Gros Clark, F.R.S., to the Oxford meeting of the British Association for the Advancement of Science.

Although this address was delivered as one of the general discourses of the Oxford meeting of the B.A.A.S., and is therefore intended primarily for the general public, it will probably have most interest for members of the Geology group.

It is given in full in *The Advancement of Science, XI* (43): 280-292. A copy of this is in the F.N.C.V. library.

—M. M. CHATTAWAY.

NATURALISTS' NOTEBOOK

(Reserved for your Notes, Observations and Queries)

THE RUFOUS FANTAIL AGAIN

In a letter dated April 9, 1955, one of the Club's country members, Mr. W. Hunter, of Mallacoota, writes:

"One day, a month or so ago, hearing a noise in my bedroom, I went in to investigate, to find a bird flying around, apparently trying to get out, but keeping much too close to the ceiling to find the door or the window. It had obviously flown in through the window, which was wide open at the top. When after quite a long time it did eventually find the window-opening, it did not immediately dash out, as I expected it to do, but it perched there, apparently quite unconcerned, for a minute or more, before it flew away. At that time, I was sure that it was a Rufous Fantail, even though I was surprised to see such a bird in the house. But since then I have been less certain about it; it was the only time I have ever seen a Rufous Fantail

away from the bush, and I thought the Rufous was a very shy bird. The Grey Fantail isn't shy, and there are plenty of them about here; so I was getting an idea that the bird might have been a Grey with unusual plumage. Now the article in the *Naturalist* has dispelled all the doubt that had arisen since that solitary visit of the Rufous Fantail."

The article referred to is entitled "Notes on the Rufous Fantail", and it appeared on page 194 of the *Victorian Naturalist* for April this year. The authorship of these notes was inadvertently omitted; they were written by another country member from Gippsland, Miss Jean Galbraith, of Tyers, near Traralgon. The coincidence and similarity of these two naturalists' experiences is quite remarkable.

Rufous Fantails come southward into Victoria for the nesting season; they are quite abundant in summer in the "jungles" and gullies of Gippsland, particularly in the far eastern corner of the State, and a few reach central Victorian districts. Our two country members are to be envied their close acquaintance with this bird, for even to see one flitting about in its normal habitat, the dense scrubs, is a delightful experience. It is certainly one of the gems of our bird-world.

—N. A. WAKEFIELD.

WHAT, WHERE AND WHEN

F.N.C.V. Excursions:

Saturday, May 14—Parlour coach excursion to Mount St. Leonard. Leader: Miss M. Elder. Subject: Ferns, Lyrebirds, and General. Coach leaves Batman Avenue 9 a.m., returns approx. 8 p.m. Fare 18/-. Bring two meals.

Wednesday, May 18—Prahran Junior Naturalists Club excursion to Botanic Gardens and National Herbarium. F.N.C.V. members are invited to attend and assist. Meet at Children's Library, Greville Street, Prahran, at 10.30 a.m., or at Botanic Gardens Kiosk at 11 a.m. Bring one meal.

Saturday, May 28—Macdonald Sanctuary. Working bee and inspection. Take 1.15 p.m. train to Sandringham, then the 1.51 p.m. Beaumaris bus to Hayden's Road. Mr. Brooks will meet party at the Sanctuary.

Saturday, June 4—Geology Group survey excursion to Black Rock to check bench mark and note changes. Meet at corner of Beach Road and path leading to boat-sheds at 2.30 p.m.

Sunday, June 12—Zoological Gardens. Leader: Mrs. Pinches. Meet at Royal Park station entrance at 11 a.m. or 2 p.m.

Group Meetings:

Wednesday, May 18—Microscopical Group. National Herbarium, 7.30 p.m. Projection Night.

Wednesday, May 25—Botany Group. Speaker: Mr. K. Atkins. Subject: Plant World, Part 1 (light and interesting). National Herbarium, 8 p.m.

Wednesday, June 1—Geology Group. Subject: The Activities of the Mineral Section of the National Museum, by the Curator, Dr. A. W. Beasley. Recent displays, laboratory equipment, choice and rare specimens, etc. Meet at Russell Street entrance of Museum at 7.30 p.m. sharp.

Junior Clubs:

Tuesday, May 24—Prahran Juniors, at Children's Library, Greville Street, at 7.30 p.m. Subject: Birds of Altona Marshes, by Mr. Roy Wheeler.

Friday, May 27—Hawthorn Juniors, at Town Hall, Burwood Road, at 8 p.m.

—MARIE ALLENDER, Excursion Secretary.

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PROCEEDINGS

There were about eighty members and friends present at the General Meeting held at the National Herbarium on Monday, May 9; and the President, Mr. Baker, extended a warm welcome to all.

Mr. J. H. Brown of Cheltenham was elected as Ordinary Member; and nominations for membership were received from Misses Alison M. Hooke and Barbara C. Hooke.

The President referred to the new cover and better paper of *The Victorian Naturalist*. He also asked for volunteers for the positions of Secretary, Assistant Secretary and Treasurer, for which no nominations had been received.

Mr. Baker then delivered the Presidential Address on the interesting and unusual subject "The Swallowing of Stones by Animals". He gave information on this habit by prehistoric reptiles, as well as by many living species of reptiles, birds and mammals, and discussed the effects of the stones in the stomachs and the reason for swallowing them. The information must have involved a considerable amount of work in research. After several comments and questions, the meeting expressed its appreciation by acclamation.

Exhibits included a collection of "stomach stones", of dinosaurs, the extinct moa, and of seals, from Wyoming, New Zealand and Victoria respectively, shown by Mr. Baker, by courtesy of the National Museum. Mr. Gabriel exhibited Victorian marine shells, *Humphreyia strangei* A. Adams, *Dacosta australis* Sowerby and *Gastrochaena tasmanica* T. Wds. Mr. Lee showed photographs of species of fungi seen during the Emerald excursion of May 8, and Mr. Mollison displayed a collection of fungi from the same locality.

NOMINATIONS FOR OFFICE-BEARERS AND COUNCIL, 1955-56

President ..... Mr. Tarlton Rayment
Vice-Presidents ... Dr. R. M. Wishart, Mr. T. Sarovich, Mr. W. L. Williams, Mr. F. Lewis
Assistant Treasurer ..... Miss M. Butchart
Editor ..... Mr. N. A. Wakefield
Assistant Editor ..... Mr. A. B. Court
Librarian ..... Mr. A. Burke
Assistant Librarian ..... Mr. R. D. Lee
Excursions Secretary ..... Miss M. Allender
Council ... Miss L. Young, *Dr. W. Geroe, *Mr. A. W. Burston, Mr. K. Atkins, Mr. J. Ros Garnet, Mr. W. C. Woollard, Mr. H. Haase, together with the two unsuccessful candidates for Vice-President.

* Retiring members.

NOTICE OF EXTRAORDINARY GENERAL MEETING OF F.N.C.V.

An Extraordinary General Meeting of the Club will take place at 7.30 p.m. on Monday, June 13, 1955, to "Consider amending approving or rejecting the proposal to finance the publication of the ms. and the illustrations of the proposed fern-book at a cost of £937/10/-"

Statement by the President

For the information of members considering the above matter, the following extracts from the Club's *Articles of Association* and details of Proceedings of Council are presented:

Articles of Association, Clause 35: "The Council may appoint any committee to deal with any special matter and may delegate to such committee such of its powers as it thinks fit and may make available for such committee such funds as the Council shall consider necessary."

Council Meeting, March 22, 1955: "Mr. Wakefield moved that Council authorize the Finance Sub-Committee and the Publications Sub-Committee to formulate a plan for the publication of the Fungi and Fern Books and to put it into action. Seconded by Mr. Lewis—Carried. Mr. Sarovich wished to amend the motion of Mr. Wakefield in that the Finance Sub-Committee should report back to Council before taking action—Seconded by Mr. Burston. This amendment was lost."

Publications and Finance Sub-Committee Meeting, March 30, 1955: Present: Mr. Baker, President; Mr. Rayment, Vice-President; Mr. Lewis, Secretary; Dr. Geroe, Treasurer; Mr. Wakefield, Editor; Mr. Hooke, Auditor. The Editor reviewed the new fern book in detail and gave a resumé of negotiations to date for its publication and subsequent sale. He stated that Brown, Prior, Anderson Pty. Ltd. had quoted £937/10/- for the printing of 5,000 copies, and that the Education Department was considering placing the book on their "free list" which would result in their purchasing 2,000 copies. Mr. Hooke stated that Mr. Chalk, his co-auditor, favoured the printing of 5,000 copies. Mr. Hooke moved and Mr. Lewis seconded the motion that 5,000 copies be printed by Brown, Prior, Anderson Pty. Ltd., subject to the Education Department placing the book on its free list for schools, failing which the matter be referred back to the Committee. The motion was carried, four voting in favour and one against.

Council Meeting, April 26, 1955: A letter was received from Mr. Rayment protesting against the decision of the Sub-Committee regarding the Fern Book. Mr. Sarovich moved, Mr. Rayment seconded, that an Extraordinary General Meeting of the Club be called to investigate the proposed expenditure of £937/10/- on the publication of a Fern Book. The motion was lost, by three votes to five.

Articles of Association, Clause 41 (under "Proceedings of Council"): ". . . but no act of the Club or by-law made by the Club in general meeting shall invalidate any prior act of the Council which would have been valid had such act not been done or had such by-law not been made." This provision is repeated in Clause 42 (under "Power of the Club").

Special Meeting of Council, May 9, 1955: The Secretary informed the meeting of the receipt of the requisition signed by 21 members of the Club asking the Council, under Clause 16 of the *Articles of Association* of the Club, to arrange for an Extraordinary General Meeting to "consider amending, approving or rejecting the proposal to finance the publication of the ms. and the illusttrations of the proposed fern book at a cost of £937/10/-", and he pointed out that this procedure was contrary to the *Articles of Association* of the Club (which ruling he had had confirmed by the legal firm that drew up the Articles). Mr. Williams suggested that, as 21 members had questioned an act of Council, a meeting *should* be held. Mr. Sarovich moved, and Mr. Williams seconded, that Council proceed to arrange a

time and place for an Extraordinary General Meeting for the purpose set out in the requisition. Carried, three votes to one, with seven abstaining. It was decided to hold the meeting at 7.30 p.m. on Monday, June 13, at the Herbarium. The Editor stated that the final approval of the Education Department had been communicated to him on April 27 and that he had placed the manuscript in the hands of the printers on May 2.

At the forthcoming Extraordinary General Meeting the Auditors and Office bearers concerned will give members a summary of the data and figures upon which they based their decision; *but the Meeting will have no power* (vide *Articles of Association*, Clauses 41 and 42) *to "amend" or "reject" the action which Council has taken.*

—A. A. Baker.

BACK COPIES OF "VICTORIAN NATURALIST" AVAILABLE FOR PURCHASE

F.N.C.V. members who wish to augment their sets of *The Victorian Naturalist* are advised that almost all back numbers are available for purchase by them at half original price. Some numbers are out of stock and others are in very short supply however. Prices for sets and volumes have been fixed as follows:

Set 1—From Vol. I (1884) to Vol 71 (with 6 numbers missing)—£15/15/-.
Set 2—Ditto (but lacking 12 numbers)—£15/10/-.
Set 3—Ditto (but lacking about 20 numbers)—£15/5/-.
Sets 4 to 10 are progressively more broken and are priced correspondingly.

With the above 10 sets put aside, the following are available for the purchase of groups of volumes, single volumes or individual numbers:

Vols. XI to XIX, XXI to XXXI, XXXIV to XXXVI, XXXVIII to XL, XLIV to XLIX, LII to LX and 65 to 71—each complete.
Vols. I, VI, VII, X, XX, XXXII, XXXIII, XXXVII, XLI, XLII, L, LI, 61 and 63—each with from 1 to 3 numbers missing.
Vols. XLIII, 62 and 64—more broken; and only a few numbers from Vols. II to V, VIII and IX.
Prices for lots from this group are as follows:
Vols. I to XLI—3/- per complete volume, or 3d. per single number.
Vols. LXII to 63—6/- per volumne, or 6d. per number.
Vols. 64 to 67—9/- per volume, or 9d. per number.
Vol. 68—12/-, or 1/- per number.
Vols. 69 to 71—15/- per volume, or 1/3 per number.

Written orders should be placed with the Hon. Editor or Hon. Assistant Editor at Club Meetings, or they may be mailed to the former at "P.O. Box 21, Noble Park, Victoria."

A permanent record will be kept of all required copies which are not available at present, and any such will be supplied if they become available later. (A list of shortages was published in this journal last month. Vol. I—No. 1; Vol. VI—Nos. 6 and 9; and Vol. VIII—Nos. 1-4, 6-8 and 10-12 are also required.)

Sets and volumes, etc., as above, are available also to persons not F.N.C.V. members, and institutions not affiliated with this Club, at original prices (double those quoted above).

PORT DAVEY, SOUTH-WEST TASMANIA

Correction: On page 2, line 23, "this journal" should be replaced by *"Papers and Proceedings of the Royal Society of Tasmania"*.

FIELD NATURALISTS' CLUB OF VICTORIA

STATEMENT OF RECEIPTS AND PAYMENTS FOR 12 MONTHS ENDED 30th APRIL, 1955

GENERAL ACCOUNT

RECEIPTS						PAYMENTS					
Subscriptions—						*Victorian Naturalist*—					
Arrears	£66	15	6			Printing	£592	10	0		
Current	809	1	9			Illustrating	104	0	0		
Life Membership	8	10	0			Despatching	75	12	2		
				£884	7	3	15	0	0		
Sales of *Victorian Naturalist*				68	8	9				£787	2	2
Advertisements in *Naturalist*				12	0	0				28	15	9
Interest received—Library Fund				1	12	6				7	4	2
Donations received				7	18	6				9	6	0
Funds of the Microscopical Society contributed on merging with this Club				12	12	4				4	4	0
										5	17	0
										14	11	7
										£857	0	8
						Surplus of Receipts over Payments for the year				129	18	8
				£986	19	4				£986	19	4

BUILDING AND CONTINGENCIES ACCOUNT

Balance in Bank on 1/5/54				£138	10	5	Fresh Stock of Badges			£29	9	10
Interest on Investments				31	16	3	Bank Charges			1	0	0
Sale of Publications				34	12	1	Balance in Bank on 30/4/55			174	8	11
				£204	18	9				£204	18	9

LIFE MEMBERSHIP ACCOUNT

Balance in Bank on 1/5/54			£35	4	1
Interest on Current Account			0	19	0
			£36	3	1
Taken into Current Subscriptions for the year			£8	10	0
Balance in Savings Bank on 30/4/55			27	13	1
			£36	3	1

BALANCE SHEET AT 30th APRIL, 1955

LIABILITIES				ASSETS			
Building and Contingencies Fund	£1,124	8	11	Bank Current Accounts		£329	7 0
Dudley Best Library Fund	50	0	0	Arrears of Subscriptions, estimated to realize		50	0 0
	£1,174	8	11	Sundry Debtors		57	13 4
Subscriptions paid in advance—				Stocks on hand at valuation—			
Ordinary	£140	7	3	Publications	£108 0 0		
Life Membership	27	13	1	Badges	48 0 0		
	168	0	4		156	0	0
Excursion Account	73	10	4	Investments at face value—			
Special Donations in hand	26	19	9	Dudley Best Library Fund:			
Surplus of Assets over Liabilities	1,830	4	4	Commonwealth Bonds	50 0 0		
				Building and Contingencies Fund:			
				C'wealth Bonds £950 0 0			
				E.S. & A. Bank 174 8 11			
					1,124 8 11		
					1,174	8	11
				Library, Furniture, Epidiascope, Loud Speaker and Water Colour Paintings, at valuation		1,505	14 5
	£3,273	3	8			£3,273	3 8

Audited and found correct
A. S. CHALK
A. G. HOOKE } Hon. Auditors
24th May, 1955

W. GEROE, Hon. Treasurer

FLORA OF VICTORIA: NEW SPECIES AND OTHER ADDITIONS—I

By N. A. Wakefield, Noble Park

Genus *Dodonaea*: A Species Hitherto Undescribed

*DODONAEA RHOMBIFOLIA** species nova ob characterem fructus *D. truncatioli* proxima, sed dimensionibus comparabilibus fructusalarum (quaeque lata quam longa) atque foliis multo latioribus (2-3 cm.) differt.

HOLOTYPE: "Granite gullies on the lower Hume River . . . Jan. 1874 . . . F.v.M." (MEL). PARATYPES to be placed at KEW and NSW.

Branchlets very sharply angled, the upper ones flattened; leaves large, rhomboid, usually up to about 6 cm long (including the petiole) and about 2 cm. broad, rarely to 10 x 3 cm.), the apex shortly pointed, the base gradually tapered to the winged petiole; main lateral veins distantly spaced, irregularly reticulated; inflorescences (female) axillary, racemose (rarely paniculate, about 5 flowered; pedicel long (about 2 cm.), subtended by a narrow bract; fruit usually 4-locular; wings very large, as long as broad, the wing-span up to 3 cm; loculi very hard, swollen, as long as broad; dehiscence septifragal (the repla persistent to the axis); seed dull, about 3 mm. diameter.

Distribution: North-eastern and eastern Victoria, southern and north-eastern New South Wales; in rough rocky terrain.

The original discovery of the species is indicated by Baron von Mueller's field label (cited above) with the type collection. A later herbarium label, in Mueller's handwriting, specifies "Hume's River and Mitta Mitta" All this was simply identified then as "*Dodonaea*".

In the National Herbarium, Melbourne, there are three other collections of the species. The first is labelled "Tooma Rapids, Miss Campbell" and "Perhaps only a form of *D. viscosa*", again in Mueller's handwriting. No other data is given, but this establishes the occurrence of the species on the New South Wales side of the upper Murray River. The Tooma specimen has the leaves up to about 3 cm. broad and with very short petioles.

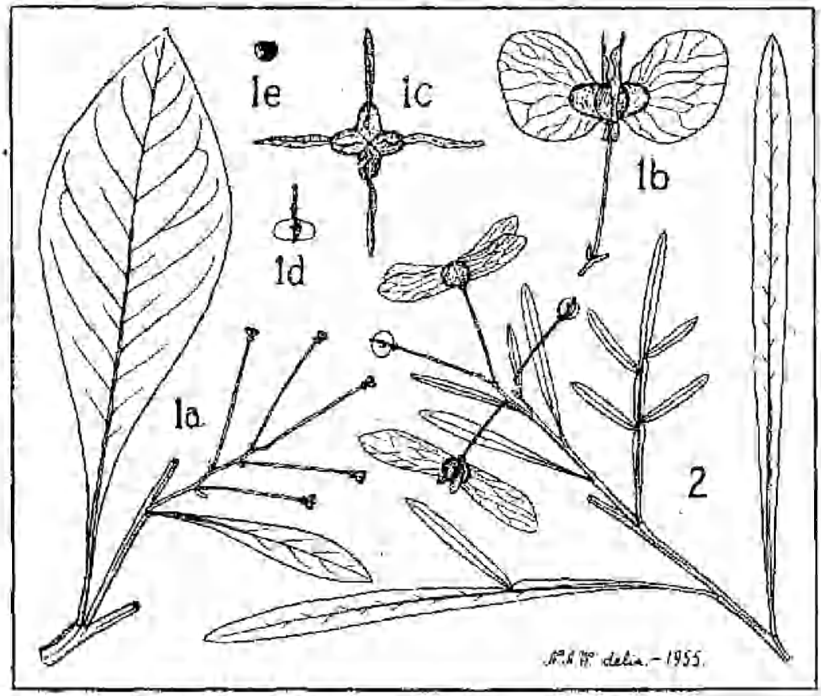
The two other Melbourne collections are from Warrumbungle Ranges, *leg.* G. W. Althofer; the one dated 6/10/1946 having typical leaves (to about 2 cm. broad), and the other, dated 7/9/1945, has the leaves not exceeding 1.5 cm. in width.

On two occasions the present writer collected specimens of *Dodonaea rhombifolia* on ledges or porphyry cliffs near the Snowy River, east of Butchers Ridge, in eastern Victoria (No. 4689, 31/8/1952 and No. 4808, 21/1/1954). In this locality the species has narrower leaves (to about 6 cm. long and 1-1.5 cm. broad) and smaller fruit the wing-span of which is only 2 cm. It was the endeavour to identify this material that led to the establishment of the "new species".

Communication with Mr. R. H. Anderson, Chief Botanist, National Herbarium, Sydney, established that the Warrumbungle Ranges plants were components of a group scattered over a circumscribed area of north-eastern New South Wales. In a letter dated April 21, 1955, Mr. Anderson stated: "Our specimens of this group come from Apsley Falls, Warrumbungle Mountains, Gloucester Buckets and Mograni Mt., but we have nothing from any other part of the State. I should be surprised to find a species from north-eastern districts of Victoria turning up again in the northern parts of New South Wales with no record between these localities." He remarked further that "the group in N.S.W. is extremely uniform". Two of these collections were sent from Sydney to Melbourne for the author's perusal, and they proved to be quite typical. The one bearing the data "Walcha district, Apsley Falls, E. Betche, 12/1898" (N.S.W., 31006)

showed leaves up to 7.5 cm. long and 2.5 cm. broad, and the other, labelled "Mograni Mt. J. H. Maiden. 9/1897" (N.S.W., 31005) has leaves up to 8 x 1.8 cm. Each of these collections contained material with male inflorescences, the characters of which were not appreciably different from those of *D. truncatiales*, the perianth segments being broad and shortly fringed.

D. rhombifolia belongs to the *D. truncatiales* group, the fruit being usually 4-locular, with hard loculi which come away from the repla, leaving the latter adhering to the axis. The new species is distinguished from *D. truncatiales* by the shape of the wing of the fruit (as broad as long) and by the very broad leaves. (See illustrations.)



Details of *Dodonaea* Species, New for Victoria

1—*Dodonaea rhombifolia* sp. nov., illustrated from type specimens: a—Showing typical leaf and immature female inflorescence. b—Side view of mature fruit. c—End view of mature fruit. d—Repla, persistent to the axis after dehiscence. e—Seed. 2—*Dodonaea truncatiales*, from Mount Zero, Victoria, showing leaf variation. (All details shown natural size.)

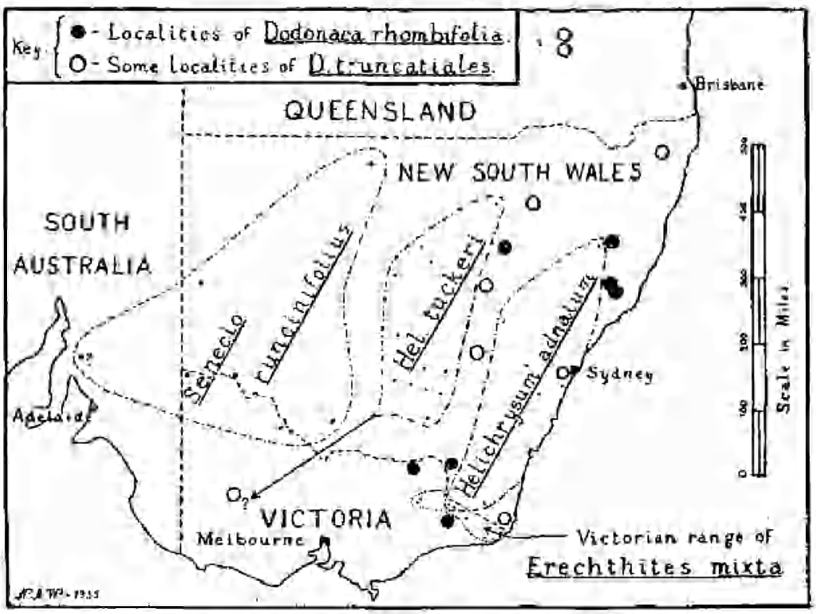
Some forms of the *D. cuneata-D. attenuata* group have the wings similar in shape to those of *D. rhombifolia*, but their leaves are very much narrower; and *D. triquetra* and *D. viscosa* are somewhat similar in foliage to the new species, but their loculi and the wings are much longer than broad. Moreover, all four of these species are distinguished from *D. rhombifolia* (and *D. truncatiales*) by having fragile 3-locular fruit.

(*D. viscosa* is not a native of Victoria, though its name has often been used in botanical literature of that State, being applied loosely to material of both *D. cuneata* and *D. attenuata*.)

Genus *Dodonaea*: An Authentic State Record of *D. truncatiales* A. Cunn.

In both *Flora of Victoria* (Ewart, 1930) and the *Census of Victorian Plants* (F.N.C.V., 1928), *Dodonaea truncatiales* was included as a Victorian species, mainly due to the belief that it occurred at Genoa in the extreme east of the State. It had originally appeared in the *Key to the System of Victorian Plants* (Mueller, 1885-1888) under the synonym of *D. calycina*, having been collected in far south-eastern New South Wales. This was discussed in a paper entitled "Premature and Erroneous Records of Plants for Victoria" in *The Vict. Nat.* 69: 83 (Oct. 1952), and the species was listed for deletion from the State plant census.

Now, the species must be reinstated. It has not been proved to occur in eastern Victoria; but, in the National Herbarium, Melbourne, there have come to light some specimens which were collected, over 60 years ago, at Mount Zero in western Victoria!



Distribution Map of Species Discussed

The fruiting characters of *D. truncatiales* are discussed in the foregoing section of the present paper. The leaves are very attenuated and normally quite entire. The Mount Zero material has typical fruiting characters and most of the foliage is quite normal, but it shows an interesting departure in having also some divided leaves with from one to four lateral pinnae. (See illustration.)

The credit for this long unrecognized new Victorian record belongs to the late W. E. Matthews who was at the time at the Stawell Technical College. He probably collected the material concerned in January 1894 and later sent part of it to Mueller for identification. Mueller labelled that lot "*Dodonaea* . . . Wimmera, 1894. Matthews . . . Stawell techn. College" and noted "Leaves partly pinnate as in *D. megazyga*".

Mueller apparently requested further information, for there is a second lot accompanied by the label "*Dodonaea* . . . Mt. Zero, 1894 . . . W. E. Matthews" and a letter from the collector, dated March 20, 1894, in which is written: "I shall be glad to revisit Mt. Zero during the Easter vacation with a view of collecting more of the *Dodonaea* you wish, if I can find it. There was but one small shrub of the kind that I came across on my last visit. I send you the balance of the specimens I then collected."

Mueller later wrote the name *calycina* on one of the labels with the Mount Zero material, and perusal of other collections in the same herbarium reveals that two from the Darling Downs of south-eastern Queensland share with it the feature of a few pinnate leaves. The several specimens available from inland New South Wales (Narrabri, Dubbo, upper Lachlan River, etc.) have somewhat small, narrow leaves (up to about 6 cm. long and 6 mm. broad), all quite entire; but it is very probable that pinnate leaves do occasionally occur on *D. truncatiales* in these areas. East of the Dividing Range, plants of the species are more luxuriant, and sometimes produce leaves up to 14 cm. long and 2 cm. broad.

Apparently Matthews was unable to make a further collection of the species at Mount Zero, and so there the story rests. The sole authentic Victorian record of *Dodonaea truncatiales* is of a single plant, with some unusual leaf features, found over 400 miles from any other known occurrence of the species. Do such still survive in western Victoria? Or are the Matthews specimens our only relics of an extinct south-western group of the species?

Genus *Helichrysum*: A "Wimmera" Record of *H. tuckeri* F. Muell. ex J. H. Willis

In the *Proceedings of the Royal Society of Queensland LXII* (11): 102,* in August, 1952, there appeared the original description of *Helichrysum tuckeri*, a species of the plain country of central New South Wales. The localities cited show it to range from Wagga Wagga in the south to Pilliga in the north; and one doubtful Victorian record was discussed by the author as follows:

> A collection of *H. tuckeri* in the Melbourne Herbarium labelled "Wimmera" (from W. H. Matthews at Stawell Technical College, 1894) is of doubtful origin. It was exhibited by Mueller as new for Victoria at the meeting of the Victorian Field Naturalists' Club in March, 1894, and is the basis of the record of *H. diotophyllum* in Victoria by Ewart (1930). No other specimen of the species is known from this State and it is highly probable that Matthews either collected his material during a visit to New South Wales or received it through some correspondent there—certainly Stawell is far beyond the expected dryland habitat of *H. tuckeri*, not to mention the still more northerly *H. diotophyllum*.

The collection concerned comprises two pieces—one in bud and the other in flower, and on the accompanying labels Mueller has written, "*Helichrysum diotophyllum* var. . . . Wimmera . . . 1894 febr. . . . Matthews . . . Stawell techn. College" and "New for Victoria".

The fact that these specimens of *Helichrysum* were apparently sent in the batch containing the Mount Zero *Dodonaea truncatiales* (discussed in the preceding section of the present paper) strongly suggests that they were collected in western Victoria. Such an occurrence, some 300 miles from Wagga Wagga, would be less remarkable than are the records from the Grampians area of several plant species which are otherwise only in eastern New South Wales, more than 400 miles away. These include such as *Boronia pinnata* and *Davallia pyxidata*; but the outstanding example is *Swainsona brachycarpa*, recorded three times from the Grampians and known

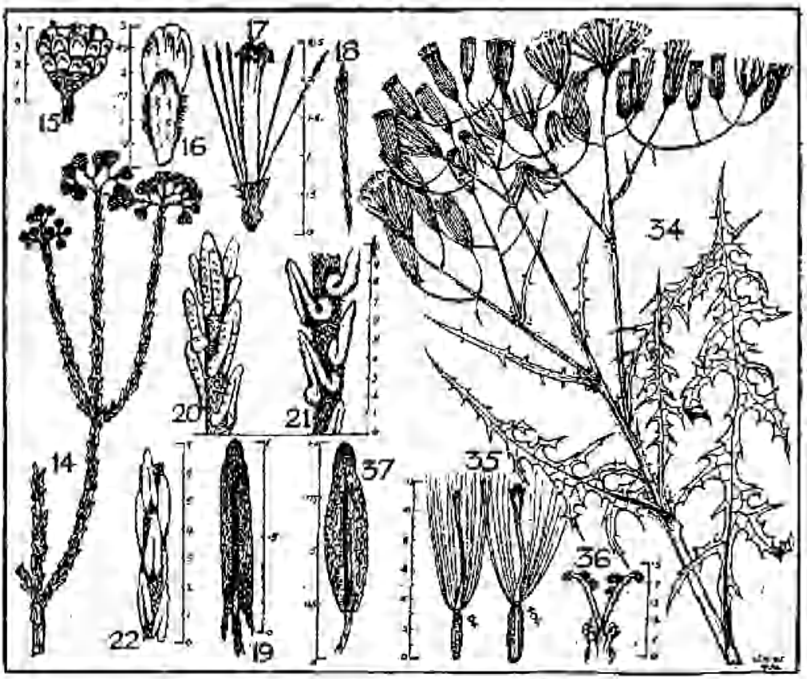
* This reference applies to J. H. Willis's paper "Notes on Some Australian Compositae". From that source several details have been taken for the present paper, and the text block on page 26 is a reproduction of part of the plate which accompanied the former paper.

otherwise only from Queensland and far north-eastern New South Wales, over 600 miles distant.

Helichrysum tuckeri is a rigid shrub, to four feet high, the leaves almost intermediate between those of *H. diotaphyllum* (with large basal auricles) and the non-auriculate ones of *H. adnatum*, but its white, pilular flower-heads in small globoid panicles are quite dissimilar. These details are illustrated on this page.

Genus *Helichrysum*: Victorian Records of *H. adnatum* (DC) Benth

The original Victorian collection of this species lay unrecognized, in the State's National Herbarium, for 64 years. It was A. W. Howitt's No. 454 from the Snowy River (presumably about Deddick), and Mueller simply labelled it "Gippsland . . . Howitt . . 1882" and put it aside in an unsorted bundle of material.



Details of Composites, New for Victoria

Figs. 14-20—*Helichrysum tuckeri*: 14—Branch with inflorescences (½ nat. size). 15—Capitulum. 16—Upper involucral bract. 17—Central floret. 18—Tip of pappus bristle. 19—Anther. 20—Leaves (enlarged).

Figs. 21-22—Leaves (enlarged) of *H. diotaphyllum* and *H. adnatum* respectively.

Figs. 34-37—*Senecio vicentinifolius*: 34—Branch with an inflorescence (½ nat. size). 35—Outer female and central hermaphrodite florets. 36—Style arms. 37—Anther. (Except in figs. 14 and 34, a scale in millimetres accompanies each drawing.)

Thus it was not until 1940 that the species was known to occur in this State, when J. H. Willis identified a specimen of *H. adnatum* collected by W. Hunter at Suggan Buggan in January 1940. Six years later, Howitt's specimen came to light and was duly labelled "*Helichrysum adnatum* . . . det. J. H. Willis, 19/9/1946".

The species is similar in general characters to *H. rackeri* but has larger inflorescenses, straw-coloured flower-heads, and leaves as illustrated on page 26 (fig. 22). It extends northward from eastern Victoria to Waleha in north-eastern New South Wales.

Although Bentham established the binomial *Helichrysum adnatum*, in *Flora Australiensis* 3: 628 (1866), he mis-applied the name there to the western Victorian *Helichrysum bilobum* (Syn. *H. rutidion*).

For information as to other new species and for further nomenclatural adjustments concerning Victorian members of the genus, see "Some Revision in *Helichrysum*" in the July 1951 issue of this journal (*Vict. Nat.* 68: 49-52).

Genus *Senecio*: The north-western Victorian *S. runcinifolius* J. H. Willis

This species is what was wrongly identified by Bentham (1866), and others, as "*Erechthites mixta*", which is recorded in Ewart's *Flora of Victoria* (1930) from Dimboola; but that collection is a mis-identified *E. quadridentata*. *Senecio runcinifolius* occurs at Cohuna (A. W. Read, Vict. Lands Dept., 1952), "between Cohuna and Kerang" (R. V. Smith, 1944) and "Berribee Tank, far N.W. corner of the State" (J. H. Willis, 1948). Otherwise this plant occurs in eastern South Australia and western New South Wales—always on inundated river flats. For foliage and floral details, see page 26, figs 34 to 37.

(The true *Erechthites mixta* is a purplish perennial plant of eastern New South Wales and the mountain forests of eastern and north-eastern Victoria. It was first found in Victoria by E. Reader, at Genoa Peak in 1880; and, several years later, E. Merrill collected it in two localities in the vicinity of the Coast Range, in the Bendoc district. Though this material was lodged in the National Herbarium, it was accorded no cognizance, for in the *Vict. Nat.* of May-June 1889, the honour of discovery was given to Charles French; for there we read, in the record of a "Trip to Croajingolong", that "Close to the top of Goon Murk our botanist found a species of the composite *Erechthites*, which Baron von Mueller states is new for Victoria". None of this history was known to the compilers of the 1928 *Census of Victorian Plants*, for they listed *Erechthites mixta* only as applying to the Dimboola *E. quadridentata*.)

A THIRD RUFOUS FANTAIL

I have just received my copy of *The Victorian Naturalist* for May, and feel I must record a recent experience with the Rufous Fantail. It is very similar to those described in the last two issues of the journal.

I teach in a small country school in a typical dairying district, in a wide valley of the Wybong Creek, which flows into the Goulburn River, a tributary of the Hunter. It is approximately 13 miles W.N.W. from Muswellbrook, N.S.W., so that we were very much in the recent unprecedented floods of February. There is no "jungle" or brush anywhere in this region, though the nearby mountains are covered with gum and pine scrub. I have lived and worked in the district for over twenty years and have not before recorded the Rufous Fantail; in fact I have not previously seen one at all that I can remember.

About a week after the rain had ceased, early in March, about seven or eight children and I were standing on the school veranda at 11 a.m., when a bird flitted past us and in through the bathroom door. I thought it must have been a Welcome Swallow and watched for it to fly out again. As it did not reappear a boy went to the doorway to look for it. At that moment it flew out and along the veranda, above our heads again, and alighted quite fearlessly on a honeysuckle vine at the end of the veranda not three yards from some of us. We all stood perfectly still, but it seemed quite unafraid.

For what seemed more than a minute, it fanned its tail and bowed to us there in the sunlight, showing to perfection its glorious colours, and there could be no mistaking its identity. Soon it flew into a lilac bush in the garden and then off to a tree. All this time it uttered no call at all. One boy saw it again during lunchtime. The experience was one of those rare delights which will stand out always in one's memory. I feel sure it was a flood victim and had evacuated itself to our district; but how far had it come?

—Helena A. Doyle.

STUDIES ON AUSTRALIAN CHAROPIDAE

Part 2 — Some Genera

By Ron. C. Kershaw

Generic features are discussed, and those genera in which the shell form is biconcave are reviewed.

Difficulty attends the definition of the genera due to the inconsistencies which appear even in the more stable genera. The shell features will be discussed in order of importance, commencing with the adult sculpture.

Adult Sculpture: Omitting the shell form for the moment, the adult sculpture appears to be the only reliable feature upon which a generic classification may be built. Shells arranged according to the type of sculpture do appear to fall into fairly natural groups, and this arrangement is then found to be supplemented by other features. Distribution and environment may then be fairly readily correlated, but there are dangers in following these factors too closely at present because of the wide distribution of some genera.

The Umbilicus: The umbilicus varies considerably from species to species; however, it is surprisingly consistent when viewed in conjunction with the sculpture. In a few instances only do pitfalls arise, and these are not serious provided a degree of latitude is allowed. Thus in certain genera some shells have the umbilicus absent, while in other shells it is present though small. Perhaps more than one group will be found to be represented eventually. The genus *Pernagera* Iredale 1933 however does present an exceptional instance. Here the umbilicus is typically broad, half the diameter in the type, but is much less in some other species.

Embryonic Sculpture, the Protoconch: As defined at present there are some genera in which protoconch sculpture is present in some species but absent in others. To bring together shells with smooth protoconchs, or, for that matter, sculptured protoconchs, would result in such a diverse assemblage that it could not be entertained. However, taken in conjunction with features already discussed, some well-defined groups appear. Thus, in the "planate" genera, a group of genera in which the protoconch is spirally lirate or striate has sculpture of regular striae or fine riblets supplemented by interstitial sculpture of various types; while in the second group the sculpture tends to be bolder, and these have smooth protoconchs, the apex being raised slightly. However, similar features are found in both groups and the protoconch assumes an importance in separating these.

The Aperture: This is so variable that it does not appeal as a reliable feature. However, the genus *Pernagera* again provides an exception, as there is a great similarity throughout the species allotted thereto. But it is rarely as valuable in the other genera.

Shell Form: In this discussion it is intended to recognize three general groups. These are: (*a*) a biconcave group; (*b*) a planate group; (*c*) a group with a convex spire. Group (*a*) includes those genera where the

spire is noticeably concave; group (*b*), those genera in which the spire is generally planate but may be a little raised or depressed; group (*c*), those in which the elevation of the spire reaches the maximum for the family. These groups are divided again on the basis of (1) aperture not dentate, (2) aperture dentate.

APERTURAL DENTITION: Where it is present, this feature has been regarded by Iredale and Hedley as of sufficient importance to warrant the immediate erection of a genus. As will be seen, this factor appears to require further study as more species are discovered, and this is beyond the scope of this work.

GROUP (a), THE "BICONCAVE GENERA"

Gyrocochlea Hedley 1924: This genus was carefully defined by Hedley at its inception. The most notable feature is the sculpture of elevated ribs in the interstices on which there is no sculpture whatever, giving a distinctive appearance. Although the ribs are numerous they are not crowded as in some genera where the sculpture is finer. Although this genus is among the most homogeneous of the *Charopidae*, Hedley nevertheless included a species, *G. strandensis* Cox, which differs in having a raised spire and a narrow umbilicus. The umbilicus in *Gyrocochlea* is typically very wide. This species (i.e. *G. strandensis*) serves to illustrate the difficulty of finding stable factors on which to base any scheme to facilitate recognition of the genera, for at first sight it does not appear to belong to the group at all, even the aperture is against it; however, the adult sculpture has been the deciding factor. No doubt it must eventually be placed elsewhere, but Iredale (1937) has followed Hedley, and his authority is accepted in this work. The protoconch in this genus is apparently smooth. Distribution: New South Wales to southern Queensland.

Eyloniea, Iredale 1937. These shells were described as "flat" in form, but there seems to be a tendency to depression more noticeable in some species than in others. *E. burrenense* Pedderd is noticeably depressed. This shell, from Bass Strait, is interesting also because it is the only representative of the genus outside New South Wales. The sculpture of the series is not unlike that of *Gyrocochlea*, but it is coarser and the interstitial sculpture is of fine ribs or striae, sometimes decussate. The species *E. pernix* Cox 1868 was claimed by its author to be not striated when viewed under a lens. The smooth protoconch and the very wide umbilicus are other features of the genus. Distribution: Islands of Bass Strait (one species) and New South Wales.

Gemmoropa, Iredale 1933: Here the shell is biconcave; but the sculpture differs entirely from that of the genera already discussed. The primary adult sculpture consists of rather close, sharp, erect, threadlike riblets, and there is a very fine, reticulate, interstitial sculpture. In the type *G. antiulbo* Petterd 1879, the interstitial sculpture varies across the shell, the radials tending to fade at the periphery, while the spirals become stronger on the base. The protoconch sculpture is extremely fine and the umbilicus wide and deep. The species *G. okeana* Gabriel 1947 appears suitably placed here. Curiously, it is found on high mountains in Victoria, and the remainder of the genus is Tasmanian. This kind of distribution has been noted with other forms. Distribution: Tasmania and Victoria.

Corrimonala Iredale 1939: This was introduced as a sub-genus of *Luinodiscus* Iredale 1937 due to the concave spire and the concentrically striate, radially lirate protoconch. The type was *C. tumidus* Odhner 1917, a Western Australian shell with regular close ridges in the adult sculpture, the interstices having regular, very fine, close, concentric striae. The adult sculpture

is seemingly a development of the embryonic. The umbilicus is moderate. No doubt this will eventually be separated. Distribution: Western Australia.

Dupucharopa Iredale 1937: Introduced for *D. millestriata* Smith 1874, this distinctive form has been described by Iredale (1939) when dealing with Western Australian land shells. Its sculpture of fine radials and fine spirals throughout is reminiscent of the Tasmanian *Bischoffena* Iredale but that genus has a different form and, moreover, a dentate aperture. Umbilicus, narrow and deep. Distribution: Western Australia.

Rhophodon Hedley 1924: This genus is the first of those containing apertural lamellae as a feature of the shell form. The general appearance is depressed but not as much as in *Gyrocochlea*. The type is *R. peregrinus* Hedley 1924, and two other species are included. Hedley (1924) discussed the classification of the "toothed snails", and noted that future classification may bring together forms with and without dentition, the present method being the simplest for the needs of the moment. There appear to be one or two instances where a relationship may exist between shells with and without apertural lamellae respectively. In the present genus the type has a radially striate protoconch, though in the species *R. contortus* Hedley the protoconch is smooth and the sculpture much finer. The type carries many fine close riblets, which are coarser in the species *R. consobrinus* Hedley. The umbilicus is large and shallow. The lamellae are prominent (except in *R. contortus*), deep seated, and on both sides of the aperture. The species *R. contortus* has one prominent palatal fold and two deep seated short parietals on the base, compared with the comparatively numerous teeth of the other species. Distribution: Northern New South Wales.

KEY TO THE GENERA OF GROUP (*a*)

Shell biconcave, aperture not dentate.
  Adult sculpture numerous elevated radial ribs.
    Protoconch smooth, umbilicus wide.
      Interstitial sculpture absent ..... *Gyrocochlea*
      Interstitial sculpture striae ..... *Egilouen*
  Adult sculpture close sharp threadlike riblets.
    Protoconch sculpture extremely fine, umbilicus wide, deep.
      Interstitial sculpture reticulate ..... *Geminoropa*
  Adult sculpture fine radials and fine spirals.
    Umbilicus narrow and deep ..... *Dupucharopa*
  Adult sculpture regular close ridges.
    Protoconch sculpture reticulate, umbilicus medium.
      Interstitial concentric striae ..... *Coriunmala*

Shell depressed, aperture dentate.
  Adult sculpture dense minute riblets.
    Protoconch radially striate or smooth.
      Umbilicus wide and shallow
        Interstitial sculpture absent ..... *Rhopodon*

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——— (1939). "A Review of the Land Mollusca of Western Australia", *Jour. Roy. Soc. W.Austr., xxv* (1938-39): 1-74, Plates 1-5, map (publ. Aug. 21, 1939).

CHELTENHAM PARK

By A. E. Brooks

On the afternoon of Saturday, April 16, twenty people assembled at Cheltenham Park to plant out about 450 native shrubs and trees grown for the purpose by the Moorabbin Council nursery. Those present included Cr. Le Page, who represents the Cheltenham Ward, and members of Cheltenham Horticultural Society, Country Women's Association and Boy Scouts. Mr. Matthews, the curator to the Moorabbin Council, and a member of his staff were present also.

The plants used were grown from cuttings and seed, obtained from Maranoa Gardens, Frankston Golf Club, the C.S.I.R.O. at Highett, and from the private gardens of Mr. and Mrs. E. M. Bourke and the writer, and by seed obtained from the Conservator of Forests in Perth and two private suppliers. The result was about 600 plants, comprising 70 species, from which the largest were chosen for planting. Most of the cuttings were made in February 1954, the best results being obtained with the new hybrid pink thryptomene and *T. saxicola*, *Prostanthera rotundifolia*, *Kunzea ambigua*, *Calytrix sullivanii*, *Brachysema lanceolatum*, *Leptospermum citratum*, *Melaleuca decussata*, *M. nesophila*, *M. pulchella*, *Micromyrtus ciliatus*, *Boronia muelleri*, *Grevillea oleoides*, *Correa reflexa*, *C. alba*, *Hibbertia scandens* and *Chamelaucium axillare*. Some of these could have been propagated more easily from seed had the latter been available.

Seeds were planted in autumn and spring last year, and the most successful plants grown thus were of *Melaleuca lateritia*, *M. hypericifolia*, *M. elliptica*, *Leptospermum rotundifolium*, *L. flavescens*, *Callistemon linearis*, *C. pachyphyllus*, *C. rugulosus*, *Eucalyptus preissiana*, *E. torquata*, *E. platypus*, *E. forrestiana*, *E. sepulcralis*, *Indigofera australis*, *Acacia juniperina*, *A. drummondii*, *A. linifolia*, *Callitris preissii*, *Grevillea banksii*, *Hardenbergia comptoniana*, *Actinostrobus pyramidalis* and *Casuarina verulosa*.

Many other species were propagated in small numbers, perhaps the most surprising strike being a single plant of *Dryandra formosa* from three cuttings tried.

Recently a plan was drawn up for the thirty acres area which comes under the control of the Planning Committee, original plans by Mr. A. J. Swaby being incorporated. The pathways formed by the Council have been of considerable help in keeping people off areas planted with shrubs and trees, and many more local species are now regenerating. Up to date, operations have been hampered by the lack of clearings amongst the tea-tree and by the large number of pine trees. Some of the smaller pines are being removed and plans are in hand to take out two large ones near the railway gates entrance. Vandalism and the dry conditions on the hillside are also problems, but, thanks to the splendid co-operation of the curator, some really effective works should be possible in the near future.

It was largely due to the interest and enthusiasm of Mr. Swaby, over three years ago, that a public meeting resulted in the formation of the Planning Committee of nine members. Mr. G. Muckleborough, an ex-councillor, has been chairman since its inception, and he has acted as liaison officer with the Council. F.N.C.V. members on the committee are Messrs. P. Wyatt, G. Echberg and the writer, and there are representatives from the local Progress Association, Horticultural Society, C.W.A. branch and Boy Scout movement. Continuity of the committee is ensured by members retiring in rotation, three each year, and their positions being filled by election.

The committee now feels that they are making substantial progress and there should be increasing evidence of the results of earlier planting and development of Mr. Swaby's initial planning.

MICROSCOPICAL GROUP

The April meeting was devoted to a discussion on diatoms. Dr. R. M. Wishart delivered a short lecture, made the more interesting by the fact that he is a New Zealander and had visited the site of the famous Oamaru deposits. Mr. Woollard exhibited a slide projector, and there were several microscopes on the bench. Dr. Wishart showed diatoms from Cormacks Siding deposit, Oamaru No. 2. Mr. W. Black: diatoms, Type, Port Philip Bay, and there were three very fine slides from the Group cabinet of mountings by Mr. Williams, a late member, of beautifully arranged diatoms. Mr. E. Snell had a slide of selected diatoms, and Mr. J. Evans showed living volvox and the rotifer *Enclanis triquetra*.

Owing to the unavoidable absence of Mr. A. Bushy at the May meeting, which was to have been a projection night, using the late Mr. F. Ockenden's machine, Mr. Woollard filled the gap by using his projector. Mr. Tarlton Rayment commented on points of interest in the various insect slides. The leader desires to express his thanks to all concerned who assisted at the show at Prahran Town Hall. The June meeting is to be an "Open Night", and members are earnestly requested to bring their mikes and slides.

WHAT, WHERE AND WHEN

F.N.C.V. Excursions:

Sunday, June 12—Zoological Gardens. Leader: Mrs. Pinches. Subject: Australian Mammals. Meet at Royal Park station entrance, 11 a.m. or 2 p.m.

Sunday, June 19—Kallista. Leaders: Mr. A. B. Court and Mr. R. V. Smith. Subject: General Botany. Take 8.55 a.m. train to Ferntree Gully, then bus to Kallista, or meet at Kallista picnic ground at 10.30 a.m. Bring one meal. Return train arrives Flinders Street, 5.26 p.m. Fares, 6/- return.

Saturday, July 2—Studley Park. Leader: Mr. R. Davidson. Subject: General Geology. Meet 2 p.m. at Johnson Street Bridge.

Sunday, July 10—Sherbrooke. Subject: Lyrebirds. Leader: Mr. Hooke. Take 8.55 a.m. train to Ferntree Gully, then bus to Ferny Creek store, where leader will meet party. Bring lunch, to be eaten at pine plantation 12 noon.

Group Meetings: (8 p.m. at National Herbarium.)

Wednesday, June 15—Microscopical Group.

Wednesday, June 29—Botany Group. Subject: Plant World, Part 2. Fungi, illustrated. Speaker: Mr. K. Atkins.

Wednesday, July 6—Geology Group. Subject: Minerals. Speaker: Mr. Cobbett.

Preliminary Notice:

Saturday, August 6—Parlour coach excursion to Kinglake West. Leader: Mr. A. A. Baker. Subject: Geology and General. Old sea-floor area, once frequented by trilobites and other invertebrates, now covered with forest and fern-gullies. Coach leaves Batman Avenue, 9 a.m., returns about 6 p.m. Fare 12/6. Leader to travel with coach. Bring one meal.

Junior Clubs:

Tuesday, June 14—Prahran Juniors, at Children's Library, Greville Street, at 7.30 p.m.

Friday, June 24—Hawthorn Juniors, at Town Hall, Burwood Road, at 8 p.m.

—MARIE ALLENDER, Excursions Secretary.

The Victorian Naturalist

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PROCEEDINGS

About sixty-five members and friends were present at the Club meeting held at the National Herbarium on June 13, 1955.

First came the Extraordinary General Meeting, at which, after a lengthy debate, the Secretary's motion "That the action taken by the Council in regard to the publication of the Fern Book be approved by the meeting" was carried by a three-quarters majority.

The Annual General Meeting followed. The Secretary's annual report and also that of the Treasurer were read and their adoption carried. These appear in this issue and last month's *Naturalist* respectively. Mr. Hooke submitted the Auditor's report and commented on the satisfactory financial position of the Club.

Mr. Baker, after thanking the Club and the Council for their support during his term of office as President, declared Mr. T. Rayment elected as President for the ensuing year. In taking over the chair, Mr. Rayment expressed his thanks to Mr. Baker and to members for the honour bestowed upon him, and expressed the hope that he would be able to fill the office in a manner comparable with that of the former President.

Messrs. F. Lewis and T. Sarovich were elected as Vice-Presidents, Miss M. Butchart as Assistant Treasurer, Mr. N. Wakefield as Editor, Mr. A. Court as Assistant Editor, Mr. A. Burke as Librarian, Mr. R. Lee as Assistant Librarian, and Miss M. Allender as Excursion Secretary. Members elected to Council were Dr. R. Wishart, Dr. W. Geroe, and Messrs. K. Atkins, R. Garnet and W. Williams.

Mr. Garnet moved a vote of thanks to retiring Council members, mentioning particularly the years of service to the Club of the retiring Secretary, Mr. Lewis, Dr. Geroe, who was relinquishing the Treasurership, and Mr. Wakefield, the Editor. The motion was seconded by Mr. Sarovich and carried with acclamation.

Miss Alison Hooke and Miss Barbara Hooke were elected as Joint Ordinary Members with Mr. A. G. Hooke.

Mr. Willis announced the passing of a Club member, Mr. P. Bibby of the National Herbarium. Messrs. Burston, Swaby and Stewart spoke concerning the passing last month of Dr. Chapman, son of the late Frederick Chapman. The meeting stood in silence as a token of respect to the memory of the two members.

The President mentioned that the *Argus* newspaper had donated a coloured illustration for his monograph of the Halictine bees, and a sample of this picture was exhibited. He told, too, of the Satin Birds' acquisition of blue-bags for their bowers, the males choosing such objects because of their resemblance to the blue eyes of the females. Mr. Gabriel commented on birds in a Kew

garden carrying large pieces of wood into a cotoneaster bush; Mr. Swaby said that the agents were probably blackbirds; and Mr. Woollard remarked that the same species had on one occasion transplanted some shallots from one position to another.

The meeting was then adjourned for the usual conversazione and perusal of exhibits.

SEVENTY-FIFTH ANNUAL REPORT, 1954-55

Your Council has pleasure in submitting the 75th Annual Report of the Club. Our membership at the end of the year was 546 as compared with 467 at the end of last year. We now have 20 honorary members, 5 life members, 353 ordinary members, 143 country members and 25 juniors. We also have 33 subscribers to *The Victorian Naturalist*. During the year honorary membership was conferred on Miss Mary Wise.

Amongst those whose passing during the year we have had to mourn were Mrs. Cooper, Mrs. Gabriel, Mrs. Gates, Miss Winifred Taylor, Miss Dorothy Kidd, and Messrs. E. E. Pescott, F. E. J. Ockenden and W. C. Tonge. The death of Mr. Ockenden in particular was a great loss not only to the Club but to the Microscopical Group in which as a society he had been such an active and useful member.

The Australian Natural History Medallion for 1954 was awarded to the Rev. H. M. R. Rupp, who was nominated by the F.N.C.V. in 1953 and the F.N. section of the Royal Society of Adelaide.

Perhaps the most outstanding event of the past year has been the incorporation of the Microscopical Society into the Club. We were very glad to welcome these good friends into our organization and feel sure that both we and they have benefited and will continue to benefit by the action taken.

Owing to the changes in governments that have taken place during the last few years, no progress, so far as we can tell, has been made with the proposed National Parks legislation. The National Parks Association continues to press for the measure and it is hoped that in the not too distant future the care of our long-neglected National Parks will be placed on a good and proper footing.

The use of the virulent poison "1080" for rabbit destruction in the Wyperfeld National Park has given us much concern. We with other interested bodies made strong protests but with no effect whatsoever on the authorities concerned. Under the regulations controlling most National Parks it would appear doubtful if even Lands Department officials have any right to go into any National Park and use poison without the approval of the trustees, but it looks as if this point has not been raised. Reports from the

Grampians, where the poison was used freely, seem to indicate that more cats, dogs and possums were killed than rabbits.

After our good Nature Show at Prahran in 1953, it was felt that future such events should not be held in the spring because of the clash with school studies and examinations, and autumn was suggested. But Mr. Wakefield received so little encouragement and so few offers of assistance that no further action in the matter of shows has been taken.

As members know, we have now made the National Herbarium our official headquarters, and all groups as well as the Club now meet there. The library, too, is gradually being transferred and thus we will make a complete break with the Royal Society's hall, which we have used for many years. This break is regretted both by our Club and the Royal Society, but it could not be avoided. The rebuilding of the hall made it practically useless for group meetings, and furthermore, the increased rental proposed to be charged was more than our Club could afford.

Mention was made in our last report that the Club fern book was being re-written and brought up to date by Mr. Wakefield. This job has now been completed and we hope before long to have this much sought after publication again available. The Club owes a debt of gratitude to Mr. Wakefield for his work on this book. A new edition of the fungi book will soon be required as it is almost out of print. As the Education Department has placed both of these books on its free list for schools we can expect a big demand for both publications.

The cost of publishing *The Victorian Naturalist* is a constant source of worry to your Council. It is the main item of expenditure in our accounts. Our printers have advised us that printing costs are again on the rise, so we urge members to do all they can to introduce new members to the Club and thus provide us with the funds necessary to carry on. While we are talking about our journal, the Editor will always be glad to receive articles for publication. Even short notes on matters of interest are welcome.

Three groups are now meeting on Wednesday evenings at the Herbarium, the Botany Group having been restarted under the capable leadership of Mr. Dakin as chairman and Mr. Ken Atkins as secretary. They are undertaking some group projects of great interest and would welcome new members. The Geology Group also reports that satisfactory interest is being maintained in their meetings and excursions, but they also would welcome new members. The Microscopical Group is also having good meetings with much interest shown.

Your Council is disappointed on the whole with the support given to the study groups. According to our constitution, the principal object for which the Club is established is to promote the study of natural history in all its branches. Simply coming

along on Club nights and listening to an interesting lecture, illustrated perhaps with Kodachrome slides, is not studying a subject. Some of our groups have had to disband because of lack of support. I wonder if we are becoming lazy.

Much credit and thanks are due to all those who have lectured to the Club in the past year, generally illustrating their remarks with beautiful Kodachrome slides.

The two Junior Clubs at Hawthorn and Prahran, under the capable leadership of Mrs. Freame and Mr. Wakefield respectively, continue to function and generally speaking receive good support. There is room for much more of this kind of thing in our city. The Frankston Club also continues to thrive. Congratulations to all of them.

In conclusion we would like to thank all who have worked hard the past twelve months to ensure the success of the Club. In particular we would thank Mr. A. W. Jessep, Government Botanist and Director of the Botanic Gardens, for his interest and assistance and for the use of the fine hall for our Club and group meetings, and especially for making a room available for our library.

On behalf of the Council,

F. Lewis, Honorary Secretary.

MACDONALD SANCTUARY

There were three F.N.C.V. members and a large number of local people present at the Macdonald Sanctuary for the inspection and planting on May 28. Several members of the Beaumaris Tree Preservation Society and representatives of the Beaumaris Parents and Citizens Association were among the local residents there.

During the week prior to the excursion, the Sandringham Council had again repaired the wire-netting enclosure and cleared an area of about a square chain behind the memorial. It was very pleasing to see that the trees had been cut close to the ground without any disturbance of the soil, as had been requested by the F.N.C.V. Advisory Committee. It was also very pleasing to receive an offer from two Beaumaris citizens who live close to the sanctuary to care for the memorial enclosure. They have suggested tan bark over a layer of ashes several inches thick as a means of keeping this enclosure in a neat, well-cared-for condition.

A large number of local plants brought by those present were planted in the new clearing. These included Running Postman, Twiggy Daisy-bush, Silver Banksia, Silky Guinea-flower, Bundled Guinea-flower, Showy Bossiaea, Common Beard-heath, Sweet Bursaria, Common Correa, Silky Tea-tree, and many others. In many cases, large blocks of soil containing several species of plants were set into the ground, and some of these had large numbers of orchid leaves growing in them. Seeds of about eight local species were also scattered in the clearing.

The energies of the people present were then diverted to forming a third clearing in about the centre of the enclosure. This was achieved to the satisfaction of the workers, and a very attractive pathway leading into it was also opened up. There is no longer any doubt that a number of clearings joined by pathways through the tea-tree will convert the enclosure into a

very attractive area and a desirable one for native species of birds. In these clearings many species will regenerate, and others can be moved into them from the surrounding areas before they are all destroyed by the activities of home-builders.

An inspection of the first clearing, made in September last, showed that several plants of Wedding Bush and some spider-orchids have commenced to grow.

It is now proposed to enlarge the Advisory Committee to include representatives of the Beaumaris Tree Preservation Society, Beaumaris Parents and Citizens Association, and other local residents. With strong support now assured from these and from the Sandringham Council, the future of the Donald Macdonald Sanctuary looks brighter than it has for many years.

—A. E. Brooks.

TALLAROOK EXCURSION

With Miss Jean Blackburn as leader, there was an attendance of six members on May 1 for the ten-mile walking excursion from Tallarook to Breech Peak and Mill Creek. After crossing the main road and walking a short distance along a lane, the party crossed a stream near a unique swing bridge made of fencing wire and short planks, and it was then farewell to roads until late in the afternoon.

With the beautiful warm weather, the climb up the spur to Breech Peak called for many rests. Guinea-flowers were most prominent among the flora. The ascent was finally accomplished before lunch, for which a site was selected just beyond the peak. In response to the leader's warning that no water would be available for lunch, a variety of drinks was produced, including orange juice, lemon juice, cocoa, and tea. A good specimen of the fungus *Poria macrocarpa*, white, with large holes, was seen on the underside of the leaning trunk of a stringybark tree growing near the luncheon spot.

As the party continued along the ridge after lunch, there were many good views, with Mt. Hickey to the south at the end of the ridge, the isolated symmetrical cone of Mt. Piper to the south-west, and Mt. William further afield. Clumps of Rock Isotome, in full flower, were plentiful on the hillsides.

The trip thus far had been through lightly timbered country, with Grey Box, Red Box, Red Stringybark and Black Sheoke all numerous, but as a gully was descended to cross a tributary of Mill Creek there were many fine stands of Eurabbie (*Eucalyptus bicostata*), and Slender Hop-bush was encountered as the party scrambled over the rocks. Rock Fern (*Cheilanthes tenuifolia*) had been frequent on the granite hillsides, and Necklace Fern was among the rocks of the gully. Even when a rest was called beside an inviting pool, the first water since long before lunch, some members continued to search for plants. A suggestion that they would prefer to have their rests while walking along seemed to describe the situation.

The route now lay towards the north. Many fine views along the valley called for some colour photographs, and Rock Isotome became very plentiful again. During a rest on a granite hillside some time was spent in speculating on the colossal amount of material which must have been eroded away to form the Goulburn Valley.

Eventually a road had to be followed again for a short distance. It passed near some huge granite tors, then Mill Creek was crossed and a halt made for tea on the banks of the Goulburn River.

The road was again forsaken for a route across country, and, on a night made as beautiful by the moonlight as the day had been by the delightful sunshine, the party entrained for home.

—A. E. Brooks.

ARE YOU INTERESTED IN NATIVE ORCHIDS?

If so, there is a large range of excellently illustrated articles and papers on the subject available to you in the back numbers of *The Victorian Naturalist*. For your perusal and consideration, these "orchid" parts of the journal, for the past twenty-five years or so, are listed below in their various categories; and they are priced for sale according to the scale set out in last month's *Naturalist* (page 19).

Series A (Wholly Victorian): Dealing with new species, new State records, etc. (mainly by the late W. H. Nicholls), each accompanied by a full page (or more) of illustration; providing a coverage of the local work done on the subject subsequent to the *Census of Victorian Plants* (F.N.C.V., 1928), *Flora of Victoria* (Ewart, 1930), *Gems of the Bush*, etc. (Period, May 1929 to April 1953.)

Vol. XLVI—Nos. 2, 7, 9; XLVII—8, 10, 11; XLVIII—6, 7, 10, 11, 12; XLIX—1, 2, 4, 7, 8, 9, 11; L—3; LI—6; LII—9, 12; LIII—4, 8; LIV—10, 11; LV—9; LVI—2, 4, 6, 8, 12; LVII—8, 11, 12; LVIII—6, 7, 8, 11; LIX—1, 9, 12; LX—4; *61*—6, 12; *62*—4; *63*—6; *64*—6; *66*—5, 11, 12; *67*—3. Fifty-two separate parts—£1/17/3.

Series B (Victorian): Less important articles and notes, by various authors, some with very good illustrations, all of interest to the keen orchid student; supplementary to Series A and covering the same period.

Vol. XLVII—No. 7; XLVIII—5, 8; XLIX—10; L—2, 5, 11; LII—2, 11; LIII—2; LIV—12; LV—6, 7, 8; LVI—3, 10; LVII—3, 4, 5; LVIII—12; LIX—3, 4, 11; LX—2; *64*—8; *65*—1; *67*—8; *68*—1; *69*—10, 11; *70*—2, 4. Thirty-two separate parts—£1/0/3.

Series C (Not Victorian): A number of parts containing papers and articles by various authors, on new species and records, etc., of other Australian states, covering the same period of publication and supplementary to Series A and B combined.

Vol. XLVI—Nos. 1, 5, 10, 12; XLVII—2, 12; XLVIII—1, 9; XLIX—3; L—1, 4, 7, 8; LI—3, 4, 7, 8; LII—1, 4, 7; LIII—11; LIV—1, 4, 8; LVI—9; LVII—2, 6, 9; LVIII—2, 3, 9; LIX—7, 8, 10; LX—11; *61*—2, 9, 11; *62*—4; *63*—8, 9; *64*—9, 12; *65*—2, 5, 6, 7, 11, 12; *66*—3, 4; *67*—1, 7, 10; *68*—5; *69*—3, 9, 12; *70*—10. Fifty-nine separate parts—£1/16/3.

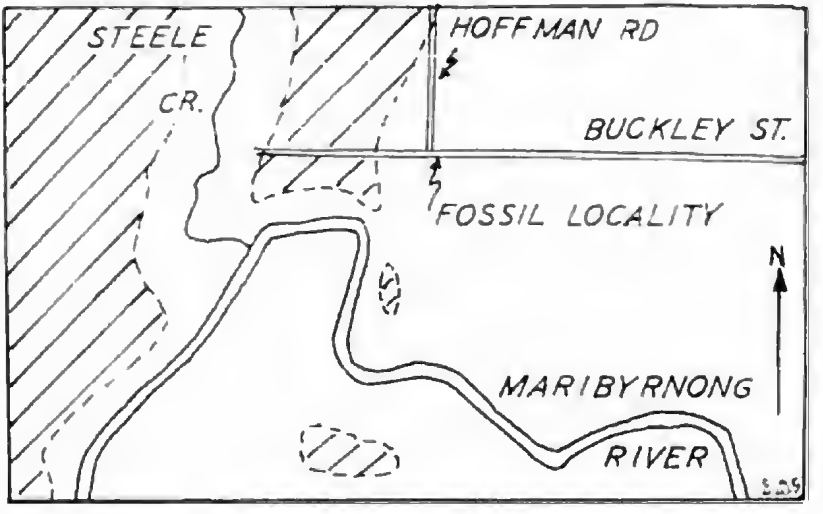
Club members of some years standing will have some back volumes and numbers already, and they can purchase any extra parts they may require, of those listed above, at the prices published last month. Similar series are to be advertised in the near future, covering other subjects (e.g. geology, anthropology, ornithology, entomology, etc.). Those who wish to build up a library catering for general natural history interests should consider acquiring complete back volumes of the *Naturalist*. In this connection, last month's advertisement should be borne in mind. It is pointed out that the twenty-five volumes covered by the above "orchid" advertisement (Vols. 46 to 70 inclusive) may be purchased almost complete (with only thirteen numbers missing) for £8/12/6.

Orders for back numbers and parts of the *Naturalist* should be mailed to the Hon. Editor (P.O. Box 21, Noble Park, Victoria) or handed to him or to the Assitant Editor at F.N.C.V. meetings.

TERTIARY FOSSILS AT ABERFELDIE, MELBOURNE

By Edmund D. Gill* and Alfred A. Baker†

Evidence of a basalt reef that stood in the swirling waters of an ancient tropical sea replete with living things is contained in a small road cutting on the south side of Buckley Street, West Essendon (now known as Aberfeldie). This interesting locality was first recorded by Armitage (1910*a*). There, he said, "Mr. Pritchard discovered ironstone of a similar lithologieal eharaeter to the Barwonian beds at Royal Park, and this contained *Cerithium flemingtonensis* MeCoy. Mr. C. Waters and the writer subsequently visited the locality, and, about 30 yards to the east of the spot where Mr. Pritchard made his discovery, suceeeded in finding several specimens of *Cerithium flemingtonensis* MeCoy, as well as *Conus ligatus* Tate, *Cypraea subsidua?* Tate, and a cidaroid spine."



Text-figure 1

Locality with Miocene marine fossils in Buckley Street, West Essendon (Aberfeldie), Victoria. The cross-hatched areas are basalt, and the rest consists of Sandringham Sands and river terraces (largely derived from the former) resting on Older Basalt. Scale: 2 ins. = 1 mile.

In 1949, a sewerage excavation was made at the foregoing loeality, which had been more or less lost for half a eentury. Large numbers of fossils were revealed, and the Geology Group held an exeursion there to eolleet the fossils available. The writers returned later to study the site more elosely, and they have sinee kept it under observation. In 1953, the road was widened and a footpath formed, and this provided an opportunity for still further

*Curator of Fossils, National Museum of Victoria.
†Leader, F.N.C.V. Geology Group.

PLATE I

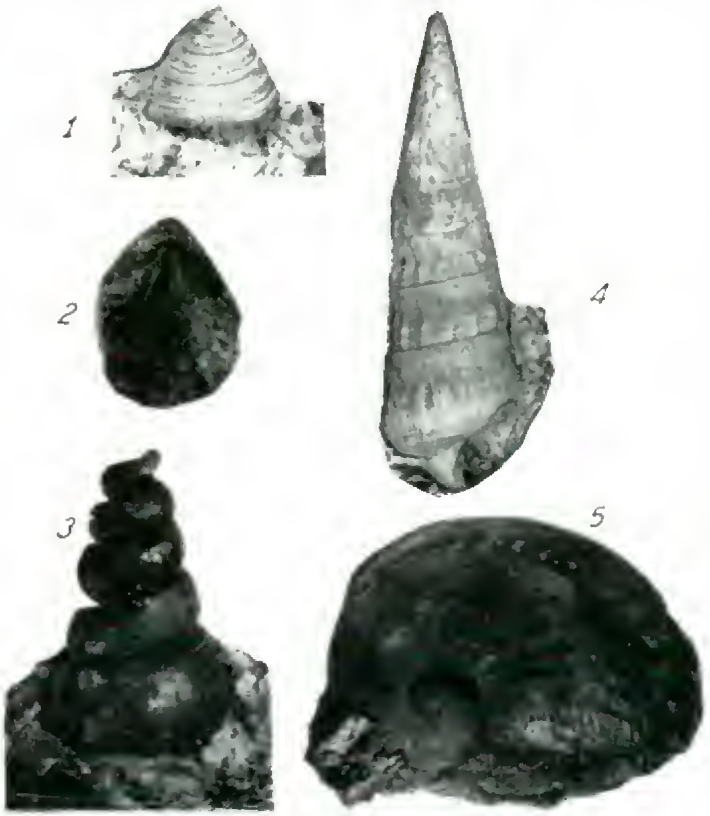


Fig. 1. *Eutrochus* aff. *fontinalis*. Latex cast of external mold in ironstone.
Fig. 2. *Magellania garibaldiana*. Steinkern in ironstone.
Fig. 3. *Cerithium flemingtonensis*. Ditto.
Fig. 4. *Cerithium flemingtonensis*. Latex cast of external mould in ironstone.
Fig. 5. *Haliotis naevosoides*. Steinkern in ironstone.

All fossils are from the locality shown in text-figure 1, and are reproduced at natural size.

collecting. The area is now being built over, and probably there will be few opportunities, if any, in the future for studying this occurrence, and hence these notes are written.

The site is on the south side of Buckley Street as shown in text-figure 1, and the fossils were found east and west of a ridge of decomposed Older Basalt situated opposite Hoffman Road and for two chains east thereof. The rich fossil locality brought to light by the sewerage locality was on the south side of Buckley Street and one chain 75 links east of the east building line of Hoffman Road. Reconnaissance shows that the bedrock in all this area is Older Basalt of Lower Tertiary age; it is grey in the creek eight chains west of Hoffman Road but yellow in the Buckley Street outcrop (see also Armitage 1910*b*). The Tertiary marine sediments containing the fossils are clayey sandstone to fine conglomerate, and are part of the Sandringham Sands formation (Gill 1950). The fossils are preserved as external casts and internal molds (steinkerns), and these are often so fine in detail that it is to be inferred that originally there was a good deal of fine sediment present to give such delicate detail in the impressions (e.g. Plate 1, fig. 1). The sediments are now highly charged with iron, but originally must have been rather poorly sorted siliceous sand to conglomerate with clayey and silty admixture.

Marine Life

The fossils in the ironstone are not easy to determine with certainty, but at Aberfeldie they are very plentiful in actual numbers. The following forms have been recognized:

GASTEROPODA

Haliotis naevosoides
H. moorahoolensis
Cerithium flemingtonensis
Conus ligatus
Cypraea sp.
Eutrochus aff. *fontinalis*

LAMELLIBRANCHIATA

Mactra sp.

BRACHIOPODA

Magellania garibaldiana

CIDAROIDEA

Spines

POLYZOA

Encrusting types

DECAPODA

Pseudocarcinus

Many more fossils could be recognized with a closer study of the material which is mostly housed in the National Museum of Victoria, and in the Department of Geology, University of Melbourne. Mr. Eric Nielsen collected parts of a big crab which Dr. M. F. Glaessner kindly determined as the "Giant Crab *Pseudocarcinus*, the first fossil representative of this present deep-water form and probably a new species" (personal communication).

In Plate I some of these fossils are figured. A modern palaeontological method has been used to portray *Cerithium flemingtonensis* and *Eutrochus* aff. *fontinalis*, the external surfaces of which are preserved only as holes in the ironstone, which of course cannot be photographed satisfactorily. Latex was painted on the inside of these external casts, cured, then pulled out. Being flexible, the latex pulls out of holes and crevices without breaking or losing shape. The latex molds were then sprayed with ammonium chloride and photographed. The latex impression shows every detail of the original fossil, and as seen in Plate 1, can appear just like the original shell long since leached away. This new method is greatly assisting the study of fossils preserved only as casts and molds.

The fauna from Aberfeldie is described in the older literature as Eocene. In those days the Tertiary was divided into Eocene, Miocene, and Pliocene only, i.e. there was no Oligocene. However, with the growth of palaeontological knowledge, the fauna has come to be regarded as of Miocene age, probably Lower Miocene.

Palaeoecology

Having noted the kinds of fossils and the sediments containing them, we are in a position to attempt reconstruction of the conditions of the Tertiary sea at this place. The coarseness of much of the sediment and the cross-bedding show that fairly strong currents were running there, due in part perhaps to the basalt reef. The fossils show that the environment was a fully marine one, so this reef was out in open water, and not in a lagoon or partly closed embayment. The sea was shallow, as is shown by the types of shells present, e.g. the plentiful *Haliotis* (Venus' Ear shell) which grows on rocky platforms at or about low tide level. So it may be that the top of the basalt reef was bare or nearly so at low tide, with the waves breaking over it.

Many of the shells present are types that live on rocks. The gasteropods crawled over the basaltic reef and thrived in the highly oxygenated waters. The encrusting forms of polyzoa would grow on the reef and on the shells of the molluscs. The brachiopods, attached to the reef by their strong peduncles, would be at home in the swirling waters of this environment, as they are to-day in the often swiftly moving waters of certain channels in Western Port Bay.

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FLORA OF VICTORIA: NEW SPECIES AND OTHER ADDITIONS—2

By N. A. WAKEFIELD, Noble Park.

Genus *Leptospermum*: A New South-eastern Australian Species

LEPTOSPERMUM GLABRESCENS sp. nov.; ex affinitate *L. lanigeri* (Ait.) J.Sm. (sens. strict.), sed differt: foliis adultis denique omnino glabris, juvenilibus a pilis longis fimbriatis (indumento brevi velutino absenti), floritione aestivali.

HOLOTYPE: Reedy Creek, Tamboon Road, Cann River valley, eastern Victoria; 20.1.1955; N. A. Wakefield, No. 4806; tall shrub on bank of creek. (MEL.—PARATYPES to be placed at KEW, NSW and AD.*)

An erect shrub, up to about 2 metres high when in swampy places, to about 4 metres high when riparian; branchlets long-pilose, the young shoots densely villose; leaves small, crowded, oblanceolate or rarely obovate, up to about 10 mm. long and 3 mm. broad, almost flat, obscurely 3 or 5 nerved, the apex evenly tapered to a short hard point, normally quite glabrous though with a fringe of long silky hairs when young, always lacking any short vestiture; flowers numerous, small, sessile, terminating very short lateral branchlets; bracts straw-coloured, pubescent, falling early; thalamus-tube hemispherical, very dark grey, densely clothed with short silky hairs; sepals short, blunt, whitish, shortly tomentose; petals small, round, white; anthers very numerous; style long; apex of ovary glabrous; fruit lateral (due to growth of basal shoot after flowering), with a loose shortly pubescent papery skin, the annulus prominent, calyx-lobes persistent; valves 5, protruding, glabrous. Flowers in summer.

Habitat: Swampy sedge-flats and heathland creek-banks of the Cann River-Genoa district of eastern Victoria; usually in the vicinity of *Leptospermum lanigerum*.

L. glabrescens was collected by the author, at Marammgo Creek, near Genoa (No. 4125, 29/9/1946) and in places along Reedy Creek, near Cann River (Nos. 2874 and 2875, 11/12/1948; and No. 4220, Nov. 1948). It was recognized as distinct from *L. lanigerum* because the two species grow in association along Reedy Creek, the latter flowering two months earlier than the former and having the felty leaf-pubescence and long-villose thalamus-tube typical of the species. There was no evidence of major variation in either of these two species in this area, nor were there any plants intermediate in character between the two.

In the Melbourne National Herbarium there are New South Wales and South Australian specimens which appear to belong to *L. glabrescens*. The

*MEL—National Herbarium of Victoria, Melbourne; KEW—Royal Botanic Gardens, Kew, Surrey, England; NSW—National Herbarium of New South Wales, Sydney; AD—Department of Botany, University of Adelaide, South Australia.

first is a fragment with no data other than "Nungatta, Genoa, W. Weatherhead"; it has leaves up to 15 mm. in length. One South Australian specimen is labelled "Square Waterhole; Jan. 6-7/1882; Dense growth in swampy ground, 4-7 ft. high; Tepper. (Near St. Vincent Gulf)"; the other bears the data "Lake Bonney; Mrs. Wehl; 1874".

There is also, in south-eastern South Australia and the adjoining lower Glenelg area of Victoria, a glabrescent form of *L. lanigerum*, but this has broader, shorter leaves and it flowers in October.

Genus *Leptospermum*: Two New State Records

L. MULTICAULE A.Cunn. Leaves tiny, obovate, bluntly pointed, usually bearing appressed silky vestiture on both surfaces; flowers sessile, each amongst the clustered leaves at the apex of a short twig; thalamus-tube shortly pubescent; sepals reddish, usually pubescent on the margins as well as the dorsum; ovary 3-celled, pubescent at the apex. The plants are small, consisting of several stems from a common stock, and usually grow on dry, gravelly hillslopes.

This species is apparently very rare in Victoria, being known only from a single collection from the Mitta Mitta River. This material was collected in January 1923 by S. Clinton, and, though its flowers are less pubescent, it is otherwise a good match for Cunningham's type collection from Bathurst, part of which is in the Melbourne National Herbarium.

(*L. trivalvum* Cheel, with which material of *L. multicaule* has in the past been confused, has pungent leaves, sub-sessile flowers, villose thalamus-tube, and the margins of the sepals are glabrous. It is endemic in New South Wales.)

L. EMARGINATUM Wendl.f. ex Link (Syn. *L. odoratum* Cheel). Branches glabrous; leaves spathulate, glabrous on both surfaces, the apex indented and often with a tiny tuft of hairs in the sinus; flowers on long pedicels, axillary, often two together, quite glabrous; ovary 5-celled.

This species is riparian and favours a rocky habitat. It has been noted by the writer, during the past nine years, in several places along the Genoa River, by Boggy Creek at Nowa Nowa, in the gorge of the Nicholson River at Sarsfield, and along Glenmaggie Creek, west of the McAlister River. In the Melbourne National Herbarium there are specimens which were collected by Mueller at "Genoa River, on gravelly banks" in September 1860; but these have not been identified nor has the species been recorded for Victoria until the present.

Nomenclatural Revision in *Leptospermum*, Involving Several Additions to the List of Species for the State and One Deletion

L. LAEVIGATUM (Soland. ex Gaertn.) F.Muell. Under this species, *L. coriaceum* Cheel must be included as a synonym, the latter being but a desert development of the former. The name *L. coriaceum* has been applied, too, to some Sandringham material which is apparently hybrid between *L. laevigatum* and *L. myrsinoides*, having the sepals and multi-valved fruit of the former, the silky thalamus-tube of the latter, and leaves intermediate in character. *L. laevigatum* ranges from Tasmania to South Australia and New South Wales; in Victoria it is abundant in coastal areas but occurs also in the north-west.

L. SERICATUM Lindl. is the true identity of the species described by Ewart (*Flora of Victoria*, 1930) under the name *L. attenuatum*. It is a small-flowered, rock-loving shrub, usually riparian, found in eastern and north-eastern Victoria and extending thence northward to Queensland. *L. brevipes* F.Muell. is a synonym.

L. ATTENUATUM J.Sm. is, in reality, a large-leaved, large-flowered species, with a paper-barked trunk, and it usually attains the proportions of a small tree. It is confined in Victoria to the far-eastern county of Croajingolong, where it is abundant, forming extensive stands on the *Xanthorrhoea hastilis* flats of near-coastal areas; thence it extends northward into Queensland. *L. stellatum* Cav. is a synonym. The Victorian material of the species represents a large development which was usually identified in the past as a form of *L. lanigerum* (*sens. lat.*). Credit for the first collection of *L. attenuatum* in this State belongs to the late E. E. Pescott, whose specimen, collected at Cape Conran plains in November 1900, is in the National Herbarium, Melbourne.

L. JUNIPERINUM J.Sm. is the correct name for the species described by Ewart under the name *L. scoparium*. The leaves are normally well under ⅛ inch wide, and the flowers are small. The species is widespread and abundant in Victoria, usually in wet situations, and it extends from South Australia to Queensland. It is not native in New Zealand or Tasmania.

L. SCOPARIUM Forst. has obovate or oblanceolate (rarely oblong) leaves, usually small (in Tasmania and New Zealand), but sometimes quite large (as in Victoria). In the latter State it seems to be restricted in range to East Gippsland, where it grows extensively on rocky creek and river banks, and high rocky outcrops of the Grampians. There it is large-flowered and showy, and has large leaves often exceeding ¾ inch in length and ¼ inch in width. This form is also in adjoining areas of New South Wales and in Tasmania, and it may occur too in the highlands of north-eastern Victoria.

L. MICROMYRTUS Miquel is confined to the Australian Alps (Mount Buffalo, etc.), where it grows amongst rocks. It has thick, rounded leaves which are glabrous except occasionally for some marginal hairs, and the flowers are quite glabrous. Previously it was considered to be a form of *L. flavescens* J.Sm.

L. OBOVATUM Sweet is widespread in Victoria, growing along the bank of lowland streams. The leaves are obovate, with the apex blunt and often indented. Flowers are small and yellowish, and the thalamus-tube is normally quite glabrous though rarely a little pubescent in some western Victorian specimens. *L. obovatum* occurs also in New South Wales, and it was previously included under *L. flavescens*, which is a northern species not native in Victoria.

L. NITIDUM Hk.f. is the showy Grampians plant, now quite popular in cultivation, often referred to as "*L. lanigerum* var. *grandiflorum*". The flowers are very large, and the leaves are large, thick, shiny and eventually quite glabrous. The species is found also in western and southern Tasmania, and perhaps too in south-eastern New South Wales.

L. GRANDIFOLIUM J.Sm. is the large, spreading, broad-leaved shrub which lines the watercourses of the Australian Alps and their foothills. Leaves are thin in texture, and their under-surface is covered with an appressed mat of short, whitish vestiture, but the upper surface is usually sparsely villose or quite glabrous and shiny. This species ranges from the Port Jackson district of New South Wales to the eastern Victorian highlands and probably to north-eastern Tasmania. The various forms of *L. grandifolium* and of the more southern *L. lanigerum* are not yet fully understood, but where their geographical ranges overlap they grow together and retain their individual characters with no evidence of intermediate forms.

L. LANIGERUM (Ait.) J.Sm. is a lowland plant in Victoria, with very small, obovate leaves when the habitat is swampy, but with long, narrow leaves when it is riparian. In some situations it develops into a tree up to about 60 feet in height. The leaves rarely exceed $\frac{1}{8}$ inch in width and, as well as the long, spreading hairs, there is normally a mat of short, appressed vestiture on both leaf-surfaces. The species extends from Tasmania to South Australia and the south-east of New South Wales. In some south-western Victorian specimens the short leaf-vestiture is not in evidence, which matter is discussed in connection with *L. glabrescens* in the first section of this paper.

[*L. MYRTIFOLIUM* Sieb. ex DC. is not affected by this revision. It is a small, rough shrub of the waterways and swampy terrain of the eastern Victorian sub-alps and alps, and it extends north through eastern New South Wales.

L. MYRSINOIDES Schlecht. is also not affected. It is abundant in lowland heaths in Victoria, and it occurs also in adjoining districts of South Australia and New South Wales.]

Key to the Victorian Species of *Leptospermum*

(This key may not identify correctly some fragmentary herbarium specimens, but it is presented rather for use in conjunction with field observation of groups of plants. Furthermore, certain features used here may not apply to non-Victorian forms of the species concerned.)

A. Summit of ovary (round style) pubescent
  B. Ovary 3-celled, habitat north-eastern Victoria .. *L. multicaule*
  B. Ovary usually having more than 3 cells
    C. Ovary usually having more than 5 cells .. .. *L. laevigatum*
    C. Ovary usually 5-celled (rarely 3- or 4-celled in a few flowers)
      D. Thalamus-tube with appressed, shiny vestiture on basal part, upper part and the sepals glabrous .. .. *L. myrsinoides*
      D. Both thalamus-tube and the sepals with spreading hairs
        E. Flowers large (about $\frac{1}{2}$ inch across), sessile or nearly so; leaves large ($\frac{1}{8}$ to $\frac{1}{4}$ inch or more broad) .. .. *L. attenuatum*
        E. Flowers small (about $\frac{1}{4}$ inch across), pedicels usually long; leaves narrow (about $\frac{1}{8}$ to $\frac{1}{6}$ inch broad) .. .. *L. sericatum*

A. Summit of ovary (round style) glabrous
  F. Thalamus-tube and sepals normally glabrous (rarely a little glandular-pubescent)
    G. Flowers pedicellate .. .. *L. emarginatum*
    G. Flowers sessile
      H. Leaves pungent-pointed, the margins slightly denticulate
        I. Leaves large (about $\frac{1}{8}$ to $\frac{1}{4}$ inch broad), flowers large ($\frac{1}{2}$ to $\frac{3}{4}$ inch across) .. .. *L. scoparium*
        I. Leaves small (mostly $\frac{1}{16}$ to $\frac{1}{8}$ inch broad), flowers small ($\frac{1}{4}$ to $\frac{1}{2}$ inch across) .. .. *L. juniperinum*

H. Leaves not pungent-pointed, the margins smooth
J. Leaves oblanceolate to obovate; habitat lowland, riparian .. .. *L. obovatum*
J. Leaves broadly obovate to round; habitat alpine .. .. *L. micromyrtus*
F. Both thalamus-tube and sepals villose
K. Leaves obovate, usually about ⅛ inch long and ¼ inch broad, apex usually rounded; sepals short, rounded, usually pinkish .. .. *L. myrtifolium*
K. Not as above
L. Leaves large, mostly ¼ to ½ inch broad
M. Flowers very large, about 1 inch across; adult leaves thick, usually quite glabrous on both surfaces .. .. *L. nitidum*
M. Flowers about ½ inch across; adult leaves thin, under-surface felty-pubescent .. .. *L. grandifolium*
L. Leaves small, mostly 1/16 to ⅛ inch broad
N. Summer flowering; adult leaves quite glabrous .. .. *L. glabrescens*
N. Spring flowering; adult leaves normally pubescent on both surfaces (rarely becoming glabrous) .. .. *L. lanigerum*

NATURALISTS' NOTEBOOK

(Reserved for your Notes, Observations and Queries)

MIRRORS SCARE CROWS FROM CHICK YARDS

(Under this heading a short article appeared in the *Weekly Times* of May 11, 1955. It was contributed by one of the Club's country members, being inspired by the note entitled "Shotguns for Hawks?" in *The Victorian Naturalist* of February last. It is reprinted hereunder with the authorship appended.)

"Each year I raise several thousands of chickens on my farm, which adjoins undeveloped country. For some years I lost large numbers of chickens to crows and a few to the Australian goshawk.

"Not all crows are killers, but those that are become very cunning and often destroy large numbers of chickens during a single visit.

"Goshawks, in my experience, never kill more than one chicken on the one day. Not all goshawks take chickens. One pair regularly hunted over my farm and didn't take a single chick.

"About three years ago a poultry farmer in the Talbot district advised me to place pieces of mirror on the tops of fence posts and chicken sheds. Since I adopted this practice my losses to predatory birds have been negligible.

"I have seen crows carrying out a reconnaissance over the chicken yards suddenly take alarm, change direction and fly off at top speed after encountering the light reflected by the mirrors.

"Chickens over about nine weeks of age are well able to defend themselves. When the youngest chickens reach this age I remove or turn face down the mirrors so that these invaluable servants to the farmer—the hawks, kites and kestrels—can return to their task of vermin destruction."—Ian R. McCann, Stawell.

FANTAILS IN SOUTH-WESTERN VICTORIA

I can add a little to your notes on Rufous Fantails (*Rhipidura rufifrons*) in recent numbers of the *Naturalist*. The birds are common every summer in the Portland district, but I have never seen them out of the thick tea-tree scrubs along creeks and round swamps, where they are certainly one of the beauties of the bird population. Nests are often found in January and February and by the end of April the fantails have disappeared, and we see them not until the following December. The thickets along the Lower Glenelg mark their western range, though the *South Australian Ornithologist* (March 1, 1950) reports from Vol. XII, p. 184, "a specimen taken at Coombe" (near Keith). This bird may have been a storm-blown stray, as the many good ornithologists in the south-east of S.A. have never recorded the species. The Grey Fantail (*R. flabellifera*) is a permanent resident in our Portland areas though many move off in the late summer. This bird prefers open forest and gardens, and two were in my garden today (May 22). Last January, Mr. Les Chandler and I found a Grey Fantail's nest without the long slender stem underneath, only the second sample of the kind that Les had seen in all his long and valuable bird experience.

—Noel F. Learmonth, Portland.

MICROSCOPICAL GROUP

An earliest appeal is made to everyone who has the success of the Group at heart to make special efforts to leave the comforts of the fireside these winter evenings and foregather on the third Wednesday of each month in an endeavour to recapture some of the enthusiasm so evident in many meetings of the past, to the mutual satisfaction and education of all. To this end Mr. Arch. Busby will be operating the late Mr. F. E. J. Ockenden's projector at the next meeting on Wednesday, July 20, and all those who have micro. slides suitable for low-power projection are asked to bring them along.

The Group had the pleasure of the company of Mrs. Erickson, one of Western Australia's outstanding naturalists, at the June meeting. Mrs. Erickson is an authority on orchids and trigger plants.

WHAT, WHERE AND WHEN

F.N.C.V. Excursions:

Sunday, July 17—Mystery Walk of about 6 miles. Leader: Mr. G. McLean. Take 8.55 a.m. train to Ferntree Gully and meet leader at Kiosk opposite station. Bring one meal.

Sunday, July 31—Botany Group excursion, Heathmont to Bayswater. Book second return to Bayswater. Catch 10.33 a.m. Ferntree Gully train, alight at Heathmont. Bring one meal.

Saturday, August 6—Parlor coach excursion to Kinglake West. Leader: Mr. A. A. Baker. Subject: Geology and General. Old sea-floor area, once frequented by trilobites and other invertebrates, now covered with forest and fern gullies. Coach leaves Batman Avenue 9 a.m., returns about 6 p.m. Fare 12/6. Bring one meal. Leader to travel with coach.

Group Meetings:

(8 p.m., at National Herbarium).

Wednesday, July 20—Microscopical Group.

Wednesday, July 27—Botany Group. Subject: Plant World, Part 3—Mosses. Speakers: Mr. Dakin and Mr. Atkins.

Wednesday, August 3—Geology Group. Subject: Fossil Invertebrates. The Trilobites, their life and form. Speaker: Mr. A. A. Baker.

Marie Allender, Excursion Secretary.

The Victorian Naturalist

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PROCEEDINGS

About 100 members and friends attended the General Meeting of the Club at the National Herbarium on July 11. The President, Mr. Tarlton Rayment, informed the Club of the passing of two old and respected members, Mrs. Sarovich and Mr. Dakin, and all present stood in silent tribute to their memory.

A letter was received from the Reverend H. M. R. Rupp, telling of his receipt, at a ceremony at the National Herbarium, Sydney, of the 1954 Natural History Medallion; and Mr. Willis read a private communication expanding Mr. Rupp's letter.

The meeting was then handed over to Mr. E. S. Hanks, who showed a series of coloured slides and spoke on the Wyperfeld National Park, from both an historical and natural history point of view. The lecture was very profitable and enjoyable to all present.

Mr. Wakefield reported the gift of a complete set of the *Victorian Naturalist* by Mr. George Coghill, whose instructions were that it was to be sold for the benefit of Club funds, which transaction had been effected for the sum of £50. He reported also that during the past month a further £46 worth of back numbers of the journal had been sold.

Mr. Swaby reported on changes in the Maranoa Gardens committee, and offered to act as this Club's liaison officer with it, which offer was gladly accepted by the Club.

It was reported that Council had appointed Mr. A. G. Hooke as Honorary Treasurer, in place of Dr. Geroe, who is retiring on account of professional reasons. The President welcomed Mr. Hooke back to the Executive, and thanked Dr. Geroe for the service he had rendered the Club.

Mrs. M. C. Chatterton was elected as Ordinary Member, Mr. and Mrs. S. Ling as Joint Members, and Mr. Stephen Berrigan as Country Member. All are accorded a hearty welcome to the ranks of the Club.

After a number of nature notes by members and comments on exhibits, the meeting was adjourned for the usual conversazione.

NATURE NOTES AND EXHIBITS

Reproductions of plates, by Mr. Tarlton Rayment: Illustrating the biology and morphology of Sericophorine Wasps, and showing the pollination by a bee of the Grass Trigger plant.

Box made from wood of *Banksia integrifolia*, by Mr. Colin Lewis.

Marine shells, by Mr. C. J. Gabriel: "Spindle Shell", *Fasciolaria australasia* Perry, from Western Port Bay and Lakes Entrance. A bunch about 4 inches in diameter from the latter locality contained about 170 capsules each with 6 to 8 juvenile forms. "Rock Whelk", *Cymatium spengleri* Chem., from Western Port Bay.

Cultivated native flowers, from Maranoa Gardens and A. J. Swaby, an illustration of the value of hardy Australian plants for winter display and long flowering periods. The following details are given by the exhibitor:

Grevillea aspleniifolia, Jan.-Dec.; *G. alcoides dimorpha*, May-Oct.; *G. victoriae*, Ap.-Sept.; *G. victoriae tenuinervis*, Ap.-Oct.; *G. punicea*, May-Oct.; *G. sericea*, Jan.-Dec.; *G. rosmarinifolia*, Jan.-Dec.

Thryptomene saxicola, Mar.-Nov.; *T. calycina*, Jy.-Oct.; *T. "payneï"*, Feb.-Nov.

Leptospermum scoparium, varieties *walkeri*, *lanbethi*, *keatleyi*, all Mar.-Oct.

Stenocarpus sinuatus, May-Oct.; *Acacia podalyriaefolia*, May-Oct.; *Anigozanthos viridis*, Mar. to ?; *Correa lasiantha*, Ap.-Sept.; *C. reflexa backhousiana*, Ap.-Sept.

Grevillea victoriae tenuinervis has been in Maranoa Gardens for several years under the name, *G. uniqueliana*. The form of *G. punicea* has elliptical leaves. It is not known where this beautiful form is native; information would be welcome. *G. sericea* took a long time to find its way into Victorian gardens; but it will be very popular—only 3 feet high, and covered with pink flowers all the year.

Thryptomene "payneï" (said to be a hybrid, *T. hyporhytis* × *T. saxicola*), raised by F. C. Payne of Athelstone, S.A., is very hardy in any soil.

Anigozanthos viridis, a swamp plant, is rarely seen in Victoria. The plant at Maranoa will continue in flower for several months.

"NATURALIST" SETS FOR SALE: ANTHROPOLOGY, MAMMALS

ANTHROPOLOGY: 43 individual numbers of the journal, selected from over the 25-year period, May 1930 to April 1954, containing over 150 pages about Australian aborigines, including numerous text-figures, and with 21 plates additional. Price, £1/5/6; see also note below. This lot comprises the following numbers: Vol. XLVI—Nos. 1, 10, 12; XLVII—5; XLVIII—2, 6, 8; L—3, 8; LI—6; LII—5; LIII—9; LIV—3, 6, 9; LV—8, 9, 12; LVI—4, 5, 7, 11; LVII—6, 7; LVIII—11; LIX—5; LX—3, 4, 5, 6, 7, 12; 62—1, 6; 64—12; 67—10, 11, 12; 68—2; 69—2, 12; 70—8, 12.

MAMMALS: Two sets dealing almost wholly with local marsupials, covering the same period of the journal as the above anthropology lot.

Set A: Over 150 pages, with numerous text-figures, and with 40 plates in addition, featuring in particular David Fleay's valuable contributions. Price, £7/3 (see note below). This comprises: Vol. XLVII—No. 1; XLIX—3, 4, 5, 7; L—2, 6; LI—3, 4; LII—4, 6, 8; LV—1; LVI—8, 10; LVIII—10; LIX—1, 7, 8, 11; 61—1, 2, 3, 4; 63—6, 7, 8, 12; 65—12.

Set B: Complementary to Set A, 65 pages, with illustrations, and two plates also, of articles of less outstanding nature, but interesting nevertheless. Price, 10/3 (see note below). Set B comprises: Vol. XLVI—6; XLVII—5, LI—10, LIII—5, 7; LIV—4, 11, 12; LV—6, LVII—5, 8, 11, 12; LVIII—1, 2; LIX—2; 61—11; 62—6; 64—10; 65—4, 8, 9.

N.B.—The prices quoted above are available to F.N.C.V. members and subscribers, being half the original cost; the same material is available to others at original price (twice those quoted above). Under the same scheme, any individual numbers or parts of the above sets may be acquired. This has been set out previously, but prices (half) are more precisely listed as follows:

From Vol. I No. 1 to Vol. XLI to No. 3	3d. per copy
XLI—4 to XLIII—5, and XLIX—2 to 64—2	6d. per copy
XLIII—6 to XLIX—1 and 64—3 to 68—2	9d. per copy
68—3 to 69—2	1/- per copy
69—3 onwards	1/3 per copy

Orders should be addressed to the Hon. Editor (see address on cover).

THE AUSTRALIAN ANCHOR PLANT

(*Discaria pubescens*)

Its Distribution and Present Status, an Occurrence along Creswick Creek, Vic., and Notes on the Fruiting Structure

By J. H. Willis, National Herbarium of Victoria

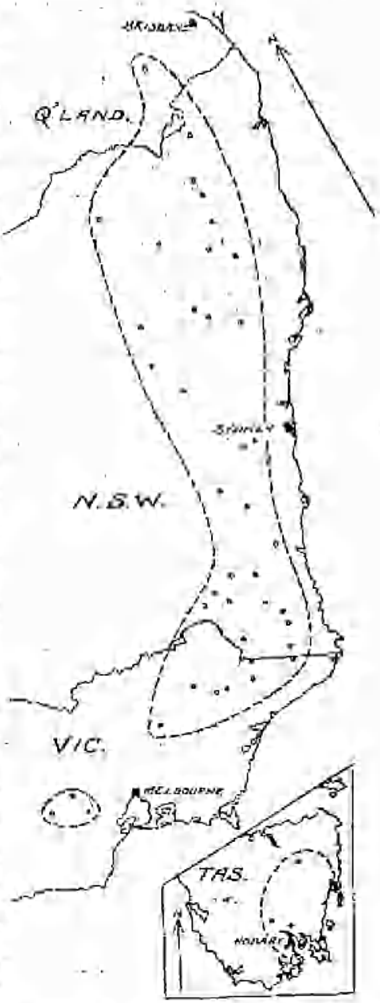
By the inevitable, if often unpalatable, application of the Rules of Botanical Nomenclature, many of our indigenous plants have been "re-baptized" in recent years. Thus the old, familiar *Discaria australis* Hook. (1830) became *D. pubescens* (Brongn.) Druce 1917 —based upon *Colletia pubescens* of Brongniart (1827). Australian botanists have been slow to adopt this change, which is particularly distasteful; as W. J. Hooker remarked in his original description of the genus *Discaria*, "The name *pubescens* is scarcely applicable, for, in general, the stems, branches and thorns are quite glabrous."

So much for the name of a remarkable plant, but what concerns us more is its present quantitative distribution—from eastern Tasmania, through Victoria and the eastern tablelands of New South Wales to the Darling Downs district in the far south of Queensland (it is absent from South Australia and the West). Just a hundred years ago, in his *Flora Tasmaniae* 1: 69 (1855), J. D. Hooker remarked that our Australian Anchor Plant was "not common . . . an ugly shrub . . . much browsed on by cattle and sheep". Do we see in these words an adumbration of impending doom? Recorded localities for Tasmania are the Hobart-Kingston area (where Robert Brown first saw it in March 1804, nicknaming it "Colletia ferox"), Derwent and Jordan valleys (including Hamilton, Brighton and Bagdad), Great Swanport and the South Esk River; but in a recent letter (2/5/1955) Dr. Winifred Curtis of the Tasmanian University tells me that she has never succeeded in finding the plant anywhere in her State and has a "horrible feeling that it may already be exterminated".

As far as Victoria is concerned, anchor plants are now a distinct rarity, and few people ever see them. Normally they are divaricate shrubs having opposite, awl-shaped spines, each pair set alternately at right angles. Leaves are small and early deciduous; but at Cobungra a tall leafy form grows (or grew), with the spines much reduced or even absent. In the *Victorian Naturalist* 59: 68 (Aug. 1942) I discussed the known Victorian occurrences (viz. Middle Creek near Mt. Cole; Mt. Warrenheip; Lal Lal falls; upper Delatite, Ovens and Mitta Mitta Rivers; Cobungra; Livingstone Creek, Omeo, Black Mtn., Wulgulmerang), with special reference to a patch near Creswick—on basalt country where Major Mitchell had first observed the species, on September 27, 1836. A visit to Birch's Creek, near Creswick, in January 1953 showed that the small anchor plant colony there had dwindled to one decrepit, moribund bush, unequal to its battle for existence beneath encroaching tangles

of introduced broom. No other occurrences had been noted anywhere in the Creswick district.

Last January (13/1/1955), in company with Mr. Allan Sonsee of the Ballarat Teachers' College and several other friends, I was exploring the lower part of Creswick Creek "gorge", one mile S.W. of "Snizort" Homestead at Cattle Station Hill. This rocky tract affords many botanical excitements and is the last refuge for several plants which have long since vanished from the surrounding basalt plains — either heavily grazed (by rabbits and stock) or put under cultivation. We found an occasional very old gnarled tree of *Banksia marginata* among boulders along the creek, nearby the shade-loving elderberry *Sambucus gaudichaudiana*, and perched high on one cliff-face a few tufts of Blue-grass, *Dichanthium sericeum* [see *Vict. Nat.* 69: 130 (Feb. 1953)]. In the last cliffy section of the creek toward Tourello grew bracken fern, attractive masses of late bluebells (*Wahlenbergia bicolor*) on the escarpment, and one plant of the Derwent Speedwell (*Veronica derwentia*) —a distinct surprise in this basaltic area. But the *pièce de résistance* of the day was *Discaria pubescens*—three old, yet vigorous, bushes overhanging the stream at an isolated patch of Swamp Gum and Blackwood; they are almost inaccessible to browsing stock and would appear fit to survive for many years. Magnificent examples of Magenta Storksbill (*Pelargonium rodneyanum*) in full bloom accompanied the anchor plants at this spot. Another important "find" for the day was a clump of showy Feather-heads (*Trichinium macrocephalum*) at the eastern foot of Mt. Beckworth, on granitic wash. Probably the species once extended over basaltic grassland near Clunes, as it does today on the Keilor plains, and we had been fortunate enough to stumble upon one of its last resorts.



Distribution of *Discaria pubescens*.

On the main road between Bendoc and Lower Bendoc (very near the N.S.W. border) Mr. N. A. Wakefield and I found a single *Discaria* plant on January 20, 1948.

After reading my anchor plant note of August 1942 (*Vict. Nat.*), the Rev. H. M. R. Rupp wrote at once with the following information concerning occurrences 40 years ago in the New England district, N.S.W.:

> Years ago (about 1911-14) I used to collect it quite frequently in the Barraba district, west of the main New England tableland. It was fairly common there, at elevations ranging from 1,700 ft. (the altitude of Barraba itself) to about 4,000 ft. on the Nandewar Range and its spurs. . . . So far as I can recollect, it was a low shrub from 2-4 ft. high, and was frequently in association with one or two species of *Cryptandra*, usually on the grassy slopes of the valleys. I do not remember ever finding it in the rough granite country towards New England proper. I think, however, that I once collected it on basalt near Glen Innes.

One wonders whether the plant is as numerous now in the Barraba ranges, or whether it still occurs at Allan Cunningham's original collecting spots near Bathurst (Macquarie River) and on Cox's River? I found a few specimens on the banks of the Murrumbidgee, five miles N.W. of Cooma, in October 1948; and in his monumental work, *A Study of the Ecosystems of the Monaro Region of New South Wales*, 1954, A. B. Costin records it as occurring in grassland, savannah woodland, and both wet and dry sclerophyll forest—though apparently nowhere frequent. L. D. Pryor (1939) records *Discaria* as a small shrubby component of *Eucalyptus pauciflora-E. stellulata* forest in the Federal Capital Territory at 3,000-4,000 feet.

Mr. R. H. Anderson, Chief Botanist and Curator at Sydney Botanic Gardens, informs me (18/5/1955) that few members of his staff have seen anchor plants in the field on more than one occasion, and then only in rocky mountainous country inaccessible to stock or where stocking is light—in such areas the shrubs were common enough and in no apparent danger of extinction. An interesting note accompanies a specimen in Sydney Herbarium from Braidwood, 1949; stating that the plant was "spreading rapidly" in that district. In answer to a further enquiry on the matter, the Braidwood Shire Clerk reported (19/7/1955) that he interviewed Mr. W. B. Henville, from whose property the material of 1949 had come, and learned that *Discaria* was certainly not "spreading rapidly" then—in fact, Mr. Henville has not seen it at all for some years. It is strange that such an erroneous remark should have accompanied the specimen to the Sydney Herbarium.

Coming finally to Queensland, there is only a single recorded locality—Eton Vale, on the Darling Downs 24 miles south of Toowoomba, where a collection was made in June 1898. Mr. S. T. Blake of the Brisbane Herbarium (in a letter to the writer, 30/5/1955) does not know anyone who has seen *Discaria* in Queensland since 1898.

To my knowledge, the fruiting structure of *Discaria pubescens* has never been adequately described. Mature fruits are 3-4 mm. in diameter, each consisting of three one-seeded, reddish-brown, bald but reticulate-veined cocci which split loculically. Seeds are about 2·5 × 1·5 mm., ellipsoid, brown, rather laccate and slightly wrinkled. But a most noteworthy thing is the *accrescent base of the calyx*. After the upper petaloid lobes have shrivelled and dropped off, the undivided tubular portion expands to form a very shallow funnel or disk subtending each young fruit; with fruit fall, these calycine disks remain in axillary clusters on the branches, giving them a distinctive appearance.

Photo: Rolf. R. Baldwin, 13/1/1955

The haunt of surviving anchor plants—on a basaltic cliff of Creswick Creek, 1 mile S.W. of "Snizort" Homestead. (*Inset* sketch of flower, 3-coccous fruit, and fruiting branch.)

Another curious feature in *D. pubescens* is the way in which the fascicles of flowers and young leafy shoots invariably develop *underneath* the opposing branch-spines, instead of in their upper axils as one might expect. Actually, the inflorescences arise in axils of old obliterated leaves from which the spines themselves once grew, and a stipular scar is discernible immediately beneath each pair of spines, even on old branches. A Bendoc specimen (20/1/

1948) in Melbourne Herbarium has both spines of one pair forked at their apices.

The accompanying sketch-map illustrates the known range of *D. pubescens*, with many occurrences (indicated by small hollow dots) throughout the tableland region of New South Wales—from Tenterfield to Delegate.

FLORA OF VICTORIA: NEW SPECIES AND OTHER ADDITIONS—3

By N. A. WAKEFIELD, Noble Park

Genus Hydrocotyle: A New Species from the Australian Alps

HYDROCOTYLE ALGIDUS sp. nov.; ob flores indumentumque *H. acutilobam* (F.Muell.) N. A. Wakefield, et ob formam foliorum *H. hirtam* R.Br. ex Rich. accedens, sed differt habitatione alpina, foliis subtus manifeste pallidioribus atque pedunculis saepissime quam petioli longioribus; a priore foliis rotundis et lobis perobtusis, a posteriore ovario quam corolla angustiori etiam recedens.

HOLOTYPE: Mount Buller, Victoria, southern slopes, 5,200 to 5,400 feet, amongst basaltic and granitic rocks under *Eucalyptus pauciflora*, 9.3.1953; J. H. Willis and N. A. Wakefield. (MEL.—PARATYPES to be placed at KEW and NSW.)

Rhizomes widely creeping; petioles long, densely villose; leaves rounded, to about 2 cm. diam., with about 7 main lobes, upper surface dark green with raised veins, under-surface very pale and the veins sunk, both surfaces bearing copious short curved acuminate hairs; peduncles longer than the adjacent petioles, densely villose; flowers about 15 per head, sub-sessile, the corolla much broader than the ovary.

H. algidus has the floral structure and the vestiture of the lowland *H. acutiloba*, from which it differs mainly in having rounded leaves and leaf-lobes; its foliage resembles that of *H. hirta*, but the floral structure is quite different; and from both these species *H. algidus* differs further by its elongated peduncles and the very pale under-surfaces of the leaves. For illustrations of various species of the group, see *Vict. Nat.* 68: 8 (May 1951).

Habitat. Under Snow Gum (*Eucalyptus pauciflora*), at elevations of about 4,000 feet and over, throughout the Australian Alps.

In the National Herbarium, Melbourne, there are also specimens of *H. algidus* from the Cobboras Mountains (leg. Dr. Ferd. Mueller, Feb. 1854), Mount Bogong (A. J. Tadgell, Feb. 1923 and Jan. 1924) and the summit of Mount Erica in the Baw Baws (J. H. Willis, 21.3.1951). It was collected also by Dr. R. Melville of Kew and the author, at the head of the Timbarra River on the Nunniong Plateau in eastern Victoria, in January 1953.

By courtesy of the Chief Botanist, National Herbarium, Sydney, the author has been able to examine two collections of the species from New South Wales. One in flower and fruit (NSW. No. 31230) bears the data "Pretty Point, Mount Kosciusko, N.S.W., J. H. Maiden and W. Forsyth, Jan. 1899"; and the other, with rhizomes and foliage only (No. 31231), is labelled "Swampy Plain River (Snowy River area), 12.4.1954, M. Mueller No. 1841".

MICROSCOPICAL GROUP

Micro-projection was the theme at a well attended July meeting. Mr. C. Middleton and Mr. A. Busby collaborated with theory and practice to give a most enjoyable evening. The August meeting will deal with photo-microscopy. So if you have any material, please bring it along.

F.N.C.V. EXCURSION TO PORT FAIRY—EASTER 1954

By K. W. Atkins

Under the capable leadership of two local Club members, the Misses G. Bowker and M. Brady, our party of twelve spent an instructive and enjoyable stay in this locality, rich in historical, geological and ornithological interests. Situated 183 miles from Melbourne, in the south-western corner of the State, Port Fairy is pleasantly placed on the banks of the Moyne River, a stream noted for its large brown and rainbow trout. Downstream are snapper, whiting, silver bream and mullet of good size and quantity.

Historical

Apparently this part of Australia was visited first towards the end of 1800, when Captain Grant, en route from London to Sydney, took advantage of the discovery of Bass Strait by Bass and Flinders. Grant sighted land near Mt. Gambier and examined the coastline carefully from there to Cape Otway. In 1802, the Frenchman, Baudin, in *Le Geographe*, charted the coast from Wilson's Promontory westward to Encounter Bay (South Australia), where he met Flinders working similarly from the west.

On April 25, 1810, Captain James Wishart, in the cutter *Fairy*, sought shelter from a south-westerly gale in the bay which he named "Port Fairy". In 1834, a master mariner, John Griffiths of Launceston, built huts for his men in this locality, and so pioneered the settlement which is said to have been for a time the busiest Australian port outside Sydney.

Geological

The bedrock of Port Fairy district consists of Miocene marine limestone. The beds, lying horizontally, are of considerable depth and they form part of the sediments extending across south-western Victoria and south-eastern South Australia.

By Pliocene times, the marine limestone had emerged from the sea. There then occurred vast outpourings of lava which covered most of the Victorian Western District, forming a great basaltic plain, 9,000 square miles in area and the third largest in the world. Where Port Fairy now stands, one of the many tongues of basalt which reached the coast from these outpourings, flowed down and filled a river valley eroded into the limestone.

The occurrence of an Ice Age towards the end of the Pleistocene period, effected a drop in sea level to 150 feet below the present level, and a conspicuous feature of the coast from Port Fairy eastward to the Hopkins River is the deposits of consolidated dune limestone formed during this Ice Age period. The deposits extend one to three miles inland, and seawards for a quarter of a mile, below the present sea level. The rock, when even and compact, is used for building purposes. It was formed from sand blown by the wind into dunes and subsequently consolidated by the presence of calcareous matter derived from shell fragments associated with the sand.

With the passing of the Ice Age, the sea encroached upon the land, ten to twelve feet higher than the present level, and there are numerous shell beds of recent character scattered throughout the district, laid down during this period. After the sea had retreated to its present level, Tower Hill volcano erupted and the fine volcanic ash from its craters has become some of the most valuable agricultural land in Australia.

The mobile sand dunes fringing the ocean are of recent origin and were once densely covered with tea-tree and native herbage. And today the sea is once again encroaching upon the land, as is indicated by the geologically rapid retrograding of the present coastline.

Excursion Activities

On Easter Friday, an afternoon was spent at the Killarney aboriginal midden, seven miles to the east along the coast. The weather was cloudy and

showery, as we walked along the beach strewn with heaps of brown leathery kelp. On the landward side the coastal dunes were covered with dense growth of Hairy Spinifex, Maram Grass and Coast Sword-sedge. Lining the sandy beach were low bushes of "Sea Rocket", *Cakile maritima*, profuse with dainty sprays of mauve flowers but emitting an unpleasant odour. This plant, an introduction, is an annual and produces fat "pods", and seeds beloved of little dull-green parrots which come in large flocks to partake of the feast.

On our way to the midden we made a varied bird list: Caspian Tern, Little Pied Cormorant, Red-capped and Hooded Dotterels, Little Stint, Sharp-tailed Sandpiper, Turnstone, Golden Plover, Lesser Knot and Double-banded Dotterel.

The Killarney midden covers an area some three acres of sand dunes, and it has been searched thoroughly for aboriginal artefacts, though enough bits and pieces are about for one to form a picture of the activities associated with the area. The midden contains the remains of a variety of molluscs, "Elephant Tusks", Limpets, Periwinkles, "Coats of Mail", Mutton-fish and Oysters, together with crude forms of stone implements, used as hammers and anvils to break open the shells, and stones for knocking molluscs off the rocks. In most heaps, the various species of shell are mingled together or strewn haphazardly over considerable areas, but some heaps, four to six feet in diameter, are composed of only one shell type.

The natives lit their fires in shallow hollows on the tops of sand dunes and from the masses of jagged, black basalt reefs running out into the sea just below the midden they gathered their main supply of shell-fish. These were cooked and the contents picked out, or the shells were smashed and the molluscs eaten raw.

On the sand dunes grew Angular Noonflower, *Carpobrotus aequilaterus*, which the Port Fairy natives called *puuyunkil*. The inch-long reddish fruits were eaten and considered a great delicacy, though to the European palate they have a brackish flavour.

For how long the aborigines had roamed this district before the arrival of Europeans is debatable, but the finding at Bushfield, north of Warrnambool, of a native axe and bone implements with fossil dingo bones underneath the Tower Hill volcanic ash has proved the often discredited aboriginal tradition that their ancestors had witnessed Tower Hill in eruption. Radio-carbon tests show that the last eruption of Tower Hill occurred about 10,000 years ago.

And from the discoveries of fossil dingo bones with those of *Thylacoleo*, an extinct giant marsupial, it is assumed that the aborigines, who are credited with bringing the dingo into Australia, had arrived in the Western District of Victoria before the Great Australian Arid Period, of 5,000-7,000 years ago, which caused the extinction of the *Thylacoleo*.

Early on Saturday morning we were on our way for an all-day visit to one of Victoria's geological wonders, Tower Hill, the world-famous caldera—a volcanic crater widened by subsidence. Tower Hill is about midway between Port Fairy and Warrnambool and was the last active volcano in Victoria.

Its history begins with very high pressures of volcanic gases, chiefly steam, thrusting through a weakness in the overlying bedrock of marine limestone. As the gases reached the ground surface, dense clouds of suffocating steam and volcanic ash billowed skyward and volcanic bombs (incandescent pieces of lava) shot into the sky. The initial crater vent vastly increased in size as walls of loose volcanic ash collapsed into the fiery furnace, and when Tower Hill declined in fury and became quiescent, a crater, roughly pear-shaped, two miles long by one and a half miles wide had been gouged out of the earth's surface. After a period of rest a minor eruption occurred and from this resulted the nest of cones that today stand in the centre of the caldera.

Taking advantage of a fine road which descends into the crater and is connected to the causeway, we walked down, examining on the way an example

of a small volcanic bomb which affected the tuff by looping sharp downward bends in the horizontal layers.

Then the party began a pleasant five-mile stroll around the island of cones in the centre of the crater lake whose waters are rich in bird life. We noticed multitudes of Coots and Grey Teal, numerous Swamp Hens, Black Duck, Swans and Hoary Grebes; there were a few White Ibis, Yellow-billed and Royal Spoonbills, White Egrets and a solitary Pelican. Brown Hawks flew low over the lake waters and overhead a Peregrine Falcon soared high in the air. From the bracken along the roadside we heard the "sissy" of the Blue Wren and noticed Silvereyes, Field-Wrens and White-browed Scrub-Wrens.

After lunch, our party climbed a steep-sided slope to the highest point of the island, 323 feet above sea level, to obtain a panoramic view of this vast crater. Running clockwise from the north-west to the south-west of the crater is the spectacular 3-mile stretch of almost vertical crater wall consisting of thousands of horizontal layers of tuff (consolidated volcanic ash) and lapilli (pea-sized pellets), over 300 feet high at its thickest part along the eastern edge of the rim.

To the west and south the wall falls away rapidly to a low bank and so the finest outside view of the cones is from the ocean, for Tower Hill occupies not a crater in a volcanic hill but a hole below the earth's surface, formed by the gouging activity of the volcano.

The difference in height between the two portions of the crater wall is due to the fact that, during the volcano's outburst 10,000 years ago, the then prevailing south-westerly winds spread the continuous shower of ashes and pellets markedly to the north-east of the crater.

The crater island is a mile in length, with a greatest width of about three-quarters of a mile. There are a number of scoria cones on the island and, except for two very distinct craters, one at each end of the island, it is difficult to separate the vents, as each interfered with the other's activity. From the summit we walked along a high narrow ridge to the rim of the well preserved southern scoria cone whose steep inner slopes are composed of coarse fragments of ash.

We made our return to Port Fairy via the road bordering the eastern and northern edges of the crater. We expected to obtain views of the crater as we travelled along, but the surrounding country rises gently to the rim on the eastern and northern sides and the road is on the outside. At the north-western sector, however, gaps occur in the rim and so glimpses are obtained of the crater wall and the island nest of bare brown cones.

Sunday afternoon was spent at Griffiths Island, at one time connected to the mainland by a breakwater pier. Through the generosity of Mr. Rogers, Port Fairy Harbour Master, we were ferried over and he conducted the tour. We visited the lighthouse, the Fairy Penguin nesting sites and the Mutton-bird rookeries with, at the time of our visit, a few fledglings almost ready to fly. From the trig. beacon we obtained views of the sweep of coastline from Port Fairy to Warrnambool.

As we made our way to the guest house, a Musk Duck displaying in the river attracted our attention, and the disorderly tail, consisting of a few spine-like feathers, was quite visible.

On Monday, we travelled by road eight miles westward from Port Fairy to the Silver Gull rookery at the Craigs, a jumbled mass of wind-swept rocks detached from the main cliff face. From the cliff top we viewed the flat-topped Lady Julia Percy Island, five miles offshore to the west.

Bird life was abundant as our party wended its way back to Tea-tree Bay over the cliff tops and along the beaches. From the dense thickets of Coast Beard-heath came the calls of the Singing Honeyeater. Where the country was covered with a mass of low herbage, we noticed Silvereyes, Flame Robins, Buff-tailed Thornbills, White-browed Scrub-Wrens, Field-Wrens and small numbers of a tiny bird with a ponderous vernacular name, the Golden-headed

Fantail-Warbler—more simply and attractively known by its scientific name, *Cisticola*.

Along the beaches were Curlew-Sandpipers, Gannets, Pied and Sooty Oystercatchers, Red-necked Stints, Whistling Eagles (the most numerous bird of prey in the district), Crested Terns, Hooded, Double-banded and Red-capped Dotterels, and several unidentified Albatross offshore. The Turnstones were apparently restricted to the basalt reefs running out into the sea, areas which they prefer, and they were not seen on the sandy sections of the beach.

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THE VICTORIAN MOLLUSCA

By RON C. KERSHAW

This paper discusses literature relating to the mollusca in Victoria. It is intended as the first of a series, variously titled.

Until recently the most important work relating to the mollusca in Victoria was the *Catalogue of the Victorian Mollusca*, prepared by G. B. Pritchard and J. H. Gatliff. The work commenced by these authors was subsequently carried on by J. H. Gatliff and C. J. Gabriel in collaboration, in the form of *Additions to The Catalogue*. Commenced in 1898, the entire work, including many additional papers describing new species, was carried on until the year 1931. All the papers published by these authors have been listed by Colliver (1947a, 1947b, 1948). Part I of the above catalogue gave a brief review of the earlier lists and papers published in Victoria, including two describing new species by the Rev. Julian Tenison Woods in the *Proceedings of the Royal Society of Victoria*, Vol. 14 (1878) and Vol. 17 (1881). The earliest list had been that prepared by Gatliff and published in this Journal, in 1887, while J. Bracebridge Wilson, who is so well known for his collection of Victorian Chitons, also provided a list.

The collection of shells brought together by the late J. H. Gatliff, numbering 7,270 specimens, is preserved in the National Museum, as an invaluable reference collection for students of conchology.

The natural sequel to the work of the early collectors was the publication by Macpherson and Chapple (1951), of a new Systematic List. However, the great bulk of the systematic revision which enabled the preparation of this valuable work had been carried out by Iredale, principally in New South Wales, and Cotton in South Australia. Iredale, after publishing many important papers dealing with his researches in England and New Zealand, several of which have been listed by Finlay (1926), began his revision of the "Check-list of N.S. Wales Mollusca" prepared by Charles Hedley (1917), with an historic paper dealing with the collections of Roy Bell (Iredale, 1924). As Roy Bell had collected in Victoria many shells referred to by Iredale, this paper assumes considerable importance to Victorian students. Later, during

a further series of essays. Iredale reviewed not only the New South Wales molluscan fauna, but much of that of the remainder of the eastern and southern coasts of Australia, and in addition the terrestrial mollusca of the same area. A list of the very large number of essays published by Charles Hedley (Iredale, 1936) was presented by this author also. In South Australia, similar important work, though perhaps on a somewhat smaller scale, was carried out by B. C. Cotton, with the assistance for some years of F. K. Godfrey. This led to the publication of systematic lists of the mollusca of South Australia (Cotton and Godfrey, 1938b and 1940b). The writer, in a forthcoming list of the Tasmanian mollusca, has provided a list of references of the bulk of the essays contributed by Iredale, Cotton, Laseron and other well-known authors. Accordingly such a list is not included with this paper.

In addition to the descriptive papers published by the early authors in Victoria, C. J. Gabriel in 1936 published a small book, *Victorian Shells*, unfortunately now out of print, dealing with a large number of the shells to be found in Port Phillip Bay. The illustrations provided made identification of most species likely to be collected on our Bay beaches rather simple. Since then Cotton and Godfrey have provided, under the title *The Molluscs of South Australia*, illustrated and descriptive books dealing with bivalves (1938a), and with chitons, tusk shells and cephalopods (1940a). Many shells found on the Victorian coast are dealt with in these works. Then there appeared the most important contribution of all, which enables the great majority of shells to be identified, Joyce Allan's *Australian Shells* (Allan, 1950).

For further illustrations the excellent *Illustrated Index of Tasmanian Shells* (May 1923), now out of print, gives figures of many shells found in Victorian waters, including species from the deeper waters off the coast.

Brief reference has been made to the literature published so far during the present century, with a few earlier references. The following notes deal with a few of the important works published during the eighteenth and nineteenth centuries, which hold some interest for students of the Victorian molluscs. Though desirable a complete review and a list of all the literature dealing with Victorian molluscs to the present day is hardly practicable, however it is hoped that many more references may be given when dealing with individual species in later papers of the series commenced here.

Systema Naturae: The work of the famous Linneaus is so well known as scarcely to need mention, and yet it seems hardly right to exclude the foundation on which the structure has been built. Binomial nomenclature, as it is now accepted, dates from the tenth edition of the *Systema Naturae*, i.e. the first day of January 1758. Names proposed before this date are not recognized. The thirteenth edition of the work was edited by Gmelin. Solander, a famous pupil of Linné visited Australia with Sir Joseph Banks.

Universal Conchologist: 4 Vols., 1784. Martyn's work, according to Iredale, was beautifully illustrated; however, he used his own system, which is not now regarded as binomial and is consequently not accepted.

Histoire Naturelle des Animaux sans Vertebres: 7 Vols., 1815-22; by Jean Baptiste Pierre Antoine De Monet De Lamarck: If Linneaus was the architect of modern systematic zoology, Lamarck was one of its greatest builders. In Victoria, we are principally concerned with Vol. 5 (1818) and Vol. 7 (1822) of this work, a second edition of which was published by Mr. Desnayes. Several noted French conchologists studied Lamarck's shells, among whom Lamy has recently made important studies of bivalves. Peron and Lesueur made collections when naturalists with Captain Baudin, but their monumental work was never fully reported on. Some shells were examined by Lamarck from the collection which was placed in the Paris Museum.

Voyage autour du monde de la Corvette l'Astrolabe 1826-9, 20 Vols. 8vo. Paris 1830-5. Jules S. C. Dumont D'Urville (Zoology (Vol. 3) part 1, pp.

1-368 (1834); part 2, pp. 369-954 (1835); Atlas of plates, issued 1833]. The three volumes dealing with Zoology were published between 1830 and 1834. Volume 3, noted above, dealt with the conchological collections. The *Astrolabe* visited Victorian waters, and its celebrated naturalists, Quoy and Gaimard, collected in Western Port Bay. Among the many species collected were the first two land shells obtained from Victoria. The Atlas of plates antedates their descriptive essays on conchology, and the point has been raised that if the plates be descriptive, should they not supersede the narrative in systematic conchology.

Museum Cuming: The famous collection of Hugh Cuming, accumulated from the Philippines, America, Africa, and Australia, passed to the British Museum on his death. The collection was worked upon by such authors as Reeve, Sowerby and the brothers Adams. Iredale and Hull (1927) give brief notes on the lives and work of these and many other authors, including Professor Thiele, G. F. Angas, H. A. Pilsbry. Philippine Islands shells from the Cuming collection have been confused with shells from southern Australia.

Museum Calonnianum, 1797 (May): M. de Calonne, having left France due to political unrest, disposed of his collection in London, to George Humphrey, dealer in natural history objects. M. de Calonne had purchased the collection from the Duke of Portland on the death of the Dowager Duchess. This collection had formed the subject matter of an unpublished manuscript "Museum Portlandicum" by Solander. Thus Humphrey obtained and dealt with, in the Museum Calonnianum, both these collections. Thus the work is of considerable interest, and the systematic implications have been fully discussed by Iredale (1937). In 1817, Dillwyn published a *Descriptive Catalogue of Recent Shells*, which contained many references to the above work.

Catalogue of Shells in the Tankerville Collection, 1825 (January). Sowerby (not the Sowerby referred to above) purchased Humphrey's business, (or collection) and when dealing with the Tankerville Collection made reference to the Portland Cabinet, and the Calonne Cabinet. He introduced names which he credited to Humphrey.

A controversial figure of this period, Perry, was the author of two works on natural history, namely, the *Arcana*, published 1810, and *Conchology*, published 1811. The former has been reviewed by Iredale and Matthews (1912), the latter by Gatliff (1902, see Colliver, 1948, *loc. cit.*), and Hedley (1902, see Iredale, 1936, *loc. cit.*). Most of the shell figures of the *Arcana* were reproduced in *Conchology*. Reeve and the younger Sowerby did not recognize Perry's work, the chief objection to which appears to be the number of inaccurate figures.

Iredale (1937) remarks the source of Perry's material to be the Bullock Museum. Genera introduced by Humphrey in the *Museum Calonnianum* were used in *A Companion to Mr. Bullock's Museum* (Eighth Edition, 1810), and Perry claimed some of these as his own. The Bullock Museum has been discussed by Iredale (1948).

Conchylien Cabinet, 12 Vols., 1769-95, Martini and Chemnitz: This important work was begun by Martini and continued by Chemnitz from 1780 (7 Vols.); the second edition was by Kuster and is commonly known as Kuster's continuation.

Conchologia Iconica, 20 Vols, 1843-78, L. Reeve: A wonderful series of monographs, beautifully illustrated by G. B. Sowerby. Lovell Reeve was stated by Iredale and Hull (1927) to be the greatest conchological worker of the last century.

Voyage of H.M.S. Challenger, Vol. 13, Lamellibranchiata: Edgar A. Smith, conchologist at the British Museum for upwards of forty years, was, according to Iredale, the only English worker, other than Jukes-Brown, to make a study of bivalves. The date was 1885.

Volume 15 of the *Challenger* reports dealt with the Gastropoda, the author being Boog Watson. Also in Volume 15 was Haddon's "Report on the Polyplacophora" (Chitons), the date of the volume being 1886.

"A List of the Genera of the Recent Mollusca, their Synonyms and Types", *Proc. Zool. Soc. Lond.* 1847; Dr. J. E. Grey, the author of this historic paper, was also the author of the "Appendix to Captain King's Survey of Australia" (1827). British Museum Catalogues and many other important works.

The Genera of the Recent Mollusca, 3 Vols., 8vo. London: This work by H. and A. Adams was published in parts between 1853 and 1858, the complete work being dated 1858.

Other interesting works include *Museum Boltenianum*, 12mo. 1798 (reprinted Hamburg, 1819); the *Catalogue of the Museum of the Empress of Austria* (Mus. Caes. Vindob.), descriptions in Latin of shells by the Chevalier Born, Director of the Imperial Cabinet; *Museum Geversianum*, 8vo (1787), the catalogue of the Natural History Museum of Mynheer Gevers sold by auction at Rotterdam.

Victorian land and freshwater shells have been reviewed by Gabriel, and other papers referring to land shells not included by Colliver (1947a) are included in the list of references below. Also included in the list are a number of references to essays in *The Victorian Naturalist* by various authors. One of these describes the egg girdle of *Saliunator fragilis* (Freame, 1940), others will be of particular interest to beginners.

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The writer is much indebted to Mr. T. Iredale for a copy of his essays in Dr. Strand's Festschrift.

RED-BACK SPIDERS WANTED

Scientists at the Commonwealth Serum Laboratories, Parkville, N.2, Victoria, are anxious to obtain living, undamaged Red-back Spiders (*Latrodectus hasseltii*) for research on the venom. If Club members or their friends would care to collect specimens during the next twelve months and forward them to the Director of the laboratories at the above address, their assistance would be appreciated. If required, containers will be forwarded on request and postage or freight will be re-imbursed. From places distant from Melbourne, air-freight is recommended. Packages containing spiders should be clearly marked "Living specimens".

LETTER TO THE EDITOR

Dear Sir,

Concerning Mr. Chisholm's letter in the April issue of the *Victorian Naturalist*, I would like to say that it is of course a matter of conjecture at what precise time any species becomes extinct. In the case of the Paradise Parrot, I was advised by a professional ornithologist whose opinion I was prepared to accept. The last authenticated observarion of the Paradise Parrot was made a long time ago, but if Mr. Chisholm can show that the species still exises, no one will be more pleased than I will be.

Yours faithfully,

EDITH M. GILL.

OBITUARY—WILFRID DINSEY CHAPMAN

Wilfrid Dinsey Chapman, M.C.E., B.ENG., M.I.C.E., M.I.E. (Aust.), died on May 6, 1955.

Dr. Chapman was a son of the late Frederick Chapman of honoured memory. His life story is one of distinguished service in the engineering world —designing bridges; development of paper manufacture; commanding the 2/2 Army Field Workshop, A.A.O.C.; Chief Superintendent of Design, Land Headquarters; Director of Civil Engineering, Railway Standardization Division; Commissioner of the State Electricity Commission of Victoria. The honorary degree of Doctor of Engineering was conferred on him, in recognition of his service to engineering in peace and war, by the University of Western Australia.

While with Australian Paper Manufacturers, Dr. Chapman, an authority on the genus *Eucalyptus*, designed a series of charts depicting the essential features of Victorian eucalypts. He was for a time a member of the Advisory Standing Committee for Maranoa Gardens, appointed by this Club.

—A. J. Swaby.

DEATH BY MISADVENTURE

Among a very large collection of Apoidea received from a valued collector, Alfred Snell of Carnarvon, W.A., was a black male *Paracolletes exsspipes* Sm., conspicuous for its size—it is even larger than a honey-bee. But the most remarkable feature was a sharp and slender thorn that had penetrated up through the mesosternum and impaled the bee, which had either flown, or been blown by the wind, against some spiny plant, and was speared to death. Although I have examined many thousands of bees, this is the first specimen I received that had been killed in this strange manner.

—Tarlton Rayment, F.R.Z.S.

(There can be recorded here a similar occurrence which took place at Cann River several years ago, when an adult of the common blowfly was found impaled through the thorax by the sharp end of a leaf of the Spear Grasstree, *Xanthorrhoea hastilis*. It had flown, evidently at high speed, against the hard point, shortly before it was observed there, for it was still alive and buzzing but did not seem able to fly free.—Editor.)

WHAT, WHERE AND WHEN

F.N.C.V. Excursions:

Sunday, August 21—Studley Park, weather permitting. Leader: Mr. K. Atkins. Subject: General Botany. Meet 2 p.m. at the Johnston St. Bridge.
Saturday, September 10—Cranbourne. Subject: Birds and Botany. Take 9 a.m. Yarram train, alight at Cranbourne. Bring one meal and a snack.

Group Meetings:

(8 p.m. at National Herbarium)
Wednesday, August 17—Microscopical Group.
Wednesday, August 31—Botany Group. Subject: Plant World, Part 4—Lycopods and Horsetails, illustrated. Speaker: Mr. K. Atkins.
Wednesday, September 7—Geology Group. Microscope Night.

Preliminary Notice:

Sunday, October 2—Parlour coach excursion to Elphinstone and Faradale with the Bendigo Field Naturalist Club. Leader: Mr. F. Robbins, President of the Bendigo Club. Coach leaves Batman Avenue 9 a.m. sharp, returns approx. 8.30 p.m. Fare £1. Bring two meals.

—Marie Allender, Excursions Secretary.

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PROCEEDINGS

Sixty-five members and friends were present at the General Meeting of the Club at the National Herbarium on August 8, 1955. After the incoming correspondence was read and received, the President told of the organization of 10-minute lecturettes to be delivered by members at future meetings of the Club. Mr. A. J. Swaby is to act as liaison officer in the arrangement of these.

The initial lecturette was delivered by Mr. W. L. Williams on the subject of Greenhood Orchids. This was followed by a talk by Dr. R. M. Wishart on a tick from a Tiger Snake; this was illustrated by a microscope mount. Members expressed approval of the lecturette idea.

Mr. F. G. Elford delivered a thoughtful and provocative address entitled "Circumstances Alter Cases"; this was very much appreciated by the meeting, and the speaker was thanked by Mrs. E. S. Hanks and Mr. A. J. Swaby. The substance of this paper will appear in a future issue of this journal.

Mrs. Rayment was elected as Joint Member; Messrs. Hickman, Gatliff and Balcombe-Quick, and Miss Johnston, as Ordinary Members; and Mr. Baldwin as Country Member. The President, in welcoming them to the ranks of the F.N.C.V., expressed the wish that they would profit by their association with the Club.

Mr. C. J. Gabriel exhibited a number of land shells, and Dr. Wishart had on show a series of stone and glass aboriginal implements. After a varied round of nature notes by exhibitors and other members, the President adjourned the meeting for the usual conversazione.

MICROSCOPICAL GROUP

The August meeting was devoted to a discussion of the apparatus used for photo-micrography. Messrs. C. Middleton, W. Evans and D. Johnston were responsible for an interesting demonstration and discourse. Because of the keen interest shown by those present, it has been decided to continue the discussion at the next group meeting.

Group members are invited to attend the General Monthly Meetings of the Club at the Herbarium, to bring their microscopes and an object, and to prepare to give a short talk of a few minutes' duration on it.

The Geology Group, too, invited the Microscopical Group to their meeting on Wednesday, September 7, for "A Night with the Microscope", dealing with the use of polarized light in the study of rocks and minerals.

SAGA OF THE RUFOUS FANTAIL

By Roy Wheeler*

Following the notes on the Rufous Fantail, *Rhipidura rufifrons*, in the April, May, June and July numbers of the *Victorian Naturalist*, something about its distribution and its amazing powers of migration may be of interest to readers.

Early records gave the distribution of this attractive bird as "Eastern Australia", but since then it has proved to range to New Guinea and the Celebes, and to parts of the Northern Territory and the East Kimberleys in Western Australia. In Western Australia the bird appears in the Napier-Broome Bay and the Parry's Creek districts. In the Territory it occurs in the Melville Bay, Anson Bay, Darwin, Warlock Ponds and Mataranka districts and probably elsewhere. Of the movements of this species in northern parts of Australia little is known. There the birds are usually found in impenetrable mangroves or jungles, in thickets of melaleuca, bamboo, rubber-vine, lantana, etc.

Perhaps there is a regular movement between the Celebes and the Territory, and between New Guinea and the Cape York district. The Rufous Fantail winters in this northern portion of eastern Australasia, but whether in Queensland or New Guinea is still an open question.

We do know, through the records of reliable observers, that each year Rufous Fantails migrate from Townsville south along the eastern coast. They follow two routes, either down the coast, using the extensive growths of mangroves for resting and feeding areas, or else by the ranges that extend practically right down the east of the continent. The ranges are clothed with jungle, rain forest and open forest areas, which, like the mangroves, yield the birds an inexhaustible supply of insects during their long trek south.

The first of the migrants pass through Townsville about mid-August, they reach the Brisbane area early in September, and they pass near Sydney in mid-September. About the last place, in the gullies of the Blue Mountains and at the National Park, birds begin to drop out, and they breed in these places later in the year. Down the coast the others go, on to East Gippsland, and then they swing west in Victoria on the last part of their long flight, their numbers progressively diminishing as more and more select suitable breeding places. The Dandenongs are usually reached about Melbourne Cup time, early in November; more drop out there in suitable treefern and tea-tree gullies. Some still fly on, across the plains, through Werribee or the Anakies, heading for the lush forests of the Otways or still farther to the tea-tree thickets of the lower Glenelg near Portland. Thus, in December,

*Hon. Secretary, Bird Observers' Club of Victoria.

ends a journey of over 2,000 miles, a tremendous flight for a bird so fragile and dainty as the Rufous Fantail. In December 1933, at Coombe, 117 miles south-east of Adelaide, the first (and only) South Australian record of the bird was made—a pioneer looking for new breeding areas.

Having finished the long migratory flight, a real task lies ahead of the birds. The nest site must be found—it is usually close to water—the nest must be built, the eggs laid and incubated, and the youngsters reared. By that time it is almost into March and time to retrace their steps, back through the Otways, the Dandenongs, East Gippsland, and eventually to Queensland. In March 1945 a bird wandered the wrong way, and on the eleventh of that month arrived at Stanley in Tasmania, with the honour of being the first recorded for the Island State. Crossing nearly 200 miles of Bass Strait was quite a feat.

How do the birds travel such tremendous distances? According to Mr. P. A. Gilbert, of Lakemba in New South Wales, they move singly or in parties just before daybreak and continue until sunrise, and later in the day they travel between sunset and dark. This would apply to open country where little protection is afforded the birds, but in the forest country the movement probably continues throughout most of the day. Some idea of the daily travel of the birds may be gauged from the writer's 1953 records. The first of the migrants reached Finchhatten Gorge near Mackay in Queensland on August 23; the first birds arrived at the Lamington National Park in southern Queensland on September 10; the first report from near Melbourne was at Toolern Vale on October 24. If the same birds headed the migration, the 2,000 miles were completed in 62 days—an average of just over 30 miles a day.

The return journey is made much more quickly than the outward one. The birds usually leave southern Victoria in March, pass through New South Wales in April, and arrive in Queensland in May.

The birds appear to keep to the coast during their journey, but occasionally some have been recorded at great distances inland. In Victoria there is a record from Ballarat, in New South Wales from Wellington, Bingarra and Moree—up to 130 miles from the coast—and in Queensland from Murphy's Creek near Toowoomba, about 100 miles inland. Stragglers may be recorded also in the open forest through the winter, but such records are few. There is no June or July record for Victoria, although three have been made during August. In New South Wales there is one record for June and several for August.

The Rufous Fantail's main breeding areas appear to be in New South Wales and Victoria. Melbourne members may be interested to learn that this bird bred at the Botanic Gardens in

PLATE II

Photo: C. E. Bryant

Rufous Fantail, at its nest.

February 1944. Along the creeks of the foothills and ranges are their usual breeding grounds.

Besides the visits to buildings mentioned in recent numbers of the *Victorian Naturalist*—the kitchen at Tyers, the bedroom at Mallacoota, and the school hat-room at Wybong Creek near Muswellbrook in New South Wales—Rufous Fantails have been recorded in a kitchen and a woolstore at Geelong, in a bookshop and a museum at Sydney, in a house at Wangaratta, and in two wash-houses at Melbourne.*

When next you see the Rufous Fantail, admire its beauty certainly but also admire the little fellow's determination and courage in covering those 4,000 miles of migration each year.

*There is also the note about the Rufous Fantail on page 113 of *Nests and Eggs of Australian Birds*, where A. J. Campbell reports: "On the 23rd March, 1888, I noticed a bird rather out of its course under the roof of the Prince's Bridge Railway Station, Melbourne".—Editor.

FLORA OF VICTORIA: NEW SPECIES AND OTHER ADDITIONS—4

By N. A. WAKEFIELD, Noble Park

Genus Galium: Two New Species from East Gippsland

GALIUM BINIFOLIUM sp. nov.

Planta subglabra diffusa; verticilli 4-foliati, foliis perinaequaliter jugatis; folia lineari-elliptica; inflorescentia perattenuata pauciflora; cocca laevia.

HOLOTYPE: Sand-dunes near Betka River, Mallacoota, Victoria; 6/1/1953; N. A. Wakefield, No. 4,794; beneath a stand of tall *Melaleuca* shrubs. (Type located at MEL, and duplicates to be sent to KEW and NSW.*)

Taprooted; stems prostrate, elongated, much branched, usually asperous, rarely rooting at the lower nodes; leaves in very unequal pairs, usually somewhat asperous, linear-elliptic, often sub-falcate, usually reflexed; peduncles much exceeding the leaves; flowers 2 or 3, on long pedicels, tiny, greenish-white; fruit normally smooth. (See figure 1.)

Distribution: In high rainfall forest areas of south-eastern Australia, from Snowy River in eastern Victoria, to McLeay River in north-eastern New South Wales.

This species was apparently first collected in Victoria by Mr. Frank Robbins, in about 1937, at the Barkwater, near the mouth of the Snowy River. Dr. Ronald Melville, of the Royal Botanic Gardens, Kew, in company with the writer, made two collections of *G. binifolium*: No. 2,782, *from the type plant* (9/1/1953); and No. 2,819, at Mount Drummer, about 35 miles to the westward (12/1/1953).

From New South Wales localities, nine collections of *G. binifolium* have been examined by the writer: Warrawee, W. F. Blakely, 11/1914 (NSW, 23900); Mount Victoria, J. H. Maiden, 12/1896 (NSW, 23901); Upper Williams River, L. Fraser and J. Vickery, 12/1/1934 (NSW, 23903); Seaview Range, J. H. Maiden, 11/1897 (NSW, 23910); Timbertop, via

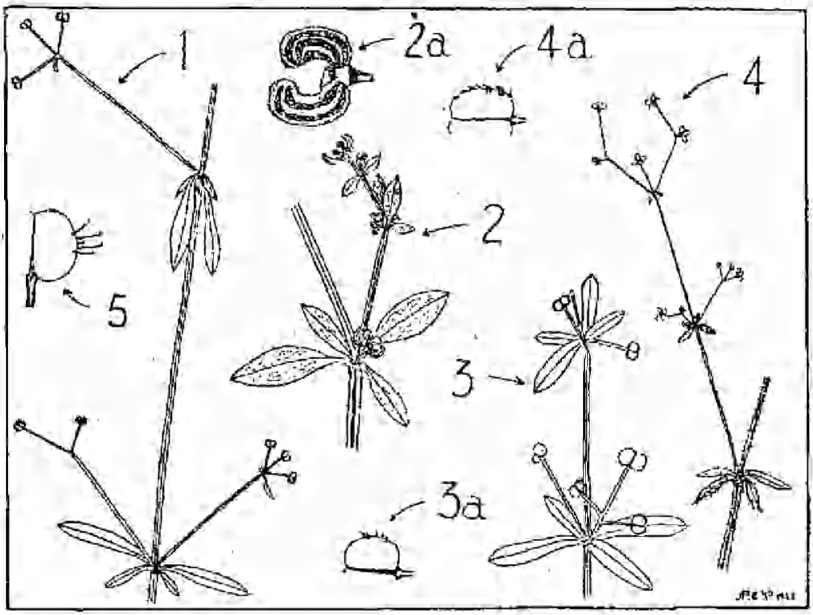
*Abbreviations: MEL—National Herbarium of Victoria; NSW—National Herbarium of New South Wales; and KEW—Royal Botanic Gardens, Kew, England.

Glenreagh, J. King, 11/1949 (NSW, 23988); Narira Creek (near Narooma), E. Reader, 26/8/1880 (MEL); McLeay River, Dr. Beckler (MEL); and two labelled "Blue Mts." and "East subtrop. Austr., Dr. Leichhardt" respectively (MEL).

G. binifolium is so named (*bini* = two by two) because of the very unequal pairs of leaves, which feature is unique amongst the smooth-fruited Australian species of the genus.

GALIUM LIRATUM sp. nov.

Verticilli 4-foliati; folia lata petiolata, in textu tenuia, venulis manifeste reticulatis; asperitates (caulium foliorumque) sparsae, subtiliter toideae planae albides; inflorescentia perbrevis pauciflora; cocca duo mature secernentia nigra longitudine lirata.



Details of Victorian Native Species of *Galium*

1. *G. binifolium* sp. nov., showing leaf whorls and inflorescences.
2. *G. liratum*, sp. nov., part of plant; *2a*, mature fruit.
3. *G. propinquum* A. Cunn., lowland form; *3a*, typical fruit "bristles".
4. *G. gaudichaudii* DC., abnormally attenuated and bristly; *4a*, abnormal outgrowths which develop sometimes on the fruit.
5. *G. australe* DC., the long, brown bristles of the fruit.

(All shown natural size, except the fruit which are enlarged.)

HOLOTYPE: Turnback Road, above Little River, near Snowy River, Victoria; 20/1/1953; N. A. Wakefield, No. 4,800; sprawling on rock outcrop. (Type located at MEL, and duplicates to be sent to KEW and NSW.)

Taprooted; stems much branched, shiny, strongly 4-ribbed; leaves up to 18 mm. long and 9 mm. wide, in sub-equal pairs, petiolate, pointed, the

margins slightly recurved, near the margins slightly asperous, the texture thin, the venation visibly reticulated; asperities (on stems and leaves) flat, whitish, triangular; flowers comparatively large, white, few, clustered in the axils, very shortly petiolate; fruit splitting into two; each fruitlet wrinkled with irregular longitudinal furrows. (See figure 2.)

Distribution: Scattered from Snowy River district in eastern Victoria, northward to central eastern New South Wales, usually amongst rocks.

In the case of *G. liratum* also, credit is due to Mr. F. Robbins for the first Victorian collection of the species; he gathered two lots (one mature and one juvenile) at Boggy Creek, Nowa Nowa, in about 1937. In January 1940, Mr. W. Hunter collected more of the species at Suggan Buggan. The writer noted it first at Upper Combienbar, on 28/10/1945 (N.A.W., No. 3957), and saw it in four other localities in 1953 (*vide* type and R. Melville's specimens).

Dr. Melville made three collections of the species during his tour of the extreme south-eastern corner of Australia: No. 2735 in the "jungle" at Bellbird Creek, near Eden, New South Wales (8/1/1953); No. 2897 on a sandy island of the upper Genoa River, Victoria (15/1/1953); and No. 3040 at the Bare Rocks, Wulgulmerang, Victoria (21/1/1953).

There are three other New South Wales collections of the species: Denman, W. Heron, 10/1908 (NSW, 23909); Eurolca Creek, Glenbrook, T. M. Whaite, 1149 (NSW, 23914); and "Bents Basin, Woolls" (MEL).

Genus Galium: Delimitation of Native Victorian Species

In the process of determining the status of the above two new species, it was found necessary to examine critically large suites of herbarium specimens of the genus, and to consider them in the light of impressions gained through field observation. Such was facilitated by the co-operation of the various botanists in charge of the major eastern Australian herbaria, and grateful acknowledgement of their assistance is made here.

It was found that the characters usually stressed in keys (the nature of the surface of the fruit and the length of the inflorescence—*vide* Ewart's *Flora of Victoria*, p. 1046) were likely to vary to extremes within one or another of the species. Therefore the following system is presented for the identification of the *native* species of Victoria (and the three adjacent States). It is important that the italicized key features should be considered in the order given, for the last species is best identified by a process of elimination.

A.—*Densely tufted annual, branches hairlike, the leaves mostly in whorls of more than 4, fruit smooth* . . . . . *G. parisiense* L. Ewart (*l.c.*) is followed in citing this name for local material; it has not been considered otherwise by the present writer.
(The five other species have leaves in whorls of 4.)

B.—*Stems arising from an extensively creeping, branched, underground rhizomic system* . . . . . *G. propinquum* A. Cunn.

The name "*Galium umbrosum*" has apparently never been validly published, so Allan Cunningham's name, which was originally applied to New Zealand plants, is given here for the species. The name *Galium ciliare* Hk. f. is also a synonym, having been given to the common, broad-leaved, yellow-flowered, smooth-fruited form abundant in Tasmania (and in the Australian Alps of Victoria and New South Wales). The *Galium gaudichaudii* var. *glabrescens* (Bentham, *Flora Australiensis*) is a form of *G. propinquum* from the mountains of north-eastern New South Wales and south-eastern Queensland. In the lowlands of Victoria and New South Wales, the species has more ramose and weak stems, almost glabrous foliage, smaller and whitish flowers, and the fruits asperous or with very short

hooked bristles. (See figure 3.) Some such were included in the var. *muriculatum* of *G. gaudichaudii* (Benth. *l.c.*) and of *G. umbrosum* (Ewart *l.c.*). Here too seems to belong *G. curtum* Hk. f., from the description.

(Note: The other native species are tufted, the stems arising from a single stout root-stock, however, there is sometimes also a minor development of fibrous roots from some of the lower nodes when sand or soil has covered the bases of the stems.)

C.—*Leaves petiolate, very broad, thin, visibly net-veined, and, together with the stems, bearing flat, triangular asperities.* (See figure 2.) .. .. *G. hirtum* sp. nov.

D.—*Pairs of leaves very unequal.* (See figure 1.) .. *G. bilifolium* sp. nov.

E.—*Mature fruits armed with long, brown bristles which are hooked at the apex.* (See figure 5.) .. .. *G. australe* DC.

This species is mainly littoral; it is widespread in Tasmania, and extends through Victoria into adjacent parts of South Australia and New South Wales. Its vestiture varies from a few scattered asperities to a dense covering of whitish bristles including a few sometimes on the petals. The development of the inflorescence is most variable, but the nature of the bristles of the fruit is uniform.

As far as can be judged without reference to type specimens, *G. densum*, *G. squalidum* and *G. albescens* (all of HK. f.) are synonyms of *G. australe*.

F.—The remaining native Victorian species is *G. gaudichaudii* DC.

This is most variable in foliage and inflorescence, apparently according to habitat, and the fruitlets, though normally smooth, may be asperous or even invested with curved, whitish outgrowths. (See figure 4.) The species is widespread in Victoria, and is abundantly distributed from Tasmania to southern Queensland and to the Western Australian border.

Synonyms of the species are *G. erythrorhizum* and *G. axiflorum* (both of F. Muell. ex Miq.) and *G. vagans* Hk. f.

ABOUT A COPPERHEAD SNAKE

Copperhead snakes have always been fairly numerous in the Cheltenham-Black Rock area, and in my boyhood days at the latter place it was not unusual to kill a snake between home and school. It was, however, an unpleasant surprise to find a copperhead snake in the home garden one evening, even a garden in which many things native to the area are encouraged. The surprise was greater because of the extension of building activities in the area, but perhaps it was because of this that the snake had forsaken its usual haunts. The idea of having a live snake about the garden was not an appealing one, so I called for a solid stick and a direct hit on the head was sufficient to despatch the life of the venemous one.

Next morning we were prepared to make a closer inspection and to put the identification of the snake beyond doubt. The tabular key on page 3 of *A Key to the Identification of Australian Snakes* by R. A. Hunt had always looked complicated, but in practice it proved easy to use, the diagrams showing clearly the different types of scales. The anal plate being entire put the specimen in the left half of the page; 15 scales counted around the body gave the first column, and 156 ventral scales under the body gave a cross-column, which limited the selection to seven species. Other details, such as 45 sub-caudal scales and the colour, definitely identified the snake as a copperhead (*Denisonia superba*). Confirmation was obtained from *Poisonous Snakes of Australia* by Eric Worrell and from the National Museum.

—A. E. BROOKS.

NEW AND INTERESTING MOSS RECORDS FOR AUSTRALIA

By J. H. Willis, National Herbarium of Victoria

In the last two years it has been my privilege to examine several moss collections of outstanding interest from various parts of the Commonwealth. All those from Victoria and South Australia, having been worked up in special detail, will form the subjects for separate papers. Four from the remaining States had never been collected previously in Australia, while three were known from a single collection. It is desirable that these, as well as a few other occurrences of particular interest, be placed on record, and the following arrangement is according to States:

Western Australia

1. *BARBULA EHRENBERGII* (*Lor.*) *Fleisch.*, 1902: Dale's Gorge, east of Wittenoom, Hamersley Range—moist shaded rock wall, growing with the fern *Adiantum capillus-veneris* (*David Moore*, Aust. Blue Asbestos Ltd., Dec. 1953; same locality, Nov. 1954).

The arid Hamersley Range, between the Ashburton and Fortescue Rivers and just within the Tropic of Capricorn, is extremely deficient in bryophytes. Until the present species was discovered, only the common cosmopolitan *Funaria hygrometrica* had been collected in that region. *Barbula ehrenbergii* is new to the Australasian area, and Mr. E. B. Bartram (Pennsylvania) to whom I am indebted for the identification, makes this comment: "A distinct calciphile, usually near calcareous spring-heads or even in water on dripping banks, but rarely found in fruit." The Dale's Gorge example is barren—long-leaved and lax, to 6 cm. tall. Brotherus (1924) gives the Mediterranean, Mesopotamia, Persia and Yunnan (China) as the principal regions of distribution, and the species is now known also from the West Indies and southern U.S.A.

2. *GRIMMIA TRICHOPHYLLA Grev.*, 1824: Porongorup Range—granitic formation near the Devil's Slide, rainfall 39 in. (Mrs. *Rica Erickson*, Jan. 1955).

The species is known from many parts of Victoria, including the Grampians, the Mt. Lofty and southern Flinders Ranges in South Australia; but this is the first undoubted occurrence for Western Australia. In the *ms.* index to the Australian moss collection of Melbourne Herbarium, it is erroneously recorded (under its synonym *Grimmia crispatula* C.M. & Hpe.) for the Western State, the compiler of that index having inadvertently given the distribution as "W.A." instead of "S.A." *G. trichophylla* is distinguished from the commoner *G. pulvinata* by its more elongated basal cells and marginal row of wide cells near the leaf base; both form little cushions on rock surfaces, but they are less hoary than those of *G. laevigata*.

3. *RHACOMITRIUM CRISPULUM* (*Hk. f. & Wils.*) *Wils.*, 1858: Porongorup Range—granitic formation near the Devil's Slide, rainfall 39 in. (Mrs. *Rica Erickson*, Jan. 1955).

The Porongorups undoubtedly provide the best environment for *Musci* in Western Australia, and more species are restricted to that small, well-watered mountain mass than to any district in the vast State. As long ago as 1848, botanical collector James Drummond wrote that

> The Porongarup are clothed with mosses and *Jungermannia* and lichens as rank and luxuriant as I have ever seen them in the moist, rich valleys in the south of Ireland.

R. crispulum is a widespread rock moss of Victorian mountains, including the Grampians, unknown as yet from South Australia and quite new to the West. It is known by the slender branches, revolute leaf margins, sinuose cells, short lateral setæ and pale-brown cylindrical capsules.

4. *MACROMITRIUM ARCHERI* Mitt. ex *Wils.*, 1858: Porongorup Range—granitic formation near the Devil's Slide,- rainfall- 39in. (Mrs. *Rica Erickson*, Jan. 1955).

In a paper entitled "The Myth of *Macromitrium* in Western Australia" [*Vict. Nat.* 69: 159 (Apr. 1953)] I discussed the only two collections, and species (*M. incurvifolium* and *M. involutifolium*), ever recorded for the West, and showed how neither could possibly have come from there. It is now of great interest to place on record a collection of *Macromitrium* genuinely from that State, the more so as *M. archeri* was not previously known west of the Otways in Victoria—an extension in range of 1,500 miles. Unfortunately this Porongorup collection is barren, but it accords in all essential vegetative details with capsule-bearing material from Victoria and Tasmania. *M. archeri* creeps extensively on damp shaded rocks or bark, has crowded yellowish shoots with ligulate leaves which are extremely contorted and curled in the dried state: the basal quarter of the leaf shows conspicuously elongated cells and the upper ones project slightly from the leaf surface, though not as boldly as in the closely related *M. ligulare* Mitt. which lacks the elongated basal cells.

5. *HYPNUM CUPRESSIFORME Hedw.*, 1801: Porongorup Range—granitic formation near the Devil's Slide, rainfall 39 in. (Mrs. *Rica Erickson*, Jan. 1955.

It is singular that this cosmopolitan species, so widespread and variable in all the other States, should not have turned up in Western Australia before now. In November 1950, I was convinced that I saw the moss on the higher granite peak of Christmas Island in the Recherche Archipelago; but, because specimens were not collected at the time, I thought it inadvisable to record the observation.

Northern Territory

1. *FISSIDENS ASPLENIOIDES Hedw.*, 1801: Talli-Parta Springs, about 35 miles west of Haast's Bluff (3,500 ft.)—among ferns in shaded gorge fed by a permanent spring (*Paul Fisch*, May, 1954).

A diminutive condition of this common cosmopolitan moss, and the first record for the Northern Territory. Material barren (as it usually is in Australia).

2. *F. PUNGENS C.M. & Hpe.*, 1853: Banks of Daly River, at crossing about 37 miles above mouth and 90 miles south of Darwin (Captain *V. Pedersen*, Salvation Army, Aug. 1952).

The first record for the Territory of a small species which is abundant throughout well-watered parts of temperate Australia and New Zealand; the nearest known occurrences are about 1,000 miles easterly in North Queensland and 1,400 miles south in the hills around Adelaide (TYPE area). Material barren.

3. *GYMNOSTOMUM CALCAREUM Nees, Hornsch. & Sturm*, 1823. Var. *LONGIFOLIUM Dixon*, 1923: Malapunyah Springs, S.W. of Borroloola and halfway to Anthony's Lagoon—on black calcareous earth under shade of *Pandanus* (Captain *V. Pedersen*, Salvation Army, Jan. 1953).

The sample is barren, but agrees excellently with Dixon's description of this variety [*Bulletin* 3 of N.Z. Institute: 116 (1923)]. *G. calcareum* is a cosmopolitan calciphile, frequent in temperate Australia, but never hitherto recorded for the Northern Territory.

4. *OCTOBLEPHARUM ALBIDUM Hedw.*, 1801: Upper Katherine River, near western boundary of Arnhem Land Reserve—on sandstone escarpment under a permanent waterfall (*W. Balcomon*, C'wealth Forestry & Timber Bureau, Aug. 1954).

A most attractive, silvery, almost pan-tropic species, it had been recorded only once for the Territory—fruiting on trunks of live *Cycas media* at Cox (or Douglas) Peninsula, *leg.* Professor Ralph Tate, Mar. 1882. The present collection is barren.

5. *PHILONOTIS TENUIS (Tayl.) Jaeg.*, 1875: Talli-Patta Springs, about 35 miles west of Haast's Bluff (3,500 ft.)—extensive cushions among ferns in shaded gorge fed by a permanent spring (*E. Rieschieck*, Aug. 1953; *Paul Fisch*, May 1954).

The first record for the Territory, and an unexpected occurrence in Central Australia of a circum-Antarctic moss which usually inhabits much damper cooler country. The collection is barren. Talli-Patta Springs affords a micro-climatic refuge for several plants of typically milder, better-watered terrain, e.g. the ferns *Adiantum hispidulum*, *Histiopteris incisa* and *Nephrolepis cordifolia*.

Queensland

1. *EPHEMERUM WHITELEGGEI Geheeb*, 1895: North Pine River (*C. J. Wild*, Apr. 1888; near Humpybong (*C. J. Wild*, May 1888).

Watts and Whitelegge [*Supplement to Proc. Linn. Soc. N.S.W.*: 62 (1902)] had misdetermined these collections as "*Asiomum perpusillum*", based on *Phascum perpusillum* C.M.—a very different plant. I have carefully examined the Wild examples in Melbourne Herbarium and find them identical in all respects with type *E. whiteleggei* from Port Jackson—hitherto the sole record of the species for eastern Australia, although I recently recorded it from near Kalgoorlie, W.A. [see *Vict. Nat. 71*: 12 (May 1954)].

2. *MNIUM ROTUNDIFOLIUM Bartram*, 1953: Headwaters of Tully River in the Cardwell Range—on rain-forest trees at about 2,600 ft. (*Pearl R. Messmer*, Sept. 1954—Herb. N.S.W., No. M10264); Hypipamee Crater, 7 miles S.E. of Herberton (*Pearl R. Messmer*, Aug. 1954—Herb. N.S.W., No. M10266).

This constitutes the first record of the family *Mniaceae* for Queensland, and is especially interesting in that the species was described as recently as 1953 [*Svensk Botanisk Tidskrift 47*: 398 (1953)] on the basis of a single collection from Mt. Hagen area in the north-eastern highlands of New Guinea. Coincident with receipt of Mrs. Messmer's North Queensland collections for checking (from the Sydney Herbarium) I had only just finished reading Mr. E. B. Bartram's paper, and I recognized their identity with the description of his new *Mnium* from New Guinea. At once, I sent a piece of the Cardwell Range plant by air to Mr. Bartram and he was able to confirm my opinion (21/10/1954). Moreover, he recounted some interesting details connected with the discovery and description of *M. rotundifolium*, which had reached him only by a stroke of luck.

In 1951 Count Nils and Countess Greta Gyldenstolpe were on an ornithological collecting trip in the Mt. Hagen, Waghi, Nondugl and Weiga regions (5,000-9,000 ft.) of New Guinea, their journey being sponsored by Sir Edward Hallstrom of Sydney. On the way out of the New Guinea highlands, the Gyldenstolpes' plane was wrecked and they lost the larger part of their collections. In some remarkable way, a few mosses were salvaged and these included the types of several new species, notably *Mnium rotundifolium*.

The species is a large long-creeping moss, with exceedingly felted (rusty-stupose) stems and big, rounded, widely spaced leaves which crinkle much in drying; the nerve terminates a little beyond the centre of the leaf and there is but a very narrow feeble border of more elongated cells. Capsules are as yet unknown.

3. *EUCAMPTODON MUELLERI Hpe. & C.M.*, 1870. Eungella Range National Park, about 60 miles W. of Mackay—damp shaded tree trunks at 3,000-4,000 ft. (*A. J. Hicks* of Kaniva, Vic., July 1954).

This distinctive moss, with setæ almost enclosed by the long-sheathing perichætial leaves, was first described from "Australia Felix" (presumably the jungles of East Gippsland) at the extreme southern limit of its range. In New South Wales, Professor A. Burges says (ms.) that it is "frequent on the coast and Dividing Range". Apparently the northernmost occurrence was Mt. Warning, N.S.W., until in 1952 E. B. Bartram [*Harlowia* 4: 238 (1952)] recorded it for Queensland—at the summit of Mt. Bellenden-Ker (5,000 ft.). The present, second record for Queensland is intermediate between Mts. Warning and Bellenden-Ker.

New South Wales

1. *DISTICHIUM CAPILLACEUM* (*Hedw.*) *Br. & Schimp.*, 1846: Tumut River falls—barren material from edge of water channel, on rocks and partly submerged (Snowy Mountains Hydro-Electric Authority, No. 1952, Feb. 1954).

The only other New South Wales record, also barren, was from Yarrangobilly Caves—on cliffs opposite the hotel (*leg.* Rev. W. W. Watts, No. 8530, Jan. 1906); so the Tumut collection is a rediscovery in the same general sub-alpine area. *Distichium* is as yet unknown in Victoria, and Tasmanian records are open to doubt. Superficially very like *Ditrichum rufo-aureum* (Hampe) J. H. Willis, it may be distinguished by the distichous, abruptly spreading leaves, smaller, non-elongated cells and papillose leaf subulæ.

2. *BRYUM LÆVIGATUM Hook. f. & Wils.*, 1844: McKeahnie's Creek in the Tumut River watershed at 4,900 ft., 9-10 miles W. of Adaminaby—small tufts in a spring basin with *Ranunculus*, *Orthomyrrhis*, etc. (*Dr. Max Mueller*, Snowy Mtns. Hydro-Electr. Auth., No. 1793, Jan. 1954); headwaters of Tooma R. at about 5,200 ft.—on rocks in stream beds and in valley bogs (*Dr. Max Mueller*, Snowy Mtns. Hydro-Electr. Auth., No. 1803, Feb. 1954).

Apparently the second records for the State, the only other collection being from Reservoir Gully, Yarrangobilly Caves at about 3,500 ft. (*Rev. W. W. Watts*, Jan. 1906). Recently [*Vict. Nat.* 71: 159 (Feb. 1955)] I recorded the first collection of this distinctive *Bryum* to be made in Victoria on the Bogong High Plains; that and the present Tooma River gathering were both certified by Mr. G. O. K. Sainsbury (of Wairoa, N.Z.).

3. *POHLIA MIELICHHOFERIA* (*C.M.*) *Broth.*, 1903: About 7 miles W.N.W. of Yarrangobilly—on rocks along roadside descent to Talbingo, at about 3,500 ft. (*Dr. Max Mueller*, Snowy Mtns. Hydro-Electr. Auth., No. 2149, Oct. 1953).

A most interesting discovery—in fruit and agreeing very well with the Victorian type. The species had been known *only* by the original collection, viz., Mt. Ararat, Vic. (*D. Sullivan*, Oct. 1883), which is located in Melbourne Herbarium. It is a small delicate plant with broadish leaves and suberect capsules, and, as the epithet indicates, it bears a strong superficial resemblance to some species of *Mielichhoferia*.

4. *MEESIA TRIQUETRA* (*Hedw.*) *Jongstr.*, 1844: Big Badja Mountain, about 30 miles N.E. of Cooma—in a peaty shrub community of *Epacris serpyllifolia*, etc., just above surface of water near Badja sawmill at 3,300 ft. (*Dr. Max Mueller*, Snowy Mtns. Hydro-Electr. Auth., No. 2015, June 1953).

Once again I have to thank Mr. Sainsbury for determining this unfamiliar collection—from barren material. *M. triquetra* is a boreal moss which seems to have been recorded only once before from the southern hemisphere, viz., in open bogs at Lake Habbema (10,500 ft.), Netherlands New Guinea [*See* E. B. Bartram in *Lloydia 5*: 266 (Dec. 1942)]. *M. austro-georgica* C.M. from antarctic South Georgia may eventually prove to be the same thing. Leaves of the Badja plant are exactly as in samples of typical *M. triquetra* from northern Europe—tristichous, decurrent and denticulate at the tips. The discovery of the species in south-eastern Australia is a most important link in its range, which may now be expected to extend also through Tasmania and New Zealand. Hitherto, the only representative of the family *Meesiaceæ* in the Australasian region had been the alpine, endemic *M. muelleri* C.M. & Hpe. (Dargo High Plains and the Cobboras, Vic., to the Kosciusko-Kiandra region and Badja Mountain, N.S.W., also in the South Island, N.Z., but not yet noted in Tasmania).

M. triquetra is widely distributed in the sub-arctic zone of the Northern Hemisphere, extending as far south as Spain and California; it occurs as a fossil in the Post-glacial peat of Neolithic age in Somerset, England. [*See* Goodwin and Richards in *Revue Bryologique 15*: 123-(1946)].

Tasmania

1. *DICRANOWEISIA ANTARCTICA* (C.M.) *Paris*, 1895: Western Tiers—in fruiting condition (*L. Rodway*, 1912); Mt. Field West, National Park—barren material in sheltered crevices among dolerite boulders at the summit, 4,700 ft. (*J. H. Willis*, No. 218W, Dec. 1952).

A widely distributed antarctic species, it is not uncommon on New Zealand mountains, but has not been recorded previously from any part of the Commonwealth. Mr. Sainsbury, who examined both of the Tasmanian collections cited above, reports (by letter, 16/3/1953) that in Rodway's herbarium the Western Tiers collection is erroneously labelled "*Distichium capillaceum*"; he would not commit himself beyond a tentative determination of the Mt. Field material, which lacks fruit. As pointed out by Dixon [*Bull. N.Z. Inst. 3*: 73 (1914)], a very characteristic feature of this handsome moss is the way in which the lower part of each leaf remains erect and unaltered in the dried state, while the upper half is strongly crisped and cirriform. H. T. Clifford [*Aust. National Antarct. Research Exped. Reports*, Series B, *2*: (1953)] recently records *D. antarctica* for Macquarie Island, some 800 miles south of Tasmania.

2. *MACROMITRIUM RODWAYI Dixon ex Weymr. & Rodw.*, 1922: Safety Cove, Port Arthur, Tasman Peninsula—on damp ledges of sandstone cliffs, growing with *M. archeri* and *Ptychomitrium Mittenii* (*J. H. Willis*, No. 261 W., Apr. 1954—Easter Camp-out of Tas. Field Nats.' Club); Port Davey, at "The Gap" about 1 mile E. of Melaleuca Lagoon and near the S. end of Mt. Fulton—on bark and often mixed with *M. archeri* (Miss *Mervyn Davis*, No. 1214B, Mar. 1954).

Until now this moss was known solely by the barren type collection, made between Brown Mountain and Safety Cove, at the entrance to Port Arthur, by Leonard Rodway during the Easter Camp-out of the Tasmanian Field Naturalists' Club in April 1920. It is of interest that a second finding of the species should be under exactly similar circumstances 34 years later and very near to, if not at, the identical spot. My material was barren and I failed to recognize its genus; but Mr. Sainsbury, who had just examined type *M. rodwayi* in the Rodway herbarium, kindly pronounced the two as identical (4/6/1954). This endemic and apparently very localized Tasmanian moss is of bronzy hue, the dry foliage being strongly spirally-twisted and the yellowish extremities of the stout branches sharply pointed; leaves are

plicate, acuminate and often with a characteristic hyaline acumen. Dixon, not having seen capsules, allied the species with *M. pennistalium* Broth. of Lord Howe Island. Miss Davis's lignicolous plant from Port Davey (found only a month before mine) shows a young smooth calyptra and one old sporocarp with definite remnants of a peristome. Mr. Sainsbury agrees (2/2/1955) that it is best referred to *M. rodwayi*, as a habitat form lacking the usual purplish-bronze colour and having relatively longer, narrower leaves which are more spreading in their apical parts; the leaf cells do not project at all and are elongated only at the very base.

3. *EPHEMEROPSIS TRENTEPOHLIOIDES* (Reinsch) Sainsbury, 1951: Florentine Valley, Aust. Newsprint Mills concession west of Mt. Field National Park—associated with the festoon moss *Weymouthia mollis*, on dead twigs of *Nothofagus cunninghamii* in rain forest (*J. H. Willis*, Dec. 1952).

This record, the first for the curious family *Nemataceæ* in Australia, was actually made by me in *Nature 172*: 127 (July 1953); but it is of such outstanding interest that I repeat it in these notes. *Ephemeropsis* is only a few millimetres long and would escape notice altogether unless in fruit; for the whole plant body consists of freely branching algal-like filaments—normal foliage is represented by a single series of three or four very minute, nerveless leaves at the base of each female inflorescence, from which the seta extends for about 2-3 mm. Besides the single Tasmanian occurrence, it is known from several localities in the North and South Islands of New Zealand, growing on the bark and twigs of *Rubus*, *Leptospermum*, *Fuchsia* and *Coprosma* species.

4. *DALTONIA SPLACHNOIDES* (Sm.) Hook & Tayl., 1818: Russell Falls, Mt. Field National Park—on trunk of *Pomaderris apetala*, along shaded tourist track to falls (*J. H. Willis* and Dr. *R. Melville*, 11 Dec. 1952—in Herb MEL, and K No. 2551)

Only *D. pusilla* Hook. f. & Wils. has been recorded for Tasmania, the type of the species coming from springs on Mt. Wellington (*leg.* A. Oldfield, No. 67). In the original description [*Flora Tasmaniæ 2*: 221 (1858)] it is allied with *D. splachnoides* of the Old World, and the authors remark that their material was "very scanty". L. Rodway [*Pap. & Proc. Roy. Soc. Tas.* for 1913: 241 (1914)] gives *D. pusilla* for "twigs and fern leaves in damp gullies. Slopes of Mt. Wellington, Gordon, etc". My Russell Falls collection accords well with the two known Victorian occurrences of *Daltonia* (Sherbrooke Falls in the Dandenong Ranges and near Beech Forest in the Otways), and I fail to see where any of them can be separated specifically from *D. splachnoides* as it occurs in Great Britain. Mr. Sainsbury informs me (14/7/1947) that the New Zealand *D. novæ-zealandiæ* Mitt. is certainly the same as our Australian plant. It is noteworthy that in his *Musci- von Butlenzorg 3*: 960 (1910) Fleischer expresses the opinion that Tasmanian *D. pusilla* is doubtfully distinct from tropical *D. angustifolia* Dozy & Molk., which again is scarcely separable from the widespread *D. splachnoides*—the name which I intend to use for our only Australasian member of this genus.

[The various collections cited in the foregoing notes are all located at the National Herbarium of Victoria, either in the State reference folders or in the writer's private moss herbarium.]

ERRATA

Vict. Nat. 72: 54, line 4—for "loculically", read "loculicidally".
Vict. Nat. 72: 55, lines 10, 26, 29 and 36—for "*algidus*", read "*algida*".
Vict. Nat. 72: 57, line 36; and 58, line 23—for "10,000", read "1,000".

KIATA LOWAN SANCTUARY

We are pleased to report that the Department of Lands and Survey has agreed to the reservation of 537 acres of virgin mallee scrub in the Little Desert, Parish of Woraigworm, County of Lowan. The purpose of this new reserve is to provide a sanctuary for the mound-building Mallee Fowl or Lowan.

The people of Victoria, in the years to come, will have reason to thank the Lands Department for its acquiescence, and Mr. Keith Hateley of Kiata for his persistent effort to obtain this area as a reserve. It is one of the few remaining places in Victoria where the Lowan still breeds. Also, it will be recalled, it was in this district that Mr. Fred Lewis, when Chief Inspector of Fisheries and Game, carried out his investigations of the breeding habits of the bird. Mr. Hateley was his guide and assistant during the observations.

As Vice-President of the Kiata Progress Association, Mr. Hateley obtained the support of the Nhill and District Progress Association, and in February last the latter body convened a public meeting at which the Shire Councils of Dimboola and Lowan and the Borough of Stawell were represented. Addresses by a number of influential citizens including Mr. Hateley and Crs. J. J. Kingston and Ian McCann (respectively President and Secretary of the Stawell Field Naturalists Club) convinced the meeting that the need for the reserve was urgent, and it decided then and there to make application to the Lands Department to have it set aside as a National Park.

EXHIBITS WANTED

Now the task ahead is to fence the reserve and clear out foxes and rabbits. To make possible the commencement of this very necessary work the Kiata Association is now preparing to hold a Wildflower Exhibition and Museum of Natural History in the Kiata Hall from September 23 to October 2 next. The new sanctuary is expected to be officially opened during that period.

Mr. Hateley would welcome suitable exhibits from Club members.

AN APPEAL FOR FINANCE

Although three councillors of the Shire of Dimboola have been appointed as its Committee of Management, it must not be thought of as a municipal reserve. It belongs to the people of Victoria, and the cost of making it an effective sanctuary should be shared by all of us.

The F.N.C.V. will gladly receive and pass on any donations from members who may wish to contribute to the rather substantial cost of erecting the fence and then freeing the sanctuary of foxes and rabbits.

A GIFT TO THE PEOPLE

Members will be delighted to learn that Mr. K. W. Jordan, a resident of Kiata, has offered to donate to the Committee of Management 200 acres of his property which adjoins the north-east corner of the reserve, thus increasing the effective size of the sanctuary to well over a square mile.

—J. R. Garnet

IS GEOLOGY ONE OF YOUR INTERESTS?

Two lists of back numbers of the *Victorian Naturalist* have been compiled, for those who have geological interests. These cover the 25-year period from May 1930 to April 1954. Members may purchase one or both sets at the prices quoted (these being half original cost), or they may select any number of individual copies and acquire them at the prices quoted for such at the foot of page 50 of the August *Naturalist*.

Set "A" includes about 120 pages of well-illustrated papers and articles of major geological interest, by such authors as Chapman, Keble, Pritchard, Colliver and Mitchell, dealing mainly with Victorian subjects. Set "B" includes about 80 pages of material of less moment, but which should be considered by those making a serious study of local geology. In all, the 56 individual numbers listed here contain over 1,000 pages of general natural history, with a considerable amount of information on botanical and zoological subjects besides the geology.

Set "A": Vol. XLVII—No. 2; XLVIII—5, 7; XLIX—12; LIII—11; LIV—10; LV—5, 9; LVI—11; LVII—2; LVIII—5, 9; LIX—7, 12; *62*—3, 8; *65*—2, 8; *66*—4, 12; *67*—6; *68*—8; *69*—4. 23 individual numbers, price 15/6.

Set "B": Vol. XLVI—3, 7, 10; XLVII—6; XLVIII—3, 10; XLIX—3; L—1, 3, 5, 11; LIII—7, 9, 12; LIV—3, 5, 7, 11; LV—2, 4, 10; LX—1, 4, 10, 11; *62*—7; *64*—4; *66*—2; *67*—4; *68*—1, 4, 7; *69*—10; *70*—3, 4. 33 individual numbers, price £1/2/6.

Address orders to the Hon. Editor, P.O. Box 21, Noble Park, Victoria.

WHAT, WHERE AND WHEN

F.N.C.V. Excursions:

Saturday, September 17—Botany Group excursion to the gardens of Mr. Hammet and Mr. Savage. Take 2 p.m. train from Prince's Bridge to Ivanhoe, or meet at 2.20 p.m. at the latter station.

Thursday, September 29 (Show Day)—Wattle Park. Leader: Miss Wigan. Subject: Birds. Meet at Wattle Park tram terminus at 2 p.m.

Sunday, October 2—Parlour coach excursion to Elphinstone and Taradale with the Bendigo Field Naturalists Club. Leader: Mr. F. Robbins, President of the Bendigo Club. Coach leaves Batman Avenue 9 a.m. sharp; returns approx. 8.30 p.m. Fare, £1. Bring two meals.

Saturday, October 8—Geology Group excursion. Details at Group meeting.

Group Meetings:

(8 p.m. at National Herbarium)

Wednesday, September 21—Microscopical Group.

Wednesday, September 28—Botany Group. Speaker: Mr. Atkins. Subject: Ferns (illustrated).

Wednesday, October 5—Geology Group. Subject: Petrology. Speaker: Mr. Blackburn.

Preliminary Notices:

Sunday, October 16—Parlour coach excursion to Mount Charlie. Leader: Mr. Williams. Coach leaves Batman Avenue 9 a.m.; returns by 8 p.m. Fare, 15/-. Bring two meals.

Tuesday, November 1 (Cup Day)—Club Picnic. Parlour coach excursion to Warncet. Leader: The President, Mr. Tarlton Rayment. Coach leaves Batman Avenue 9 a.m.; returns by 8 p.m. Fare, 17/-. Bring two meals.

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PROCEEDINGS

There was a good attendance at the General Meeting held at the National Herbarium on September 12. Dr. Gwenda Davis of the New England University was elected as a Country Member.

Mr. C. Derrick addressed the meeting on behalf of the organizers of the forthcoming Scout Jamboree, and asked for members to give talks to the scouts. The function will be current from December 29 to January 10, and the President gave an assurance that speakers would be available.

A letter was received from the Fisheries and Game Department to the effect that an area along the lower Glenelg River would not be reserved. Mr. Ros Garnet pointed out that this was because the proposed area was not sufficient and hence its reservation not desirable.

The President reported the resignation from Council of Mr. W. L. Williams, and expressed appreciation of his work for the Club. Mr. A. J. Swaby was welcomed as a new member of Council.

Attention was drawn to an exhibition by two Club members, Mrs. Wood and Mrs. Sutherland, of pottery and paintings of wild-flowers, to be held at the Kosminsky Gallery from October 10 to 21.

Several lecturettes were given by members. Mr. N. A. Wakefield spoke on one of our smallest birds, the Brown Warbler, *Gerygone richmondi*, which inhabits the lilly-pilly jungles of far eastern Gippsland. Mr. Colin Lewis told of his success with the culture of boronia by the application of sulphate of ammonia, with most adjacent species benefiting except the grevilleas. Mr. Garnet spoke on "Cores from Bores" and showed samples of basalt cores from Tyrendarra. Members of the Microscopical Group treated members to some most interesting micro-projections on a variety of subjects from the Group slide library.

Mr. H. Stewart reported that at the recent Box Hill Horticultural Show, one of our members, Mrs. Paul Fisch, gained a first prize with a display of native Australian flowers, one of which, *Grevillea juniperina*, took the show's highest award.

Mr. Swaby reported that a party from the Club had attended at Maranoa Gardens on the previous Saturday, when members of the State Electricity Commission had planted a specimen of *Eucalyptus chapmanii* in memory of the late Dr. W. D. Chapman in whose honour the species had been named.

CIRCUMSTANCES ALTER CASES*

Some Random Thoughts on Conservation

By F. G. Elford

The history of mankind is a succession of events that have resulted from the operation of particular sets of circumstances at particular places at particular times. Man is the common factor. Circumstances, places, and times differ. If circumstances had been different a certain event may not have occurred. If those same circumstances had operated in a different place, or at a different time, the resultant event may have been different. It is difficult to imagine, for example, how the history of Australia would have read had the Dutchman, Dirk Hartog, in 1616, touched Australia at Botany Bay instead of landing on an island in the vicinity of Sharks Bay. Similarly, modern history may have been very different if, in 1945, an atomic bomb had not fallen on Hiroshima.

And so it is in matters of conservation—circumstances alter cases. To conserve means to keep from decay or change or destruction. Sometimes we speak of preservation rather than conservation. To preserve also means to save from decay or, according to whether we use the word in a particular or general sense, it may mean to save from death, or injury, or loss, or from oblivion. Ideas on conservation vary from generation to generation in one particular place, and they vary from place to place at any one time. They all depend upon circumstances, and it is the people who decide. Although individuals may plan and advise, it is people collectively who are responsible for the final result.

All naturalists are interested in conservation or preservation. Consequently, they should be interested in a study of two things—

1. The objects to be preserved, that is, the living things (animal or plant) within their natural habitat;
2. mankind, people, their fellow human beings—those who determine, in the long run, whether an object will be preserved or not.

And of these two, human beings are by far the most difficult to deal with. Generally speaking, although there are exceptions, a careful and thorough study is made of the objects to be preserved. But, after being carefully planned, and after the expenditure of much time, effort and money, a conservation project may be doomed to failure because insufficient attention has been given to the people of the community in whose hands the success of the project lies.

Human nature, complex as it is, is very difficult to understand. We are told that, individually, we are the products of Nature and Nurture. We are born with a certain degree of intelligence and with various physical and mental aptitudes and abilities. We have a number of fundamental physical needs in order to survive—air, water, food and warmth. Quickly, we acquire by education a certain standard of living and part of the cultural background of our race. As social animals, we develop those worthy characteristics which are essential for the progress of the community as a whole. But we are also prone to those undesirable features commonly referred to as human weaknesses—selfishness, greed, jealousy, and so on.

The characteristics of a community are the sum total of the characteristics of its individuals. We in Australia have a reputation of being a light-hearted, carefree, happy-go-lucky people, lovers of sport and the great outdoors. We gamble, but believe in fair play. We are tolerant and have our own particular sense of humour, but will fight when aroused. We regard ourselves as having a high standard of living, and as having high standards of education. We rise to the occasion when called upon to do so, as we

*An address given to the Club on August 8, 1955.

have shown in two world wars. We believe in democracy and have a code of laws accordingly. Of course, we have our weaknesses too. For example, we believe in doing what we like until we are convinced that we cannot do what we like. We almost have a tradition that it is not wrong to break laws but the wrong lies in being caught breaking laws. And so we could go on analysing human nature and classifying the characteristics of the people collectively.

But what has all this to do with conservation? A very great deal. Let us consider some problems of conservation which are really problems of human beings—as individuals, or as the community at large.

As a community we are tolerant people. During the early years of settlement in this country, man's reaction in part was to turn to commercial gain certain of the unique animals and plants that were discovered here. Thus, kangaroos, wallabies, possums and koalas were slaughtered by the tens of thousands for their pelts. Emus, lyrebirds and egrets were killed for their plumes. More tragic still was the indiscriminate firing of thousands of acres of natural flora for the purpose of clearing such unprofitable rubbish out of the way to enable the more necessitous and profitable primary industries to be established. In this process, of course, the indiscriminate destruction of fauna was a natural corollary. Then circumstances changed. Animals such as koalas and lyrebirds, being on the verge of extinction, became rigorously protected. Other animals also became protected and the destruction of kangaroos, wallabies, possums and emus became controlled by permit.

Mr. Everyman was gradually educated to the fact that it was about time we took some pride in our unique flora. Scientists had found all kinds of interesting things about them. Conservation became the watchword, but, as a community, just how proud are we? We still tolerate those rather crude representations of koalas, lyrebirds and other animals on our postage stamps. At the same time, we appear to be content to allow these animals to be used as brands for our produce in such a way that people overseas are not at all sure about "kangaroo" butter or whether jam is made from parrots. We have rather a poor idea of methods of displaying our fauna to the rest of the world. In some zoological gardens we put a koala on a dead tree trunk in a relatively small enclosure and provide it with bunches of gum tips placed in a kerosene tin of water.

Then, again, we have people who are exhibitionists, who remain childish throughout life, who always want to see to what an extent an animal will behave like a human being, some who have an insatiable appetite for sensationalism, and, finally, the adherents of blatant vandalism. It is most difficult to classify or even name these human peculiarities. There are those who will take duck out of season or who will trap or shoot possum for sheer deviltment, while others do it because they are "agin the law". Dame Fashion will always find women who have the necessary wherewithal to be so different from all others as to appear in public wearing the plumes of some rare bird even though, these days, it is usually exotic. But perhaps these are minor misdemeanours which we tolerate. Defenceless creatures, such as koalas and penguins, often become objects for fun. To the amusement of onlookers, they are poked and pulled and subjected to all kinds of hazards just to see what they will do. In zoos, lions have to be kept in cages to protect the sightseers. But some of our creatures are so harmless and defenceless that it is obviously essential to put the sightseers in cages in order to protect the animals from being tormented to death. More distressing still is the lack of respect paid to-day by city and suburban dwellers to the properties of country dwellers and to the natural bushland which, to them, "belongs to nobody". The utter disregard and disrespect for flora and fauna, the litter that is left behind, and the acts of vandalism in some localities, are almost unbelievable. One wonders what would happen if

country folk invaded cities and suburbs and behaved in a similar manner.

Passing on to bigger problems, we have human weaknesses such as selfishness and greed. We manage to have relatively large tracts of country set aside as sanctuaries, reserves or national parks. But if these contain any vestige of natural resources that may be turned to profit, you may be sure that someone will want to use these to his advantage. In such matters, some people are experts. They may be regarded as opportunists, or as shrewd business brains. And you all know what can happen to the Thryptomene of the Grampians, and the consequences of grazing permits in national reserves. At our own backdoor we can see what is happening to the Dandenongs. Geographically, we are told, they are an ideal spot for Melbourne's playground. But first the rubbish, the natural beauty, must be bulldozed out of the way. Exotic plants are much more attractive than the giant mountain ash. Those fern gullies are too damp and dark and dismal. The lyrebird is a pest—it is impossible to make a garden when it is near. So let us transform the place—tidy it up and make it fit to live in. Do you see the problem you are up against? People believe that they can always improve upon Nature. Man's standards of art and beauty are very different from those of Nature's.

Within recent weeks we have had a very interesting example of how circumstances alter cases. It concerns the ways of the eagle. People to-day must have their thrills to make life worth living. And, of course, we live in a world of sensationalism. This is the modern field of competition for the cinema, the radio, and the press. Now the wedge-tail eagle has really never been studied thoroughly from the viewpoint of its feeding habits. If only the stomachs of all eagles that have been killed in this country had been examined and careful records kept, we might know what we are talking about when we discuss this bird. What did eagles feed on before rabbits and sheep were introduced into this country? With the introduction and spread of the rabbits and sheep, circumstances appear to have altered its feeding habits. Now that rabbits are being rather effectively exterminated, what will be the result of these new circumstances? We seem to have a tradition that anything with a bad name must be killed and made the object of a public exhibition. And so the fences in many parts of the country are lined with the remnants of eagles. And the shooting of an eagle is still sufficiently sensational, especially if it has a wing span of seven feet, to almost warrant front-page press headlines. These are all interesting peculiarities of human nature. Well, some weeks ago a certain Federal Cabinet Minister decided that it would be thrilling to shoot eagles from an aeroplane. You know the rest of the story. No doubt you followed the news reports and resultant correspondence from day to day. What was your summing up of the situation? There was rather an interesting summing up in a sub-leader in *The Bulletin* of July 27. It reads something like this:

1. Mr. Casey is not likely to shoot many eagles from an aeroplane.
2. What eagles do to the sheep population is nothing to what other preventable causes do.
3. Eagle-lovers will never see eye to eye with eagle-haters.
4. Had Mr. Casey been plain Joe Blow and gone and shot an eagle, there wouldn't have been the slightest fuss.
5. Next time Mr. Casey takes a holiday, he shouldn't tell the press what he intends to do, or have himself photographed doing it.

The episode proved to be an interesting view of human nature; the status of the eagle remained unchanged.

Now let us come nearer home. We must not forget that naturalists are human beings and not different in any way from the average citizen. Let us hope that none of you requires to be disillusioned on that point. Some

of us, on Club excursions, believe that we have the right to collect wild-flowers *ad lib.* if we want to. Those who are enthusiastic bird photographers believe we have the right to use any device to secure our objective. The photographic record is the thing; the methods of obtaining it do not matter. It is all done in the interests of Science. Some of us even allow sentiments to overshadow our reasoning. The kookaburra, for example, by nature is a likeable bird, but it can be a cruel brigand in its feeding habits. Therefore, let us remove it from the protected list. Some of us abhor parasites. Hence, when we find the eggs or young of a cuckoo we destroy them. And so we take sides—we may even become inconsistent, mainly because we do not consider all the facts and base our judgments on sound reasoning. We know the rabbit is a pest and we are thankful that myxomytosis has decimated its numbers. In particular reserves, things will now be much better. Native plants will have a chance to survive. Even the koalas will benefit because the seedling manna gums will thrive. But do you know what the Lands Department is doing? It is going into those reserves with "1080" to try and completely exterminate the remaining rabbits. We must stop that because of the risk to the native fauna. You see, we want to win both ways.

Yes, members of a naturalists' organization are prone to all the difficulties that beset anyone trying to live with one's fellows. We tend to become parochial—we develop that well-known attitude that all the world is queer but thee and me. Differences of opinion arise, these become mixed up with human feelings, develop into jealousies and, unfortunately, into bitter hatreds—such appears to be human nature. All is well with us and the world when we are getting our own way, but when a shadow crosses our path then circumstances alter cases. The net result is "man's inhumanity to man". We notice this particularly when, now and then, not very often, a born naturalist arises among us. He finds life hard enough, while engaged in his researches, in securing the necessities to survive. Such a person is an individualist—he finds it hard to conform to the ideas of others. He is nearer Nature than to man. Thus, he is sure to annoy someone, sooner or later. It seems very hard that he should be persecuted by his fellow naturalists. But that is the kind of thing that can happen, and it does happen.

You must be thinking that this is all very critical or even very cynical, and that I have a very poor view of human beings. That is not so. Human beings are the most wonderful manifestations of life on this planet. The trouble is that so few of them realize this fact. Those actively engaged in conservation of native flora and fauna and natural habitats are worthy of our greatest admiration. They have an uphill task at hand. Our various laws relating to the protection of flora and fauna are like our traffic laws, and our licencing laws, and many other laws—completely out of date; they have not kept pace with modern progress. Furthermore, the machinery which changes laws and enforces them is very slow-moving—as is characteristic of a democratic way of life. Education in the direction we desire is also a very slow process. Whether in our homes, in our schools, or through the various media of adult education available to-day, natural history has many competitors as a subject which claims human interest. And the biggest task of all in conservation is that of dealing with people. Conservation is a problem of humanity—of civilization.

In dealing with any human problem it is often a good idea to pause occasionally and contemplate, to ensure that you have your facts straight and that you see the problem with which you are wrestling in its true perspective. Where do our koalas and lyrebirds, for example, fit into the scheme of things? And what is man's place? Have you ever looked at the sky? Out in space, which has no beginning and no ending, are countless thousands of universes. Within our own universe, that of our solar system, new worlds are coming into manifestation every second, and old worlds

are passing out. And on this planet which is our home, the stream of life flows constantly on and we, the highest manifestation of that stream, are posed with the task of working out our salvation. And all is change, nothing stands still. As the poet Tennyson has said in "In Memorium":

> The hills are shadows, and they flow
> From form to form, and nothing stands;
> They melt like mists, the solid lands,
> Like clouds they shape themselves and go.

We find, on pondering, that the whole great scheme, so great that it challenges our imagination and the limits of our comprehension, works with perfect harmony in accordance with certain fundamental laws. There is, for example, the Law of Conservation of Matter—a law that has always operated, a law that was brought to the attention of man very many centuries ago but which was not understood, its significance was not appreciated, and it was forgotten. It was not until the latter part of the 18th century that Lavoisier showed experimentally that this law still operated. To quote his words: "Nothing is created, either in the operations of art or in those of nature, and it may be considered as a general principle that in every operation there exists an equal quantity of matter before and after the operation, that the quantity of the constituent is the same, and what happens is only changes, modifications." In modern language—nothing is created, nothing is destroyed, there are only changes in disposition.

Within very recent years, within our life time, physicists and chemists have carried their researches to the stage of the certain realization that matter has no substance—it is but transitory manifestations of forms of energy. And biologists are satisfied that there is no clear demarcation between living and non-living substance—one form merges into the other. And so the Law of Conservation of Energy has a new significance to us—the sumtotal of the energy in the universe remains the same despite changes in its disposition. Thus, in the universal scheme of things, all matter and energy are conserved or preserved, always have been, and always will be. What have we to conserve or preserve? Are we trying to stem the stream of life and taking upon ourselves the rôle of deciding upon the disposition of matter and energy?

Did the passing of the Dodo into oblivion alter in any way man's place in his universe? Will the preservation of the koala and the lyrebird have any effect on man's ultimate destiny? What are we really trying to do in attempting to preserve our native fauna and flora and their natural habitat? If, in the process, we can teach people how to live, if we can make learned men wise, and if we lead man to the finding of his own soul, it will be worth while. If not, the sooner the koala and the lyrebird pass into oblivion with the Dodo, so much better.

I have not intended to be critical or cynical, but I thought you might be interested in a slightly different approach to questions on conservation—the human approach—and so I have tried to convey to you just a few random thoughts on this subject. But the thought I would leave with you is this. To-day, as never before, there is need for a change in the hearts of men. Without such a change, nothing matters.

MICROSCOPICAL GROUP

The subject for next meeting is "Practical Micro-projection". The next meeting of the F.N.C.V. on October 10 offers special interest to group members also. The pond life excursion on Saturday, October 15, is to the Burke Road lagoons, on the south side of the bridge.

FOSSIL INSECTS, CENTIPEDE, AND SPIDER

By Edmund D. Gill.*

The oldest land plants known in the world occur in Victoria. They comprise the *Baragwanathia* flora found on the Wood's Point Road, at Mansfield, at Eildon, at Lilydale, and a few other places in Victoria. However, no insects have been found with this flora. Insects depend on the botanical world for their existence, and so the most primitive insects will no doubt be found some day associated with the most primitive land floras.

NUMBERED BY THE BILLION

Insects are one of the most successful groups of living organisms, and indeed many people think they are the most successful of all. In their numbers they are to be counted by the billion, and even in their species they occur in tens of thousands. Imaginative writers have thought of a final show-down between man and this, the most successful group of living things, picturing mankind beset by trillions of insects claiming his "living space". The case is overstated by these writers, but it does emphasize the great success of the insects—the animals having their skeletons on the outside instead of on the inside as we do.

The study of insects of ages past reveals a world that is strange indeed. In carboniferous times, for instance, there were insects which measured 2 ft. 6 in. across the expanded wings. Even more notable is the fact that several insects of the period possessed three sets of wings, one pair for each pair of legs. As has been already indicated, insect life is determined by plant life. In carboniferous times there were monotonous forests of fern and moss types that were devoid of flowers, and so no bee hummed in floral cup or butterfly fluttered over scented inflorescence. There were no flies either, nor wasps, nor ants. There were not even grasses in those times. It was the coming in force of grasses in middle Tertiary time that in many ways changed the face of the earth, and made it resemble the world we know to-day. Our earth has long been covered with a mantle of green, but it has not always had the same mantle. With each different vegetal covering there has been a different fauna of insects, but all the modern groups appeared by Mesozoic times. The oldest orders are the Orthoptera and Neuroptera.

AUSTRALIA'S FOSSIL INSECTS

From New South Wales have come rich faunas of fossil beetles, and they have become famous through the researches of the late

*Curator of Fossils, National Museum of Victoria, Melbourne.

PLATE III

Fossil moth larvae, Pejark Marsh, Victoria. ×1

Fossil centipede, Bogong High Plains, Victoria. ×4
—*L. A. Baillôt photos.*

Dr. Tillyard. Insects are known in numbers also from strata in Queensland, and papers have appeared in recent years telling us more about them. However, Victoria is very poor in fossil insects, and the writer knows of only the following records, two-thirds of which are new.

1. *Jurassic.* Etheridge (1902) has recorded an insect wing (no. 362) from the Parish of Jumbunna East, South Gippsland, and mentions a couple of doubtful specimens (nos. 374, 426). These are the earliest evidence of insect life found so far in the rocks of Victoria.

2. *?Eocene.* Early in Tertiary time, Victoria was a broad, flat expanse of monotonous country whereon there were numerous lakes and swamps. The climate was a tropical to sub-tropical one. Over this terrain volcanoes poured the lavas we call the Older Basalts, and the first step in the uplift of the area took place. Some of these buried lake deposits, protected by their thick armour of basaltic rocks, are now perched loftily on the highlands, such as the Bogong High Plains. The Mines Department of Victoria collected fossil plants from old lake deposits on the Bogong High Plains, and with these plants was a fossil myriapod, as shown in Plate III (reg. no. 50701). Nothing much can be identified in this fossil, but Mr. A. N. Burns has suggested it is a chilopod (centipede) because there is one pair of legs to each body segment. I am indebted to Dr. D. E. Thomas for permission to figure this unique specimen.

3. *Miocene* or *Pliocene.* In the National Museum are some specimens from the Central Company's Shaft, Rokewood, 25 miles S.S.W. of Ballarat, which were presented by the late Mr. J. Dennant. One of these consists of dark grey carbonaceous sands bearing plant remains and the elytron of a coleopterous insect (P16410). Mr. A. N. Burns, Curator of Insects, National Museum of Victoria, informs me that the elytron is probably that of a ground weevil of the family Curculionidae, which are wingless forms confined to Australia and New Zealand. They are found in association with tussocks, sedges and reeds, and under logs and stones near streams. Their elytra are generally thick, pointed, and sculptured like the fossil one. These insects like wet conditions, and such an environment is suggested by the highly carbonaceous matrix in which the fossil elytron occurs. From the same bed came also fossil Forget-me-not seeds, and these plants grow in moist, shady places. Mr. J. H. Willis of the National Herbarium of Victoria kindly examined these fossil seeds, and reported, "I see no reason why the enclosed seeds should not be referable to a species of *Myosotis* ('forget-me-not'), of which both *M. australis* and *M. suaveolens* are at present indigenous in Victoria—usually in moist shaded situations among the hills

(e.g. Dandenongs, Otways, South Gippsland hills, and even the alps). The general size, shape, flattening and lustre conform well to seeds in this genus of the Boraginaceae."

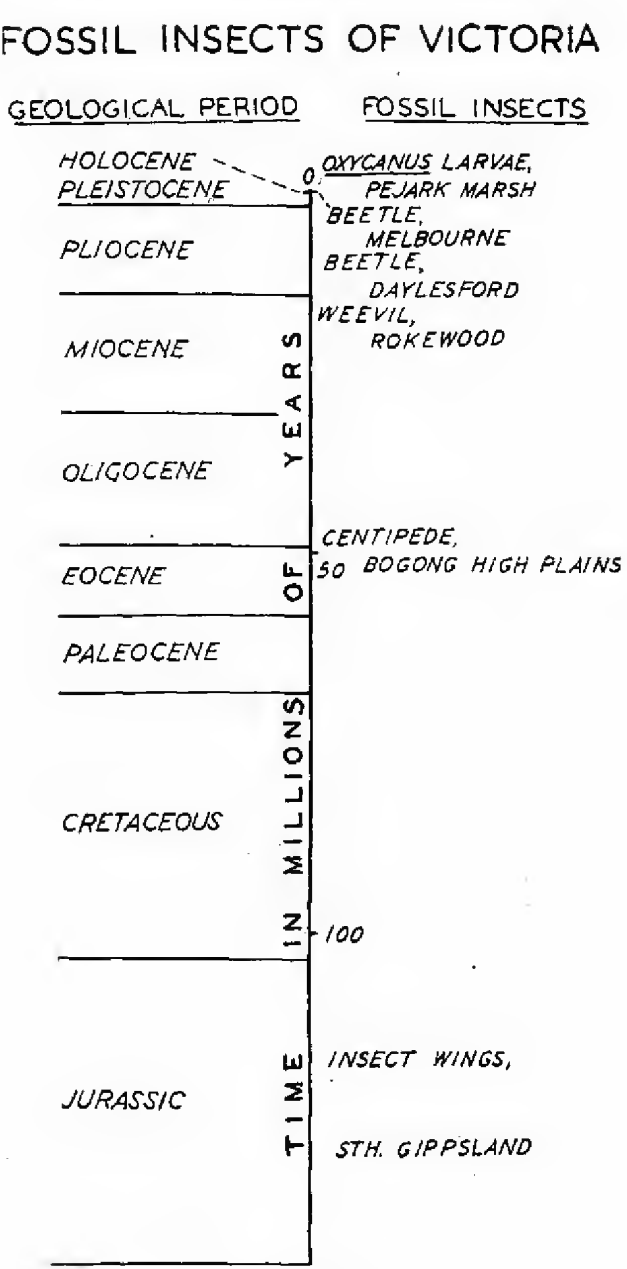
4. *Pliocene.* Coulson (1954) has given an account of the Tertiary lake deposits overlain by a series of volcanic flows and ejectamenta in the Daylesford district of Victoria. When Dr. Isabel Cookson was examining some of this deposit for fossil leaves and pollen, she discovered the elytron of a beetle. These structures, by reason of their strength and chemical stability, are one of the parts of insects most frequently preserved.

5. *Lower Holocene.* Another beetle elytron was found in layers of vegetable matter excavated when the south abutment of the Spencer Street bridge over the River Yarra was being built in Melbourne. Mr. J. Willis (1955) was able to determine this mass of vegetable matter as composed almost entirely of *Sphagnum cristatum*, a bog moss now found only on the Bogong High Plains and such places 4,000 feet and more above sea level. A radiocarbon dating for a fossil red gum stump in position of growth at the same level as the elytron has been obtained, and shows the time to have been 8,780±200 years ago (Suess, 1954). The Yarra River was then running in a gorge and the sea was over seventy feet below its present level. Port Phillip was mostly dry land. The gorge at Melbourne was rich in ferns, including the Rough Tree Fern, *Cyathea australis*, as is shown by a pollen analysis carried out by Miss Kathleen Pike. The beetle whose elytron has been found was at such a level that it could have been an inhabitant of the big *Eucalyptus camaldulensis* whose wood was used for the C^{14} dating.

6. *Upper Holocene.* There was an active volcano at Terang between a thousand and a few thousand years ago (Gill, 1953). Since then only three feet of alluvium has gathered at the south end of Pejark Marsh. In the tuff of the local eruptions were found two larvae which have been identified as probably belonging to the moth *Oxycanus fusconnaculatus*. The larvae have been replaced by the fungus *Cordyceps* cf. *lavarum* (Keble, 1947). They are registered in the National Museum of Victoria as numbers P16153-4, and are figured for the first time, in Plate III.

FOSSIL SPIDER

Because of their comparatively slender structure, and the nature of their habitats, spiders are seldom preserved as fossils. However, a phosphatized spider (P15264) has been presented to the National Museum by Mr. L. S. G. Butler, who informs me that it is referable to the genus *Lampona* as far as can be determined from the structures present. This fossil spider comes from the



Text-figure 1

island of Nauru in the Pacific Ocean, where it was found in the phosphate deposit which is so extensively worked for the manufacture of superphosphate.

REVIEW

The insects and centipede which constitute the rather limited record of these animals from the rocks of Victoria are presented diagrammatically in relation to a time line in text-figure 1. These six fossils are all we know so far of the insect life of Victoria covering a period of 140,000,000 years!

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FLORA OF VICTORIA: NEW SPECIES AND OTHER ADDITIONS—5

By N. A. WAKEFIELD, Noble Park

Genus Acacia: Two New Species from the Snowy River District

ACACIA HUNTERIANA sp. nov.

Frutex ramosissimus *A. linifolia* (Vent.) Willd. affinis, sed differt: phyllodiis crassis, nervo medio haud prominente; floribus auratis: legumine angusto (circiter 5 mm. lato); floritione verno incipiente.

HOLOTYPE: Banks of Snowy River, near Deddick, eastern Victoria; about 600 ft. elevation; 8.9.1955; N. A. Wakefield No. 4810; growing in sand and gravel. (To be located at MEL; duplicates to be sent to NSW and KEW.*)

General diagnosis: A large bushy shrub; branchlets very numerous, small, angled, glabrous; phyllodes to about 7 cm. long and 2 mm. wide, straight, flat, coriaceous, glabrous, the midvein not prominent, the surface slightly wrinkled, apex obtuse but with a short recurved point; inflorescences axillary, racemose, up to about 3 cm. long and with about 10 flower heads, the axis glabrous; flower heads globular, few flowered; peduncles to about 4 mm. long, each subtended by a small bract; flowers 5-partite; bracteole peltate; calyx lobes short, broad, translucent, little united, the apex slightly fringed; pod to about 7 cm. long and 5 mm. wide; seeds up to about 7 in number, funicle short; flowering season about September.

Distribution: In sand, gravels and about cliffs in open forest areas, in the vicinity of the Snowy River and tributaries, in both southern New South Wales and eastern Victoria.

*MEL—National Herbarium of Victoria, Melbourne; NSW—National Herbarium of New South Wales, Sydney; KEW—Royal Botanic Gardens, Kew, England.

The earliest known collection of *Acacia hunteriana* was made by A. W Howitt, in 1883, and it bears the label "764 Turnback", this name referring to an old track to the Snowy River. A second specimen of Howitt's is labelled "45. Banks of Snowy River, granite, low level". A New South Wales collection was made by William Bauerlen in April 1885—No. 163 from "Delegate district".

The species is named in honour of Mr. W. Hunter who, during his surveying activities in eastern Victoria, has done much to add to our knowledge of the flora of that area. His specimens of this *Acacia*, collected at Deddick in September and November 1940, are accompanied by these notes: "Of very limited range in East Gippsland: it is fairly frequent about the Deddick and Snowy Rivers, but my only other locality for it is Ingeegoodbee, where it is rather scarce. A shrub 6 to 12 ft., rarely a small tree up to 20 ft." This material was at the time identified for Hunter as *Acacia linifolia*, but he subsequently pointed out that the latter species had thinner phyllodes, paler flowers and broader pods, and that it flowered in autumn. (See note on page 95.)

The present author first saw *A. hunteriana* on 30.1.1947, at the Snowy River near Deddick (N.A.W. No. 4059), and fruiting specimens were collected at the same spot on 17.1.1948 (No. 2383). Material was collected too on 6.1.1949, on porphyry cliffs near Boundary Creek, Wulgulmerang, at about 2,500 ft. elevation (No. 2702), and a further lot on 31.8.1952, on the banks of the Snowy River, east of Butchers Ridge (No. 4697). More recently, opportunity was taken to collect a suitable suite of type material.

Acacia hunteriana is one of the most attractive members of its genus, with fine, often weeping foliage and golden masses of delicate blossom. Mr. Leo Hodge has plants of the species growing in his native garden at W Tree in East Gippsland, and he refers to it as "Snowy River Wattle". This would be a very suitable vernacular name for the species, for it apparently does not occur outside the valley of the Snowy River.

ACACIA PAUCIJUGA F. Muell. ex N. A. Wakefield sp. nov.

> Frutex vel arbor parva ex affinitate *A. decurrentis* (Wendl.) Willd., *A. mollissimae* Hort. ex Willd. et *A. deanei* (R. T. Baker) R. T. Baker ex Welch, Coombs & McGlynn, sed ob combinationem sequentem characterum differt: folia perparciter pubescentia, pinnae paucae (circiter 2-7 paria), pinnulae circ. 7 mm. longae et 0.7 mm. latae, floritio aestivalis.

"*Acacia paucijuga* ferd Mueller", (without diagnosis), in the *First General Report of the Government Botanist on the Vegetation of the Colony of Victoria, 1853*, page 12.

LECTOTYPE.—Specimen in National Herbarium of Victoria, Melbourne, with label bearing the following inscription in Mueller's hand: "*Acacia paucijuga* ferd Mueller. In virgultis planitierum steriliorum ad flumen Broken River, gregaria. Fruct. 7-10' alt. Dr. M." (This specimen would have been collected in February 1853.)

General diagnosis: Large shrub up to 5 metres high; branchlets striate, the uppermost acutely angled, minutely hispid; leaves bipinnate, minutely hispid on all parts, petiole to about 2 cm. long, rhachis to about 5 cm. long, with 2 or 3 glands below each pair of pinnae; pinnae few, usually 2 to 7 pairs (rarely to 9 pairs), up to about 5 cm. long, the axis narrowly winged; pinnules up to about 30 pairs on each pinna, linear, up to about 7 mm. long and 0.7 mm. wide, apex rounded and slightly recurved, lateral margins incurved; inflorescence axillary, simply racemose with up to 10 heads or a branched panicle up to about 9 cm. long and with about 30 heads; pedunicles usually 2 to 3 mm. long, each subtended by a small bract, florets 5-partite, up to about 40 in a globular head; calyx half the length

of the corolla, the lobes very short and with shortly ciliate margins; bracteole spathulate, with the keel and bilobed apex shortly ciliate; pod up to about 9 cm. long and 7 mm. wide, usually straight, usually conspicuously constricted, with up to about 9 seeds; funicle short, white, thick, straight; flowers in late summer.

Habitat: The *Callitris-Eucalyptus albens* association of the border district of the Snowy River valley, scattered on gravelly hill-slopes in open forest, often dominating small areas. Also in north-eastern Victoria and Wagga Wagga district of New South Wales.

Acacia paucijuga is closest in its affinities to *A. deanei*, but the latter is more tomentose, has more pinnae per leaf, the pinnules are shorter and closer, and it flowers in winter. *A. decurrens* has large, glabrous leaves, pinnules about 1 cm. long and ¼ mm. or less wide, and it flowers about late winter. *A. mollissima* has densely pubescent leaves, the pinnae more numerous, the pinnules much more numerous and only 2 to 3 mm. long, and it flowers about late spring.

In the Melbourne National Herbarium there are, besides the lectotype, several collections made by Baron von Mueller over 100 years ago; they are accompanied by the following data:

"Among rocks . . . of Mt. Hope. A tall shrub or little tree 12-20 ft. high. 3 Jan. '53. Dr. M."

"Disposed in woods of *Eucalyptus populifolia* inhabiting rather scrubby places. Between 10-mile Creek and Broken River. Shrub 7-10 ft. high forming beautiful belts in the scrub. 10 Feb. '53. Dr. M."†

"Shrub 4 to 6 ft. high, erectly branched. In sterile flats of the valleys near King River. 11 March '53. Dr. M."

"*Acacia paucijuga* ferd Mueller. King River. 1853. F.M."

"*Acacia paucijuga* ferd Mueller. Snowy River. 1854. Dr. ferd Mueller."

There is also a specimen, ex Herb. Sonder, labelled "*Acacia paucijuga* ferd Mueller. Murray."

The first four and the last, as well as the lectotype, were in flower. The Snowy River material bore pods; and it would have been collected in March 1854 on the New South Wales tract of the river. (See *Vict. Nat. 69*: 81, Oct. 1952.)

From 1939 to 1941, Mr. W. Hunter made collections of *A. paucijuga*; but, as these were not satisfactorily identified at the time, they led to the comment in his "Flora of Suggan Buggan" (*Vict. Nat. 58*: 26, June 1941): "The black wattle (*A. mollissima*) occurs in a shrubby form which I have not seen elsewhere except in the similar Deddick country: the fewer pairs of pinnae and of leaflets to each leaf, and the leaflets longer and less closely disposed, seem to show an approach towards *A. decurrens*."

The species was first noted by the present author at Deddick on January 30, 1947 (N.A.W. No. 2508), and at Suggan Buggan on January 31, 1947 (No. 2093); and an excellent suite of material was collected by Mr. J. H. Willis (in the company of the writer) near Ballantynes Hills, Suggan Buggan, on January 16, 1948. Further collections were made by the writer at Deddick in September 1954 (No. 4809) and at Suggan Buggan on January 13, 1955 (No. 4805), and by John D. Lovis, of Leeds University, at Deddick in August 1955.

Further occurrence of *Acacia paucijuga* in New South Wales is indicated by the data with two collections housed at the National Herbarium, Melbourne: "Wagga Wagga. Sent by Rev. R. Thom. March 1885", and "No. 24 from Wagga Wagga".

†The species of *Eucalyptus* referred to here is probably *E. polyanthemos*.

Genus Hypolepis: A Species Hitherto Undescribed

HYPOLEPIS AUSTRALIS sp. nov.

> Filix *H. rugosula* (Labill.) Sm. arte affinis, sed recedit: fronde angustiore (circiter triplo longiore quam lata); rhachi antidiore, saturatius rubra, pilis brevioribus pluribusque; pinnulae lobis paucis comparate magnis rotundis uninervatisque.

HOLOTYPE: Arte River, eastern Victoria; 23.3.1941; N. A. Wakefield No. 107; in moist soil along mountain stream. This is a small specimen with stipes 8 to 15 cm. long, arising about 2 cm. apart from a thin rhizome, and each frond lamina is about 25 cm. long.

The following general diagnosis is derived partly from some of the other collections cited below:

Stipes and main rhachis deep red, shining, slightly asperous; hairs of the rhachises numerous, short, very crooked, reddish; frond lamina narrow-triangular, up to 60 cm. long and 20 cm. wide, tripinnate; pinnules (tertiary pinnae) up to about 1 cm. long and 4 mm. wide, pinnatifid, finally lobed, sparsely pubescent on both sides and the margins; lobes few, comparatively large, rounded, mostly uninerved; sori up to 4 per pinnule, each partially protected by a recurved lobe.

Habitat: Shaded mountain gullies of Tasmania, eastern Victoria and south-eastern New South Wales.

H. australis is allied to *H. rugosula*, but the latter has the fronds broader, rhachises reddish-brown and with large tubercles, the hairs of the rhachises sparser and much larger, and the pinnules less deeply divided and with more numerous veins.

In the Melbourne National Herbarium there is material of *H. australis* from Mount La Perouse in southern Tasmania (C. Stuart, No. 1842; March 1, 1857), and from three eastern Victorian localities: Warburton (C. S. Sutton, No. 1503; 4/1906), Beenak (A. J. Tadgell; March 1930) and Wongungarra River (J. Stirling, No. 67; "silurian formation, 3,800 ft.").

In the herbarium of the University of Tasmania there are four collections of *H. australis*: Myrtle Forest (near Collinsvale), 1,000 ft., July 9, 1930, Ellen Atkinson; Myrtle Gully, Mt. Wellington, July 17, 1937, 1,200 ft., H. D. Gordon; Myrtle Gully, Hobart, 1,000 ft., 3/9/1936, A. M. Olsen; and Lufra Gully, Eaglehawk Neck, W. M. Curtis.

Some years ago Miss J. Somerville sent the writer some samples of the new species, collected in August 1939 on Mount Wellington, Tasmania. Part of this collection was a juvenile frond which had not developed the characteristic lobing of the pinnules. Similar juvenile material was collected by the writer on 11.1.1942 between the Princes Highway and Wombeyn Inlet, in south-eastern New South Wales (N.A.W. No. 179). The frond shape and nature of the rhachis identify these specimens as *H. australis* despite the more entire pinnules."

Illustrations of the new species and of the three other local members of the genus will appear in the forthcoming F.N.C.V. book, *Ferns of Victoria and Tasmania*.

I am indebted to Mr. J. H. Willis for assistance in connection with the preparation of this paper, particularly with regard to the formulation of the Latin diagnoses.

[Note: While this was in press, Mr. Hunter wrote to the author with the information that it was Mr. M. W. Nichols of Kurri Kurri, New South Wales, who originally suggested that the "Snowy River Wattle" was not *A. linifolia* and pointed out the differences between the two.]

MICROSCOPICAL GROUP MEETING

At the meeting in the National Herbarium on September 21, Mr. Evans and Mr. Middleton each spoke on the problems of photo-micrography. One of the main difficulties is the elimination of glare, to which the eye may become accustomed but which the camera makes very obvious. The operator must decide what he wants, for it is impossible to have high resolution, depth and a wide field all together. The Barlow lens is an ideal eye-piece for photo-micrography; such must be achromatic and corrected for spherical aberration. Short exposures are not necessary, except for a dark field, in which case it is less than the amount of light would lead one to expect. Rock crystals may be taken on Kodachrome film, and light filters are advisable only when contrasts are required. To emphasize red, a blue filter is used, and for older lenses a Gifford green filter improves the image. A special light meter may be used in connection with colour work. Exhibits included a photographic camera attached to a microscope, shown by Mr. Evans. Mr. Middleton displayed an enlarged photo-micrograph, together with the original slide under a microscope. Dr. Wishart's microscope showed a fascinating micro-photograph of the Seven Bridges across the Seine, Paris, taken by J. B. Dancer in 1870.

EXHIBITS AT THE SEPTEMBER GENERAL MEETING

Orchids predominated, with Mr. V. H. Miller's several pots of Rock Orchid, *Dendrobium speciosum*, occupying a complete table; these originated from small ones obtained at Mallacoota in 1930. Mr. W. L. Williams brought along *Pterostylis curta* and *P. concinna*, and Brother Mercovitch exhibited a plant of *Caladenia fitzgeraldii*. Other garden-grown natives on show were Mr. A. E. Brooks' ten species of *Acacia*, and an assortment brought by Mr. Ros Garnet. Mr. H. Stewart tabled examples of Bell-fruit, *Codonocarpus cotinifolius*, and White Matrush, *Lomandra leucocephala*, both from the township area at Red Cliffs; and Mrs. E. Coghill and Miss F. Furster brought along flowers from Central Australia. Miss Paull showed a plant of *Grevillea rosmarinifolia*, grown from a cutting in a open garden; Mr. A. J. Swaby exhibited the common web of the Imperial White butterfly with pupae attached; and Mr. N. A. Wakefield displayed some photographs of the Brown Warbler at its nest.

WHAT, WHERE AND WHEN

F.N.C.V. Excursions:

Sunday, October 16—Parlour coach excursion to Mount Charlie. Leader: Mr. Williams. Coach leaves Batman Avenue, 9 a.m., returns by 8 p.m. Fare 15/-. Bookings with Excursion Secretary. Bring two meals.

Sunday, October 30—Botany Group excursion to Tallarook, including visit to Bolton Wildflower Sanctuary. Take 9.20 Shepparton train from Spencer Street, alight at Tallarook. Bring two meals.

Tuesday, November 1 (Cup Day)—Club Picnic. Parlour coach excursion to Warneet. Leader: The President, Mr. Tarlton Rayment. Coach leaves Batman Avenue, 9 a.m., returns by 8 p.m. Fare 17/-. Bookings with Excursion Secretary. Bring two meals.

Group Meetings:

(8 p.m. at National Herbarium)

Wednesday, October 19—Microscopical Group.

Wednesday, October 26—Botany Group. Subject: Conifers, by Mr. K. Atkins.

Wednesday, November 2—Geology Group. Literature Night. Speaker: Mr. E. D. Gill

MARIE ALLENDER, Excursion Secretary.

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PROCEEDINGS

There was a full attendance at the General Meeting held in the National Herbarium on October 10. The President delivered a short eulogy on the passing of three esteemed members, Major H. W. Wilson, Mrs. Kathleen Woodburn and Miss Mary Wise, and members stood in silent tribute to their memory.

Mr. A. E. Brooks delivered a short lecturette on the raising of Thryptomene from seed. The subject for the evening, on the use of visual aids in the teaching of nature study, was conducted by Mr. E. Byrne of the Melbourne Teachers' College; and the films he showed were remarkably interesting, particularly one showing microscopic details of the life cycle of a fern.

Mr. J. Millane and Mr. Z. Gizycki were elected as Ordinary Members, Dr. A. Brown as a Country Member, and Mrs. A. Lewis and Mrs. I. Gizycki as Joint Ordinary Members. The President welcomed them to the ranks of the F.N.C.V. and wished them a profitable and happy association with the Club.

General business included the receipt of several nominations for membership, and a decision was made to communicate with the Sandringham City Council supporting a local proposal to reserve three blocks of land at Beaumaris for flora preservation.

There was a very pleasing series of exhibits, touching on the fields of geology, botany, horticulture, microscopy and marine biology; and the President adjourned the meeting at 10 p.m. for the usual conversazione.

THE LOWER GLENELG FOREST RESERVE

This note is intended to correct any misapprehension which may have arisen from the condensation of remarks to the General Meeting of the Club in September last as reported in the Proceedings. (*Vict. Nat.* 72: 81.)

The whole of the area recommended in 1947 jointly by the F.N.C.V., the Portland F.N.C. and the R.A.O.U. for permanent reservation as a National Forest is in fact now a reserve controlled entirely by the Forests Commission. As such it is as much a sanctuary for native plants (including all protected wildflowers) as any other State Forest. However, it has not yet been proclaimed a sanctuary for native fauna. Such a proclamation can be effected only on the recommendation of the Director of Fisheries and Game.

In his recent letter to the Club the Director advised that he was not prepared to make such a recommendation. Although no explanation was given for his refusal to adopt a course which it was well known he originally favoured, the Club should understand that his inaction in the matter seems entirely justified, even if unfortunate.

From the landholders whose properties adjoin the northern boundaries of the Forest Reserve there is considerable opposition to it being proclaimed a sanctuary because of the fear of kangaroos and emus, breeding unmolested in the reserve, invading and damaging their holdings. These landholders will agree to all that part of the Forest Reserve on the south side of the river being proclaimed, but want the river itself and the forest on the north side excluded. The proponents (the F.N.C.V., the Portland F.N.C. and the R.A.O.U.) will not agree to this on the ground that the exclusion of the river itself would practically nullify the value of the reserve as a fauna sanctuary. The Lower Glenelg is a magnificent stream and, in a sanctuary, would be a perfect haven for wildfowl. Exclude the river and shooting parties would have it all their own way. Game inspectors would have to confine their attentions to the heavily timbered portion in which both inspectors and shooting parties would find it too difficult to operate anyway.

It can be assumed that when agreement as to the boundaries is finally reached (and it will be reached only when the river itself is accepted as being included in the sanctuary by the nearby settlers) the Director of Fisheries and Game will reconsider his decision. Meanwhile we can console ourselves with the knowledge that there are some 80,000 acres of country bordering the Glenelg River in its lower reaches which is permanently reserved forest and which contains some of the most picturesque and magnificent scenery and profusion of native plants to be seen in that part of Victoria. In the absence of bushfires (which, under the administration of the Forests Commission, are likely to be less of a menace than of yore) the animal wildlife will probably have a better chance of survival, and even of multiplication, than it had in the past, even though the whole area remains in the condition of not being formally proclaimed a sanctuary.

—J. R. Garnet

MICROSCOPICAL GROUP

The meeting of October 19 was devoted to "Practical Micro-projection", and the apparatus displayed by four members—Messrs. C. Middleton, W. Woollard, D. McInnes and W. Evans, showed excellent progress in this field.

An appeal is made to all concerned to return outstanding library books at the next meeting. Mr. F. Millane has been appointed group librarian and he desires to organize the library for borrowing by the New Year.

At the forthcoming General Meeting on November 14, the Microscopical Group is to entertain the Club with an evening of microscopy. All members are expected to bring their instruments and a favourite slide, preferably with a dark-ground or a top-lighting subject, for display on the bench. There are to be several projectors in operation. Dr. Wishart will describe the slides on show, Mr. Nance will talk on botanical section-cutting, Mr. McInnes will deal with pond-life and Mr. W. Evans with photo-micrography.

The next group meeting will be on November 16, and the main business is to be a discussion on the group's activities at the forthcoming Scouts' Jamboree at Wonga Park from December 26 to January 10 next. This follows a special invitation from Scout Headquarters to assist in entertaining at the fraternity centres in the camp.

OFFICE-BEARERS REQUIRED

Your Council requests that consideration be given to the question of filling the vacancies of Honorary Secretary and Honorary Assistant Secretary of the Club. The matter is very urgent.

P. N. S. BIBBY (1907-55)

On June 6 last, Victoria—and, indeed, Australia—was bereft of a competent and highly-esteemed professional botanist. Patrick Noel Sumner Bibby died in his 49th year at the Austin Hospital (Heidelberg) after a long illness, and was interred at the new Cheltenham Cemetery on June 8, a large number of his former co-workers from the Melbourne Botanic Gardens and National Herbarium attending the funeral.

Mr. Bibby was born at Ballarat on March 13, 1907, and received a primary education at St. Patrick's College in that city; his father, the late W. J. Bibby, served as clerk to one Lazarus, a Ballarat solicitor, and was one of the very last of the old engrossing law clerks. Coming to Melbourne in his early teens, young Bibby first obtained employment with a firm of furriers, but he found the work uncongenial and soon transferred to the Botanic Gardens staff as seed boy in April 1924. His duties were to collect seeds for the local nursery and for exchange; this often meant climbing high trees or venturing along slender branches—not without risk. He found himself in many a predicament, and could entertain with amusing stories about this phase of his career: on one hot summer day, for instance, he was ostensibly gathering seed, but actually in a large leafy mulberry tree sampling the ripe fruits, when who should come along but the then Director of the Gardens, and a friend—the two men stood yarning under that mulberry tree for an interminable time, while the culprit above their heads was on tender-hooks lest he should betray his presence!

In 1938, following several reverses in health, Pat (as he was always affectionately known by his associates) became attached to the staff of the National Herbarium, where work was physically less arduous. His long experience with so many plants under cultivation, and his powers of observation and memory, proved invaluable in routine horticultural determination at the Herbarium, where he soon became proficient in handling dried material of the indigenous flora. Almost his first assignment was to incorporate in the Herbarium folders a European collection of about 8,000 specimens which arrived from the German botanist Alfred Meebold just after the outbreak of hostilities in 1939. Then he completely re-organized the official reference set of Victorian plants, mounting all specimens, replacing old and inadequate examples with good recent material, and making the set truly representative of the 2,300-odd native higher plants and some 500 naturalized weeds known to occur within the State. Another major undertaking (regretfully not completed before his death) was the mounting of the entire eucalypt collection (thousands of sheets), at the same time bringing its arrangement and nomenclature into conformity with Blakely's *Key to the Eucalypts* (1934). To better equip himself for systematic work, he voluntarily attended classes in Latin and German at his own expense.

But Pat Bibby's most important contribution to botanical science concerned the lichen and hepatic floras of the Commonwealth. In this cryptogamic research he had an absolutely open field, and it is true to say that he was the *only* person in Australia qualified to give a critical opinion on the identities of lichens and liverworts—even the commoner species. Last year he published a list of the hepatics (20 species) and lichens (13 spp.) collected by L. J. Brass on the Archbold Expedition to Cape York Peninsula, Queensland, from March to September 1948; the determination of these cryptogams had been entrusted to him. [See *J. Arnold Arboretum 35: 260-265* (1954).] Correspondents in all the other States submitted specimens to him, and there was a constant flow of letters to and from experts in New Zealand, Europe and America; as the well-known hepaticologist, Mrs. E. A. Hodgson of Wairoa (N.Z.), wrote to me on learning of his imminent demise, "*from a bryological viewpoint he simply could not be spared.*" Fortunately, he left behind an ms. check-list of Victorian *Hepaticae* (with localities for the 130 species) and a complete bibliography of all the hepatics

recorded for Australia and New Guinea; these, it is hoped, will be published as posthumous papers, for they would be of the utmost utility to future bryologists. A large card index to Australian lichen species was also prepared and may be consulted at the Melbourne Herbarium. He left no private herbarium, but many of his valuable botanical books have been purchased for the Herbarium library.

I had the privilege of nominating Pat Bibby for membership in the Field Naturalists Club, to which he was elected in November 1941. His popularity with fellow members was immediate and he became a keen worker in the affairs of the Club, until indifferent health prevented him from attending meetings. He has led excursian parties, and was an official botanist during the three-day visit to Rushworth early in October 1948. He served on the Council as librarian in succession to Dr. C. S. Sutton for a short term (August 1943—June 1944), having been Assistant Librarian during the early years of World War II.

P. N. S. Bibby (1907-55)

Of the man himself, perhaps no higher tribute could be paid than this: I have *never* heard anyone utter a single word of reproach or complaint against him. Always a patient sufferer, who "cracked hardy" over personal problems, Pat had an infectiously sunny demeanour and the strength of his handclasp was a warming experience—you felt instinctively that here was a friend who understood, and somehow your faith in mankind was rekindled. Yet he was so gentle and unobtrusive, the very soul of honour. I miss him profoundly as a colleague and close friend, and shall never forget the last conversation we had—four days before his passing. He had always been an admirer and stout champion of Baron von Mueller, that illustrious founder of Melbourne Herbarium, and, as I turned to leave his bedside, Pat said simply: "The Baron will be there to meet me; he has a wonderful new *Ajuga* in all kinds of colours, but the seeds haven't been sent down here yet." I like to think that way of him, in rapt enjoyment of those celestial treasures reserved for the brave and faithful. To his sorrowing widow (formerly Jean Hunt of Mona Vale, N.S.W.) and two young sons we extend the deepest sympathy.

The paper which follows is presented as a memorial to Mr. Bibby's hepatic researches. It was only partly written at the time of his death, but the remainder of this important manuscript has been put together from notes found among his correspondence and from discussions I have had with him from time to time.

—J. H. Willis.

SOME AUSTRALIAN SPECIES OF FRULLANIA (HEPATICÆ)

(with necessary rectifications to their nomenclature)

By P. N. S. Bibby*

Among the larger genera of hepatics represented in Australasia, none has stood in greater need of revision than *Frullania*. With a view to writing up the Australian and New Guinea species of this corticolous group, as Mrs. E. A. Hodgson has done recently with those in New Zealand [see *Trans. Roy. Soc. N.Z. 77*: 361-389 (1949)], I have examined the abundant material preserved in Sydney, Melbourne and Hobart Herbaria, and have been enabled to consult a number of crucial types housed overseas. It has become apparent that several names are being erroneously applied to common species of southern Australia and, as a preliminary to the major project, it is desirable that these misconceptions be cleared up—particularly with regard to the application of the names *Frullania cranialis*, *F. reptans* and *F. probosciphora* [mis-spelt *"proboscifera"* by L. Rodway in his "Tasmanian Bryophyta—Hepatics" (1916), and *"proboscidophora"* by W. Mitten in the *Flora Tasmaniæ 2*: 236 (1858)].

1. *Frullania cranialis* (Hook. f. & Tayl.) Tayl.

This name has been used by various workers (including Stephani and Rodway) for a number of related species, e.g. *F. fugax* (Hook. f. & Tayl.) Tayl., *F. incumbens* Mitt. and *F. pentapleura* Tayl. The differences between supposedly typical *F. cranialis* from Western Australia and Mitten's *F. reptans* were not at all clear. In many specimens I have found an astonishing variation in the perianth—from long-tubular and many-ribbed to the one figured as typical *F. reptans* by Mitten in *Flora Nova-Zelandiæ 2*: T.104, fig. 4 (1854). So it became imperative to examine the actual type specimens of *F. cranialis*—a basic species.

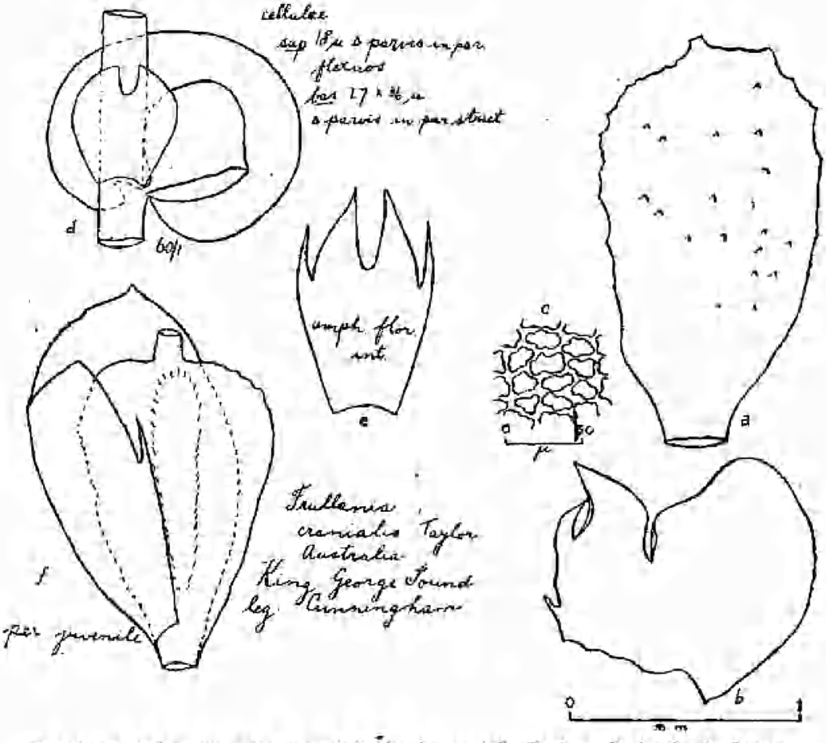
Giving the habitat as King George's Sound, W.A., and the collector as Allan Cunningham, J. D. Hooker and T. Taylor described *Jungermannia cranialis* in Hooker's *London Journal of Botany 4*: 86 (1845). Through the courtesy of the Director, Royal Botanic Gardens, Kew, I have had on loan all the type material of *J. cranialis*. This consists of: (1) a sheet with three attached specimens, labelled *"Jung cranialis* Tayl. (*Frullania*), King George's Sound, N.H.—Cunningham"; and (2) an envelope with the inscription *"Frullania cranialis* Tayl., King George's Sound, W. Australia—Coll.? Date?" The first specimens are without perianths, but the second has several perianths; I consider both collections, although labelled differently, as being from the same source.

A critical examination of this type material has revealed, surprisingly enough, that it does *not* agree with any accepted Australian species of *Frullania* at all, but rather with the European *F. dilatata* (L.) Dum.—distinguished, *inter alia*, by its tuberculate perianths. Allan Cunningham's hepatic specimens† were all studied by Taylor who, in 1845, was writing voluminously on bryophytes from many parts of the world. One can only assume that, somehow, the specimens he handled from Australia had become mixed with a European collection, and that the type specimens of *F. cranialis*, purporting to originate from King George's Sound (W.A.), actually came from some place in Europe. Stephani too must have seen this type material, because his figures of *F. cranialis* in the unpublished *"Icones Hepaticæ"* agree perfectly with *F. dilatata*. It is obvious that another name must now be found for the Australian and New Zealand population hitherto passing as *"F. cranialis"*.

* *Obit* 8/6/1955.

2. *Frullania prohosciphora* Tayl.

An examination of the types of this hepatic and of *F. reptans* Mitt. has convinced me that they refer to one and the same species. Moreover, the widespread plant (New Zealand to Western Australia) for so long erroneously called *F. cranialis* is also inseparable specifically from *F. prohosciphora*, as is Gottsche's *F. macerrima* which was considered a rare Victorian endemic. One might assume that the epithet *"prohosciphora"*



Drawings of the type collection of *Frullania cranialis* Tayl. *a*, Perianth; *b*, Bract; *c*, Median cells *d*, *e* and *f*. Copied from Stephani's unpublished *"Icones Hepaticae"*.

would denote some *Frullania* having a long, snout-like lobule. Indeed, it has been considered for nearly a century that Taylor described his *F. prohosciphora* incorrectly; but inspection of the type amply justifies his description —it was W. Mitten [*Flora Tasmaniæ 2*: 236, T. 180 fig. 5 (1858)] who made the mistake of depicting another species, *F. clavata* Tayl., under the former name, and unfortunately he has been followed by Australian workers ever since. Typical *F. prohosciphora* has a galeate lobule, shortly rostrate at the tip, and a many-ribbed perianth (at least in the apical part) varying from cylindroid to ovoid.

† The Cunningham collections were donated to Kew Herbarium by Robert Heward who may have mixed some of the items. [*See* H. Trimen in "Botanical News", *J. Bot., London 15*: 380 (1877).]

3. *Frullania clavata* (Hook. f. & Tayl.) Tayl.

The type specimen and accompanying sketches of *Jungermannia clavata* Hook. f. & Tayl., kindly loaned to me from the Kew Herbarium, prove conclusively that this was the species wrongly figured as "*F. probosciphora*" by Mitten in *Flora Tasmaniae* 2: T. 180 fig. 5 (1858). The lobule is very long, decurved and spur-like. In a small envelope on the lower right-hand corner of the type sheet of *F. probosciphora* is a piece of *F. clavata*. Either this was added after the *probosciphora* type had been described, or Taylor, when he saw it, failed to recognize his own species published a year earlier; but, in any case, this fragment would seem to be an intruder, and it may have been responsible for Mitten's unfortunate misrepresentation of *F. probosciphora*—as a species having long proboscis-like lobules. *F. clavata*, although a frequent robust species in south-eastern Australia, does not appear to extend to New Zealand.

SUMMARY

The synonymies discussed above may be summarized briefly as follows:

1. *Frullania cranialis* (Hook. f. & Tayl. 1845, sub *Jungermannia*) Tayl. 1845, non Auctt. Aust.
   = *F. DILATATA* (L. 1753, sub *Jungermannia*) Dum. 1835—European.
2. *F. cranialis* Auctt. Aust., non Tayl. 1845.
   = *F. reptans* Mitt. 1855 (syn. *F. marcowanii* Gott., 1856).
   = *F. PROBOSCIPHORA* Tayl. 1846—Aust. & N.Z.
3. *F. probosciphora* sens. Mitt. 1858 (*ut "probosciduphora"*) & Auctt. Aust. seq., non Tayl. 1846.
   = *F. CLAVATA* (Hook. f. & Tayl. 1845, *sub Jungermannia*) Tayl. 1845—Aust.

SOME AUSTRALIAN SPECIES OF THE GENUS CAMPYLODISCUS

By H. BARRETT

The genus *Campylodiscus* is a sharply defined branch of the *Diatomaceae*, the double bend in the valves giving its members a saddle-shaped appearance which renders them easily recognizable. The group is closer perhaps to the genus *Surirella* than to any other, but their saddle-shaped valves and circular outline are distinctive enough to prevent any confusion with that genus.

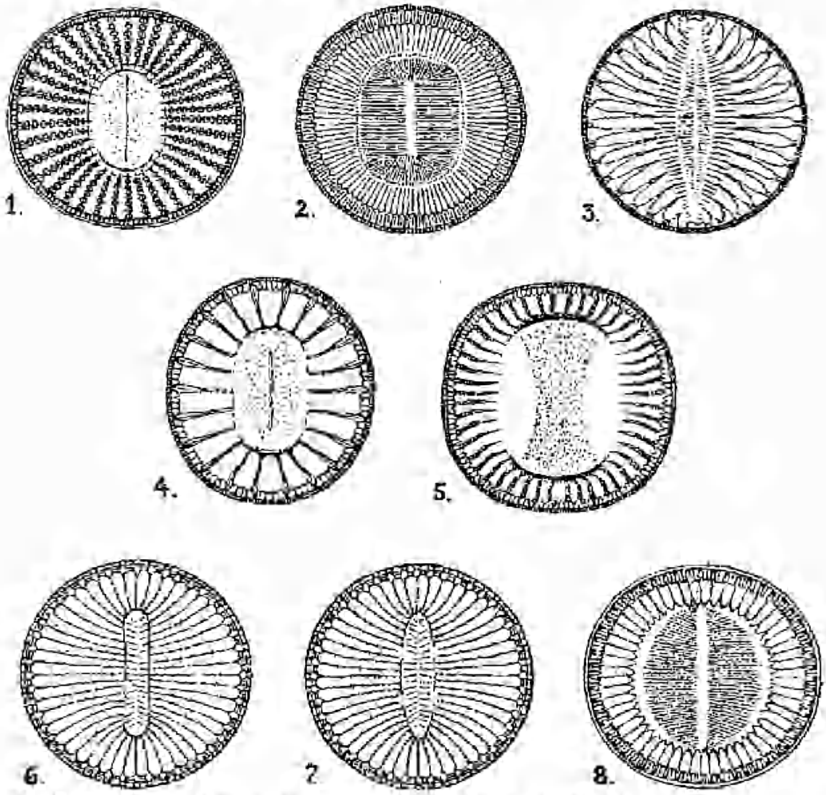
Although there are a few freshwater forms, the great majority are in either brackish or marine habitats; they are also nearly all recent. It is rather surprising how few are found in the best known fossil marine deposits; there is none at all in the Oamaru, Barbados, Maryland or Virginia fossil material, nor in the Russian beds of Archangel and Simbirsk, while in the whole range of the Californian deposits, including St. Monica, St. Barbara, Redondo Beach, Monterey and many others, there are only two or three species, and those are very sparingly distributed.

The recent forms however make up for this scarcity, and, while there are not the number of species contained in some of the genera, such as *Navicula*, there are about 120 species known, and of these some 20 species known to the writer are to be found in Australian waters.

One, a fresh-water form, was found by a former member of the Microscopical Society of Victoria in the Coburg Lake, and the writer, who saw it only in the living state, when it is difficult to see the sculpturing of the valve, thinks it was a variety of *C. noricus*. All the others to be mentioned are either marine or brackish, and illustrations are shown of eight species.

Owing to the intricate nature of the markings of the diatoms, a written description rarely gives an accurate picture of them; a good photo or drawing is better than any amount of word painting. However, a brief description is given of the species not illustrated in the hope that this may be of some help in identification.

C. biangulatus Greville: This has about 64 costae reaching from the margin to a narrow hyaline centre, costae are transverse in the centre but slightly radial towards the apices, they have a slight bend near their centre which gives them a biangulate appearance. The species is found mainly on the New South Wales and Queensland coasts.



1. *C. robertsianus* (dia. 0.135 mm.)
2. *C. lemniatus* (dia. 0.111 mm.)
3. *C. thurstii* (dia. 0.075 mm.)
4. *C. ambiguus* (dia. 0.678 mm.)
5. *C. kittonianus* (dia. 0.145 mm.)
6. *C. wallichianus* (dia. 0.095 mm.)
7. *C. wallichianus* var. (dia. 0.085 mm.)
8. *C. imperialis* (dia. 0.08 mm.)

C. bicostatus var. W. Smith: A small form with marginal band of about 36 cuneate markings, a hyaline centre with a sausage-shaped band divided into compartments on each side between centre and margin. It was not rare in a gathering from the Hopkins River.

C. ambiguus Greville. Not found so far in Victoria or Tasmania, but is not uncommon in gatherings from Gunamatta Bay, N.S.W. It could be classed as a variety of *C. latus* Shadbolt. [Figure 4.]

C. ecclesianus Greville: This has a stout double row of marginal costae, the lines of which do not coincide but are alternate to each other; the central area has a series of transverse lines with a fan-shaped series above and below them. These central markings vary considerably in specimens obtained from different localities; at times they consist of close-set moniliform striae, or again they may be sparsely set faint feathery lines, but the double marginal rows seldom vary. The writer has located them so far only in a Queensland gathering.

C. echeneis Ehrenberg: A robust strongly bent form, with lines of beading radiating from an irregular hyaline central band to the margin. It is a common form, found in large numbers at certain seasons on estuarine mud in Port Phillip Bay and is usually associated with the following species.

C. daemelianus Grunow: This has two marginal rows each of about 64 rows of large double beads, the inner row about twice the width of the outer; the centre has an irregular oval punctate ring. It was discovered first in the Yarra River, but has since been found all along the eastern coast.

C. horologium var. *pfitzeri* A. Schmidt: A small form found very rarely in the Tamar River is doubtfully this species, as it is rather oval, not circular like the type. It has about 30 costae not unlike thin stalked leaves, the stalks inward, reaching about half-way to the centre; the central area is faintly marked with a few scattered beads and is separated from the margin by a band of fine lines.

C. imperialis Greville: Found occasionally in Port Phillip Bay, principally at Ricketts Point and Seaholme. [Figure 8.]

C. kittonianus Greville: Not uncommon, from Tasmania right along the eastern coast to Queensland. The species found in these localities is the variety *zanzibarica*, a rather more robust form than the type. [Figure 5.]

C. samoensis Grunow [Syn. *C. concinnus* and *C. marginatus*]: Somewhat similar to *C. imperialis* but the marginal costae are narrower, and there is no clear space round the central transverse lines. It is not uncommon in some Bay gatherings.

C. singularis A. Schmidt: Not unlike *C. samoensis*, but has broader marginal costae, and these have a distinct line running centrally through them. It is usually found associated with the preceding species.

C. taeniatus A. Schmidt: Very plentiful in parts of the Tamar River, also found in Port Phillip Bay and along the Victorian coast. [Figure 2.]

C. thuretii Brebisson: A small form; while most of the members of this genus are found on the surface of mud or sand, the writer once found *Zostera* at the estuary of the Great Forrester River in Tasmania covered with this form. It also occurs in Victorian gatherings. [Figure 3.]

C. triumphans A. Schmidt: This has a narrow border of about 48 costae, then a narrow hyaline crescent each side. There is a narrow longitudinal clear centre with about 24 transverse lines each side; these are broad at the centre and narrowing towards the apices. This was a single specimen found at Seaholme.

C. undulatus Greville: Somewhat similar to *C. triumphans* but the marginal costae are wider at the centre and the central lines are almost parallel. It is found occasionally in local gatherings but is more plentiful on the Queensland coast and the adjacent islands.

C. wallichianus Greville: Found in the Tamar River and at Seaholme. [Figure 6.] *C. normanianus* Greville is identical with this species. Figure 7 shows an interesting variety; it has four hyaline spots on the margin of the central area but is otherwise the same as the type form. It was fairly abundant in a gathering made by the writer at Seaholme about eight years ago. It does not appear to have been previously recorded.

C. robertsianus Greville: Although a few specimens have been collected at Tooradin, Westernport, the coast of New South Wales seems to suit this diatom best; it is very plentiful in some Sydney Harbour and Botany Bay gatherings. [Figure 1.]

[The size has been shown for all the species illustrated. These measurements are correct for the diatoms shown in the illustrations, but it is as well to indicate that they are average sizes only, and that both larger and smaller specimens of all the species are not uncommon.]

REVIEW: "MEMOIRS OF THE NATIONAL MUSEUM OF VICTORIA" No. 19

Three distinguished members of the Field Naturalists Club of Victoria have made outstanding contributions to our knowledge in three very different sciences—Entomology, Ornithology, and Palaeontology—in the current issue of the *Memoirs of the National Museum of Victoria*. There is also a wealth of fine illustrations so the March 1955 issue is a singularly valuable one.

Professor W. Stephenson of the Queensland University has contributed some notes on Victorian Crustacea, particularly the genus *Squilla*. The Group is an exceedingly interesting one for investigation, but it fails to attract as many students as it should do.

In this issue of the *Memoirs*, the F.N.C.V. President, Tarlton Rayment, has produced an admirable monograph of nearly one hundred pages, sixteen of which are devoted to beautiful plates, on the "Taxonomy, Morphology and Biology of SERICOPHORINE WASPS". He has increased the number of described species from five to fifty, and has illustrated every detail of their anatomy with meticulous skill. The reviewer found the biological studies full of interest, and these succinct facts emerge: It takes twelve golden blow-flies to rear one baby wasp. There are two babies in each shaft, which means twenty-four flies. Each wasp digs about six shafts; that connotes the capture of at least one hundred and forty-four blow-flies by each wasp for the season. There are often several hundred wasps in one colony, so that the total number of flies destroyed each summer runs into many thousands. These are valuable wasps indeed for the pastoral industry!

Edmund Gill delves into something very different—fluorine analysis, which he has used to determine the relative ages of fossil bones. The fluorine index is a modern measuring stick for Time, and he says, "Every ton of the earth's crust averages something over three hundred grains of fluorine (Mason 1952), and for any given ground-water environment with fluorine in solution, the accumulation of fluorine ions by fossil bones, if pervious, is a function of time." Gill has the happy facility of presenting his thoughts and facts in pleasant language understandable to the ordinary naturalist.

Roy P. Cooper records his observations on birds of the remote Macquarie Marshes in New South Wales, and he includes a list of species for the area. The paper contains eighteen very fine photographs of the birds of that area, and it is intriguing to compare the two methods of illustrating a scientific paper—pen and camera.

A Swedish scientist, Bengt Hubendick, of Stockholm, contributes a report on *Siphonaria* from Queensland, and makes some interesting comparisons with Indian and West Pacific forms. There are several illustrations of the anatomy of these shells, and we glean that Hope Macpherson, conchologist of the Museum staff, rendered material assistance.

It is not possible to do justice to the *Memoir* in a tabloid review of this character, but it can be truthfully said that No. 19 is an outstanding volume that reflects great credit, not only on the contributing scientists, but on the Director of the Museum, R. T. M. Pescott, and on the Government Printer who has turned out a very fine production.

—L. YOUNG.

FLORA OF VICTORIA: NEW SPECIES AND OTHER ADDITIONS—6

By N. A. Wakefield, Melbourne

Some New State Records from East Gippsland

Since the publication in 1930 of A. J. Ewart's *Flora of Victoria*, numerous additions have been made to the vascular plant census for the State. Much of this expansion has been the result of revisionary studies of certain groups and genera, and from time to time many of the additions have been noted in *The Victorian Naturalist*. Thus, botanists and naturalists have access in this journal to up-to-date information on the Victorian ferns, orchids and mistletoes and on such genera as *Pomaderris*, *Leptospermum*, etc.

The additions listed in the present paper are in no cases the results of revised delimitation of species, but simply of discoveries made recently within the borders of the State. Except for a few comments about some particular points, descriptions are not included here, but references are given to such in George Bentham's *Flora Australiensis* and Baron von Mueller's *Key to the System of Victorian Plants*. Those species hereunder which were included in Mueller's *Key* are amongst those listed as "erroneously recorded for Victoria" on pages 70-72 of *A Census of the Plants of Victoria* (F.N.C.V., 1928).

All observations recorded here which are not acknowledged to other persons have been made by the writer during the past ten years.

Family GRAMINAE

PANICUM FULGIDUM Hughes Syn. *P. bicolor* R.Br., as in *Fl. Austr.* 7: 487.

On 19/12/1947 this grass was noted to be abundant on sedge-flats near Maramingo Creek, by the Princes Highway, 6 miles north of Genoa.

DEYEUXIA GUNNIANA (Nees) Benth. *Fl. Austr.* 7: 584. Including also the *D.? breviglumis* Benth. *loc.*, which appears in Mueller's *Key* (Vol. 1, p. 492) as *Agrostis breviglumis*.

This species was found at Bidwell, by the upper Delegate River on 20/1/1948, and on the high ridge towards the Snowy River, east of Butchers Ridge on 23/1/1953.

[For a complete revision of this genus, involving a number of additional species, see J. Vickery's paper in *Contributions from the N.S.W. National Herbarium*, Vol. 1, No. 2 (1940). Of the new species described therein, *D. microsela*, *D. parviseta* var. *boormanii* and *D. rodwayi* have since been found to occur in Victoria.]

ERAGROSTIS TRACHYCARPA (Benth.) Domin Syn. *E. nigra* var. *trachycarpa* Benth. *Fl. Austr.* 7: 643.

A single plant of this species was found at the railway bridge over Providence Ponds on 19/4/1953. The inflorescence is paniculate with very long, fine branches and tiny, few-flowered spikes.

DANTHONIA PARADOXA R.Br. See *Fl. Austr.* 7: 591.

This was found on 26/1/1947, growing abundantly at Maramingo Creek, near Genoa. It is distinguished from all other Victorian members of the genus in having a broad panicle with very long, filiform branches and in the central awn of the flowering glume being almost obsolete.

[For revision in this genus, including a number of new species, many of which occur in Victoria, see paper by J. Vickery in *Contrib. N.S.W. Nat. Herb. 1 (5)* (1950).]

CHLORIS VENTRICOSA R.Br. See *Fl. Austr.* 7: 613.

This was found at Suggan Buggan in about 1940 by W. Hunter.

POA SAXICOLA R.Br. See *Fl. Austr.* 7: 654.

This Tasmanian species was found on 27/1/1949 on the northern peak of the Cobboras Mountains, at an elevation of 6,000 feet.

Family RESTIONACEAE

LEPYRODIA ANARTHRIA F. Muell. See *Fl. Austr. 7:* 216.

This species is distinguished from other Victorian members of the genus in having the stems unbranched and without sheathing scales. It was found to grow abundantly on sedge-flats at Maramingo Creek and also near the upper Genoa River, on 26/1/1947 and 2/10/1949 respectively.

Family LILIACEAE

THYSANOTHUS JUNCEUS R.Br. See *Fl. Austr. 7:* 43.

This was added to the Victorian flora by its discovery near Genoa in about 1940 by W. Hunter. It has since been found to occur in several of the heaths and sedge-flats in the Cann River-Genoa-Mallacoota districts.

Family IRIDACEAE

PATERSONIA LONGIFOLIA R.Br. See *Fl. Austr. 6:* 406.

This is distinguished by its very narrow leaves which are invested with long, silky hairs. It was found on sandstone formation near the upper Genoa River and by Yambulla Creek on 29/9/1947 and 21/12/1948 respectively.

Family PROTEACEAE

PERSOONIA MYRTILLOIDES Sieb. ex Roem. et Schult. See *Fl. Austr. 5:* 401 (as var. *brevifolia* Benth.), and Mueller's *Key 1:* 277.

This species was found to extend a few hundred yards within Victoria, on sandstone formation by Yambulla Creek, in the upper Genoa River area, on 29/12/1949.

Family SANTALACEAE

SANTALUM OBTUSIFOLIUM R.Br. See *Fl. Austr. 6:* 215, and Mueller's *Key 1:* 287.

It was discovered growing amongst granitic rocks by the Genoa River, both in the gorge above the township and a little downstream from Wangrabelle, on 19/3/1949 and 2/10/1949 respectively.

Family POLYGONACEAE

MUEHLENBECKIA GRACILLIMA Meissn. ex DC. See *Fl. Austr. 5:* 274, and Mueller's *Key 1:* 172.

This was found to grow in Victoria near Cann River by W. Hunter in the late 1930s. That occurrence was in the township area and it has since disappeared, but the writer noted it recently on the river bank about three miles further north.

Family ULMACEAE

TREMA ASPERA (Brogn.) Blume. See *Fl. Austr. 6:* 158, and Mueller's *Key 1:* 162 and *2:* Fig. 24 A and B (as *T. cannabina*).

This was found near Mallacoota Inlet by V. H. Miller in 1930, and more recently in the Howe Ranges by the writer. It is a large "jungle" shrub or small tree the leaves of which are as harsh as sand-paper.

Family LEGUMINOSAE

COMPHOLOBIUM GLABRATUM DC. See *Fl. Austr. 2:* 48.

This is a tiny plant distinguished from others of its genus in Victoria in having each leaf composed of 5 to 7 leaflets. It is apparently very rare, a few plants only having been noted in each of its known Victorian habitats: No. 1 Peak near Mount Kaye, and by the upper Genoa River, on 13/10/1948 and 25/9/1948 respectively.

DAVIESIA WYATTIANA Bail. See Mueller's *Key 1:* 203 (as "*wyattii*").
This species was discovered in Victoria on 20/10/1946, growing plentifully on the western slope of Mount Kaye. Each inflorescence is so short that it appears to be an umbel of about 5 flowers, subtended by an involucre of an equal number of bracts.

PULTENAEA SUBSPICATA Benth. *Fl. Austr. 2:* 137.
Although specimens of this were collected by A. W. Howitt in 1882 at Wulgulmerang, it was not included in subsequent works on the State flora. Attention was drawn to this descrepancy when the species was re-discovered in the same area by A. W. Cleaves in 1947.

Family RUTACEAE

BORONIA LEDIFOLIA (Vent.) J. Gay ex DC. See *Fl. Austr. 1:* 314.

This is a remarkably showy species, growing to a height of several feet and with masses of reddish flowers each almost an inch across. It grows in profusion amongst the porphyry cliffs towards the Snowy River, east of Butchers Ridge, where it was discovered several years ago by Leo Hodge of W Tree.

Family EPACRIDACEAE

ACROTRICHE DIVARICATA R.Br. See *Fl. Austr. 5:* 226.

This species is distinguished from other Victorian members of its genus by its robust growth, individual plants being 2 or 3 feet high and spreading to a width of several feet. It was found at Boundary Creek, Gelantipy, by W. Hunter in about 1940, and it has since been noted by the writer on rugged outcrops in other places in the Wulgulmerang-Gelantipy district.

Family LOGANIACEAE

LOGANIA PUSILLA R.Br. See *Fl. Austr. 4:* 366.

This is distinguished from other local species of the genus by its tiny size, individual plants being no more than an inch or so in height. It was found in the coastal heathlands at Mallacoota by J. H. Willis on 23/10/1948 and later by the writer at Maramingo Creek.

Family LABIATAE

PROSTANTHERA SIEBERI Benth. *Fl. Austr. 5:* 96.

A small piece of this species was collected in the Howe Ranges by C. Walter in about 1870, but the specimen remained unidentified until the writer rediscovered it in the same area on 24/10/1946. It grows abundantly in gullies on both sides of the ranges.

Family STYLIDIACEAE

STYLIDIUM LARICIFOLIUM Rich. See *Fl. Austr. 4:* 21.

Credit for the discovery of this species in Victoria belongs to B. H. Buckland, late of Genoa. In about 1940 he told the writer of a plant with pine-like foliage which he had seen near Wingan Inlet, but its identity did not become apparent until he collected a specimen in 1948. Investigation showed that the species grows abundantly in moist peaty or sandy soil over about 3 miles of scrubby country on the west side of the inlet. It sometimes attains a height of 6 feet, with branched stems and numerous panicles each over a foot long.

Family COMPOSITAE

GLOSSOGYNE TENUIFOLIA Cass. See *Fl. Austr. 3:* 544, and Mueller's *Key 1:* 530.

A single plant of this species was discovered at Suggan Buggan on 3/11/1939 by W. Hunter.

ADDITIONAL SPECIES OF THE GENUS DIURIS (ORCHIDACEAE) IN NEW SOUTH WALES

By the Rev. H. M. R. Rupp, Willoughby, N.S.W.

In a paper to the Linnean Society of N.S.W. entitled "The Orchid Flora of the Central Western Slopes of New South Wales" [Vol. 73, parts 3 and 4 (1948)], I described three new species of *Diuris* (*D. althoferi*, *D. cuculiata* and *D. cuneilabris*), all of which were discovered by Messrs. G. W. and P. Althofer, of Dripstone. The Althofer brothers sent other specimens, some of which are still undetermined; but recently I have been examining three forms which appear to me so distinctive as to merit specific rank; they are therefore named and described in the present paper.

D. MACULOSISSIMA, sp. nov.

Planta usque ad 40 cm. alta. Folia 2-3, angustissima, 25-30 cm. longa. Bractea conspicuissima. Flores 5-7, fulvi; segmenta *utrinque* dense maculosa. Sepalum dorsale ovatum, c. 10 cm. longum, fere plane fuscum. Sepala lateralia 1 cm. longa, fusca (præter in apicibus viridibus). Petala (cum unguibus fuscis) 16 mm. longa; lamina graviter maculosa. Labellum trilobatum; lobi laterales fere 1 cm. longi, angusti, acuti; lobus intermedius paulum longior, in fronte lunatus. Columnae alae non antheram excedentes.

Plant up to 40 cm. high. Leaves 2-3, very narrow, 25-30 cm. long. Stem bract very conspicuous. Flowers 5-7, dark yellow, the segments all heavily blotched *on both sides* with deep brown. Dorsal sepal ovate, about 10 mm. long, almost wholly brown. Lateral sepals 1 cm. long, dark brown except at the green tips. Petals with the brown claw 16 mm. long, lamina covered with large blotches. Labellum trilobate, lateral lobes nearly 1 cm. long, narrow and acute; mid-lobe a trifle longer, crescentic in front, sometimes apparently bifid. Column wings not exceeding the anther.

Kerr's Creek, Wellington-Molong Road, *P. Althofer* Oct. 1947; Dripstone, *G. W. Althofer* Oct. 1947.

The superlative of *maculosus* has been used in preference to that of *maculatus*, to avoid possible confusion with *D. maculata* Sm., a species from which the new one is strikingly distinct.

D. GOONOOENSIS, sp. nov.

Planta usque ad 45 cm. alta. Folia 2, aliquantum lata, c. 35 cm. longa. Flores comparate magni, 3-6 in racemo flexuoso, subflavi, maculis fuscis paucis ornati. Sepalum dorsale fere rhomboidale, nota una fusca ad basin præditum, margines punctis parvis. Sepala lateralia paulum longiora quam dorsale, fusca (sed apicibus viridibus), aliquando mutue in transversum. Petala latissime ovata, in unguibus fuscis brevibus. Labellum trilobatum lobi laterales longi sed saepe angusti; lobus intermedius triangularis sed in fronte lunatus, maculis duobus magnis instructus. Disci calli breves et saepe lati, a carina separati. Columnae alae non antheram excedentes.

Plant up to 45 cm. high. Leaves 2, relatively broad, 30-35 cm. long. Flowers rather large, 3-6 in a flexuose raceme, light yellow with a few brown markings. Dorsal sepal almost rhomboid, with a single dark brown blotch at the base and dotted margins. Lateral sepals scarcely longer than the dorsal, brown with green tips, sometimes crossed. Petals very broadly ovate on short brown claws. Labellum nearly triangular, but crescentic in front, with a large brown blotch on either side of the median line; discal calli short and rather wide, with a keel between them; lateral lobes as long as the mid-lobe but less than half as broad, yellow with 2 brown spots. Column wings not as high as the anther, or at least not exceeding it.

Goonoo Forest, 18 miles from Dubbo, *G. W. Althofer* Oct. 1947 (Holotype).

The local spelling of this forest is "Ganoo", but officially it is spelt "Goonoo".

D. CURTIFOLIA, sp. nov.

Planta usque ad 35 cm. alta. Folia 2, curtissima (c. 12 cm. longa), acuminata. Flores 5-8, subflavi. Sepalum dorsale ovatum, fere 2 cm. longum; sepala lateralia anguste linearia, 13-14 cm. longa. Petala in unguibus brevibus; lamina late ovata, 12 mm. longa. Labellum trilobatum; lobi laterales breves; lobus intermedius aliquantum magnus, late cuneatus vel fere rhomboidalis. Columnae alae dentatae, non antheram excedentes.

Plant up to 35 cm. high. Leaves 2, extremely short (about 12 cm.), acuminate. Flowers 5 to 8, light yellow. Dorsal sepal ovate, nearly 2 cm. long; lateral sepals narrow-linear, 13-14 mm. long. Petals on short claws, lamina broadly ovate, 12 mm. long. Labellum trilobate; lateral lobes short, mid-lobe rather large, broadly cuneate or almost rhomboid. Column wings dentate, scarcely as high as the anther, never exceeding it.

Goonoo Forest, *C. W. Althofer* Sept. 1950 (Holotype).

The exceptional shortness of the leaves suggested this name, they are much shorter than those of *D. brevifolia* Rogers.

THE EYE-SIGHT OF AN INSECT

From time to time facts come to light concerning the various organs of perception in insects. Recently I noticed a pair of tiny flies mating; they were partly hidden in a small crevice in a log. After some time, to my astonishment, another tiny male appeared on the scene making straight for the crevice, which he entered. However, in a moment he apparently realized the situation and departed.

Some time ago, when moving a case of fruit, my attention was attracted to a large winged ant, which appeared to notice my movement. My curiosity aroused, I moved my hand about over its large eyes in an effort to find how much it could see. Beyond a distance of perhaps six inches the insect lost interest, but at two inches it was obviously disturbed. A movement of the hand from side to side brought a like response in the movement of the creature's head. The experiment was kept up for several minutes during which time the insect never failed to follow every movement. However, on the hand being brought to a distance of about an inch above it, the insect retreated into a space between two cases. From this vantage point of comparative safety it continued to follow my movements with close attention. However, it soon tired of the game and flew off, leaving me to reflect on the marvels of nature.

This latter observation has not much value as I was not able to retain or identify the insect. Nor is it so fascinating as, for instance, the extraordinary range of the perceptive organs of the Gum Emperor Moth when mating. However, all these cogs in the great wheel of Nature are the ingredients which make their observation a delight. I feel too that most of us would be even more amazed if we could experiment with the organs of perception of our own remote ancestors who, living close to Nature, were probably less surprised at the ability of her children than we are.

—ROS C. KERSHAW

LAND CONNECTION BETWEEN AUSTRALIA AND NEW ZEALAND

An article, "Thoughts on Plants Common to Australia and New Zealand", which appeared in *The Victorian Naturalist* for February, 1954, reached the conclusion that Australia and New Zealand were once joined by a land chain, not necessarily complete at any one time. It was also noted that geologists do not believe that the two countries were ever directly joined.

Further consideration has done nothing to upset the former suggestion, but the deep channel between Australia and New Zealand also supports the

geologists' view that the countries were not joined across what is now the Tasman Sea.

The fact that Tasmania has stronger plant connections with New Zealand than has the mainland supports a theory that Australia and New Zealand both had a common land connection with the Antarctic. Certainly if the land connection were now complete no plants would be likely to survive the frozen wasteland along the route, but the presence of coal in the Antarctic shows that its climate was once much different from what it is now.

If South Africa and South America were also once connected with the Antarctic land mass, this would explain the existence of some plants common to two or more of the four southern land masses, and it would explain the close relationship of the native birds of Australia (emu and cassowary), New Zealand (kiwi and extinct moa), Africa (ostrich) and South America (rhea).

To the previous conclusion that Australia and New Zealand were connected by a land link should now be added, therefore, the assumption that the land connection was with the Antarctic, to which Africa and South America were also joined.

—A. E. Brooks.

WHAT, WHERE AND WHEN

F.N.C.V. Excursions:

Sunday, November 20—Seville. Leaders: Mr. and Mrs. Hanks. Subject: Birds and Trees. Take 9.15 a.m. Warburton train from Flinders Street, alight at Seville. Bring two meals.

Saturday, November 26—West Melbourne Swamp. Subject: Birds and Botany. Take 2 p.m. Williamstown train, alight at Footscray, or meet 2.15 p.m. at Footscray station.

Sunday, December 4—Kalorama. Leader: Mr. Webb. Take 9.15 a.m. train to Croydon, then Mount Dandenong bus to the scenic railway. Bring one meal.

Saturday, December 10—Geology Group excursion to Green Gully, Keilor. Meet 2 p.m. outside Essendon station in front of picture theatre.

Group Meetings:

(8 p.m. at National Herbarium)

Wednesday, November 16—Microscopical Group.

Wednesday, November 30—Botany Group. Subject: Monocotyledons, by Mr. Atkins.

Wednesday, December 7—Geology Group, Members' Night of Exhibits.

Preliminary Notice:

December 26 to January 2—Excursion to Mount Buller. Accommodation at Welcome Lodge, 32/6 per day in six-bunk rooms, 42/- in four-bunk. Towels are *not* supplied, but tariff covers everything else, including cut lunches if required and free transport up to the ski village or down to the river. Bookings, including £5 deposit, close with Excursion Secretary on November 16, after which members may make their own bookings through the Greyhound Tourist Bureau in Elizabeth Street (mentioning the F.N.C.V.). Transport details from Excursion Secretary.

Marie Allender, Excursion Secretary.

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PROCEEDINGS

There was a good attendance of members and visitors at the General Meeting held at the National Herbarium on November 14, 1955. The President reported the death of Sir Russell Grimwade, a distinguished member of the Club since 1913 and an Honorary Member since 1953, and of Mr. A. W. Burston, an ex-councillor with a fine record of service to the Club. Members stood in silent tribute to their memory.

The lecturette for the evening was delivered by Miss Balaam, on the pollination of the poppy, and a number of slides were shown to illustrate it.

The Microscopical Group presented the subject for the evening, an interesting demonstration of the biology of ponds, and they showed too some stained botanical sections. The President thanked those who had been the main contributors –Dr. Wishart and Messrs. McInnes, Middleton, Evans and Nance.

Six new members were elected—Mr. and Mrs. A. F. Tylee, Miss L. M. White, Miss Edith Pecke, Mr. S. Filer and Mr. H. Kleditz. To these the President extended a cordial welcome to the ranks of the F.N.C.V.

Miss L. M. Young intimated that she would not continue to act as Secretary after December, and the President stated that, in the absence of any volunteer for the position, it would be necessary to obtain the service of a paid secretary.

There was a large array of exhibits, mainly of botanical subjects, and the President adjourned the meeting at 10.30 p.m. for the usual conversazione.

F.N.C.V. FERN BOOK AVAILABLE

It is expected that the first batch of the Club's new publication, *Ferns of Victoria and Tasmania*, will be in hand by the December General Meeting. The book comprises 80 pages of letterpress and text-blocks as well as 16 pages of photographic reproductions. It is comprehensive of the 116 species which are native in these two States, every species is illustrated by line drawings, and there are over 30 photographs of ferns in their natural settings. The book is durably bound and has a stiff cover. The price is 7/6. A full review will be published in a future issue of the *Naturalist*. Members may obtain copies, post free, by addressing orders to the Honorary Editor, P.O. Box 21, Noble Park, Victoria.

EXCURSION TO MOUNT CHARLIE

On October 16, about twenty members and friends made the trip by bus to Mount Charlie and the Rowallan Rotary Scout Camp at the eastern end of the Macedon Range. The party arrived at the camp at about 11 a.m. and after inspecting the huts the leader, Mr. Williams, selected a vantage point on the hill from which to point out the landmarks in the wide view southward across the plains to Melbourne and eastward to the mouth of the Kilmore Gap. A tour of the hill-top portion of the property gave opportunity for studying the flora of the drier areas. The eucalypts comprised the Common Peppermint (*E. radiata*), with some trees in flower, Silver-leaf Stringybark (*E. cinerea*), probably at its most westerly point of occurrence, Messmate Stringybark (*E. obliqua*) and Manna Gum (*E. viminalis*). The buds and the fruit, as well as the leaves and the bark, of the two stringybarks were compared and contrasted. The country was thickly populated with grass-trees not in flower, probably *Xanthorrhoea australis*.

Lunch was had on the hill, and afterwards an excursion was made along the Mount Charlie road as far as the base of the spur leading to the main ridge. Several of the party proceeded upward for some way, two members going on to the top of the mount.

A number of birds were seen during the day, including the Australian Raven, Scarlet Robin, White-throated Tree-creeper, Grey Thrush, Crimson Rosella, Yellow-tailed Thornbill and one of the pardalotes. A comparatively large number of Painted-lady Butterflies were noted, and a specimen of the Blue-tongue Lizard was examined.

Flowering plants noted were as follows: *Eucalyptus radiata, Glossodia major* (many fine specimens), *Caladenia cucullata, Caladenia carnea, Caladenia testacea, Diuris maculata, Calochilus robertsonii* (in bud), *Thelymitra pauciflora* (in bud), *Pterostylis longifolia* (in quantity), *Pterostylis nutans, Chiloglottis gunnii, Stackhousia monogyna, Drosera auriculata, Thysanotus patersonii, Leucopogon virgatus, Daviesia corymbosa, Kennedya prostrata, Bossiaea prostrata, Pultenaea angustifolia, Hovea heterophylla, Hardenbergia violacea, Indigofera australis, Acacia vomeriformis, Acacia verniciflua, Acacia verticillata, Helichrysum obcordatum* (in bud), *Burchardia umbellata, Centaurium pulchellum, Dianella* (sp., in bud), *Viola hederacea, Hypoxis glabella, Anguillaria dioica, Veronica gracilis, Cymbonotus lawsonianus, Helichrysum scorpioides, Unkea rugosa, Grevillea alpina, Clematis aristata, Tetratheca ciliata, Billardiera scandens, Bredemeyera volubilis* (a particularly fine show in places along Main Creek), *Ranunculus* (sp.) *Epacris impressa, Spyridium parvifolium* (in bud) and *Glycine clandestina*.

The weather, which had been slightly showery up to midday, improved in the afternoon, and the party had tea in very pleasant surroundings beside Main Creek.

F.N.C.V. EXCURSION TO BENDIGO, OCTOBER 1954

Twenty Club members spent the week-end of October 16-17 at Bendigo, under the leadership and generous fellowship of the local F.N.C.

On the Saturday a visit was made to the Big Hill-Mondurang area where, under the Yellow Box and Red Stringybark trees, there was a profusion of blossom. These included Fairy Wax-flower, Guinea-flowers, Fringe-myrtle, Goldfields Grevillea and three species of orchids—Musky Caladenia, Scented Sun orchid and Pink Sun-orchid.

The object of our visit was to see the four-acre patch of Sticky Boronia, *B. denticulata*, which made a glorious display of pink and white blossom. Since that time, this area has been enclosed by the Forests Commission with a rabbit-proof fence, and so too has a patch of Club-leaf Phebalium, *P. obcordatum*, near Flagstaff Hill in the whipstick area.

In the evening on Saturday a large audience attended an illustrated lecture on "How Old is Australia?" given by our Past-President, Mr. A. A. Baker, in the School of Mines theatrette.

On the morrow, an excursion was made to the whipstick country. Three flowers were of particular interest: Golden Pennants, *Londonia behrii*, put on a glorious display with its glowing chrome-yellow flowers, Scarlet Mint-bush, *Prostanthera aspalathoides*, was at its best, and there was the interesting Clasping Goodenia, *G. amplexans*, with its stems pressed flat to the ground and each tipped with single yellow flower.

In the afternoon opportunity was made to inspect an area of *Melaleuca wilsonii*, where a dozen superb specimens displayed their horizontal branches heavily clothed with crimson flowers. Birds noted in the area included the Yellow-tailed Pardalote, Firetail Finch, Blue Wren, White-plumed Honeyeater, Brown-headed Honeyeater, Orange-winged Sittella, Dusky Wood-Swallow, White-browed Wood-Swallow, Gilbert Whistler and Purple-backed Wren.

SANCTUARY FAUNA INCREASING

Bandicoots, Pademelons, and Rat-Kangaroos at the Sir Colin MacKenzie Sanctuary, Healesville, are all increasing at a satisfactory rate. This is very gratifying as so many small marsupials are either extinct or threatened with extinction. Many animals, the progeny of freed animals, are now running wild in the Sanctuary bushlands.

The Rufous Rat-Kangaroo (*Aepyprymnus rufescens*) is a case in point. About fourteen inches high, this marsupial is the largest of the nine species of Rat-Kangaroos. It was once abundant along the coast of New South Wales, from the sea to the inland slopes of the mountains, but now its range is greatly restricted. However, it is gradually building up its numbers in the wild state in the Sanctuary area. A pair of Rufous Rat-Kangaroos share an enclosure with the Long-nosed Rat Kangaroo (*Potorous tridactylus*), a soft-furred marsupial once common but now extremely rare on the mainland. A geographical race survives in Tasmania. Other occupants are three Bandicoots: the Long Nosed (*Perameles nasuta*), Short-Nosed (*Isoodon obesulus*), and the Tasmanian Barred Bandicoot (*Perameles gunnii*). These Bandicoots also run wild in the area.

In a nearby enclosure are a number of Wallabies and Pademelons. The graceful, fat-tailed Dama Pademelon (*Thylogale eugenii*), once common in South Australia, is now found only on Eyre Peninsula and Kangaroo Island. The Quokka or Short-Tailed Pademelon (*Setonix brachyurus*) is now believed to be abundant only on Rottnest Island near Perth. The Tasmanian or Red-bellied Pademelon (*Thylogale billardierii*), once common in Victoria, is now thought to be extinct on the mainland. Fortunately, these small, shy Pademelons breed readily in captivity.

A number of Kangaroo Island Kangaroos (*Macropus fuliginosus*) seem very contented with their large enclosure. It is unfortunate that this gentle, dark brown Kangaroo has only partial protection outside the Flinders Chase Reserve on Kangaroo Island.

About a year ago a pair of Lowans (*Leipoa ocellata*) and three Bustards (*Eupoditos australis*) were added to the Sanctuary's collection. The Brush Turkey (*Alectura lathami*) has been running wild at the Sanctuary for nearly twenty years. Large incubator mounds of the Brush Turkey can be seen near the kiosk. Recently, migrating progeny have spread into the nearby ranges. It is a good thing that this bird, which is a native of Queensland and northern New South Wales, should have been so successfully introduced into Victoria.

—J. Mollison

REDISCOVERY OF A "LIVING FOSSIL" DAMSEL-FLY IN VICTORIA

By Alex. N. Burns*

During 1954 entomolgists at the National Museum of Victoria were desirous of finding again, after a time lapse of twenty-seven years, a small damsel-fly of a metallic green colour, which had been captured in small numbers in one or two lagoons along the Goulburn River in the Alexandra district. Accordingly plans were set in motion and contact was established with a Mr. R. Dobson of Sydney, a noted authority on these insects. The result was that an expedition was planned to visit the Alexandra district during December, the time of year when this rare and interesting insect might be found.

Interesting it is indeed because a special family had been created for it in the Order *Odonata*—the insect order which contains all the dragon-flies and damsel-flies. This family, the *Hemiphlebiidae*, contains a single species in the whole world, *Hemiphlebia mirabilis!* Entomologists have come to recognize this insect as a "living fossil" because of its archaic type of structure which shows direct affinities with fossil remains of dragon-flies in contrast with that of the present-day forms.

Back in 1927 the late Dr. R. J. Tillyard who was an eminent entomologist and world authority on Australian dragon-flies, went to the Alexandra district specially to collect and study this insect. He was successful in his mission and several snapshots of the lagoons in which this insect was breeding were taken. Eventually these snaps were sent to England, so before the 1954 search could be undertaken it was most desirable that these pictures be procured on loan to assist if possible in locating the correct spot. Although there are many hundreds of lagoons and billabongs adjacent to the Goulburn River in the Alexandra district, this damsel-fly had apparently been taken in two only! Then again a time lapse of twenty-seven years might have so altered the landscape that it was problematical whether the exact spot could be found, even with the snaps to guide one!

With excellent weather, the right time of year and the snaps, hopes were high that the quest for this damsel-fly would be successful. On the first day, from 10 a.m. until 3.30 p.m., all visible lagoons and billabongs within a couple of miles or more of Alexandra were carefully examined, but none corresponded to the snaps. Neither was any specimen of the damsel-fly seen. By strange coincidence a stop was made on one road, and it was decided to examine the view for the possibility of any portion of it resembling one of the two snaps. One large tree in the foreground bore a strong resemblance to one in the foreground of one snap, and after

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shifting position several times the party decided that the spot did bear some resemblance to one snap in particular. A small lagoon was in the middle foreground, and our delight can well be imagined when, after searching this for a few minutes, a specimen of the insect was seen and captured! The first capture went to our Sydney friend, but it was not very long before each of the three members in the party had collected specimens.

The afternoon was by this time well advanced and conditions were not the best for these insects to be active, so it was decided to leave further investigation and collecting until the morrow. The next day dawned fine and warm with a light breeze, excellent conditions under which to pursue the quest. By early afternoon quite a nice series of specimens had been collected; on account of the rarity of the insect and its extremely restricted habitat, it was decided not to collect more specimens than were actually needed. To ensure safety in transit the specimens were taken back alive, being carefully placed in fairly large glass tubes.

For a species of damsel-fly, "Hemiphlebia" is not large: it measures just under an inch in total length from head to tip of the abdomen. The measurement across the expanded wings is three quarters of an inch. The general colour of the head and body is metallic green. At the tip of the abdomen are small whitish appendages. When the insect is at rest on a reed or grass stem, it has a characteristic habit of moving the end of its abdomen up and down, and one's attention is drawn at once to the white appendages which more or less give away the insect's presence.

Although supposedly known only from the above-mentioned small and very local area, it is quite possible that Hemiphlebia may yet turn up somewhere else. Many years ago a specimen was reputed to have come from as far away as Bowen in Queensland; it is hard however to clear up the doubt that exists regarding this record, when all the authentically known labelled specimens came from the Alexandra district. If, however, specimens are collected in the future from localities between Alexandra and Bowen in Queensland, the accuracy of the latter place as a spot for Hemiphlebia will be greatly enhanced.

The existence in the present day of species of living organisms whose structure compares with that of known fossil remains of similar types, is of inestimable value to science in that it completes lines of study that enable students to trace the process of evolution from a particular geological period right up to the present day.

CLUB STOCKS OF "VICTORIAN NATURALIST"

Our stocks of Volume 71 (May 1954 to April 1955) are seriously low. Members who have any of this lot for which they have no further use could assist greatly by passing them back into the library. Also, would those members who have some of the Club's bound volumes of the journal please supply the Librarian or Editor with details, as an inventory of such is being prepared.

FLORA OF VICTORIA: NEW SPECIES AND OTHER ADDITIONS—7

By N. A. Wakefield, Melbourne

Genus Hibbertia: Delimitation of H. acicularis and H. stricta and of some Species Allied to them

These species are members of a natural group in the genus, having the ovary consisting of two carpels with the stamens in a single bundle lateral to it, and the leaves are narrow, with the margins recurved to the midrib so as to obscure the under-surface lamina.

All specimens cited in this paper are in the National Herbarium of Victoria, Melbourne.

There is apparently no significant variation in features of petals within the group, so they are not commented on in the descriptions.

HIBBERTIA ACICULARIS (Labill.) F. Muell. *Pl. Indig. Col. Vict.* 1: 17 (1860).

This was originally described from Tasmania, as *Pleurandra acicularis* Labill., in *Nov. Holl. Pl. Spec.* 2: 6 T.144 (1806). The typical Island form is a sprawling plant with wiry stems and glabrous needle-pointed leaves; the flowers are borne on long peduncles; the calyx has a sparse investment of small, hooked hairs; and the ovary is pubescent. [See figure 1.] It is widespread in Tasmania; and it occurs in Victoria in the near-coastal country east of Port Phillip Bay, such as at Cheltenham, Mentone, Grantville, Wilson's Promontory, Port Albert, Snowy River, etc. Thence it extends north through eastern New South Wales and into Queensland.

Of the three following species, the first is apparently a recent derivative of *H. acicularis*, but the other two are only superficially similar to it. All three have been included by botanists under this one specific name.

HIBBERTIA EXUTIACIES sp. nov.

Ex affinitate *H. acicularis* (Labill.) F. Muell., sed acie ad apicem folii decidua, floribus sessilibus, calyce glabro recedit.

Holotype: Specimen bearing the data "Trailer common about Stawell. St. Eloy D'Alton No. 13".

General Diagnosis: Stems prostrate, short, stout, much branched, when young bearing a little simple vestiture; leaves tiny, usually about 5 mm. long and 1 mm. wide (sometimes up to 10 mm. long), linear, acute, margins recurved to the midrib, often a little tuberculate, glabrous or with a few tiny forward-pointing bristles; apex of young leaves bearing a simple bristle which is shed later; flowers terminal, sessile within a few small broad pointed shortly fringed reddish bracts; sepals about 5 mm. long, glabrous; stamens 4-6, in a single cluster, the filaments usually free (rarely united), anthers 1.5-2 mm. long; ovary invested with short simple whitish tomentum; carpels 2. [See figure 2.]

Distribution: From central Victoria westward to South Australia—upper Goulburn River, Seymour, Bendigo, Castlemaine, Maldon, Coliban, lower Loddon River, Maryborough, upper Avoca River, St. Arnaud, Stawell, etc.; Mount Lofty, Mount Remarkable, Port Elliott, Adelaide, etc.

H. exutiacies differs from typical *H. acicularis* in having sessile flowers, glabrous calyx and the leaves not so sharply pointed. On each young leaf there is a fine needle-point of colourless material, distinctly jointed to the apex, and this becomes detached as the leaf hardens. From this unique character is derived the name of the new species. In sub-tropical localities there are divergent states of *H. acicularis*, some with the calyx glabrous and some with sub-sessile flowers, but none of these has the leaf of *H. exutiacies*.

HIBBERTIA RUFA sp. nov.

H. acicularis (Labill.) F. Muell. similis, sed foliis apice obtusis et ad basin cordatis, sepalis (praeter ad apices) atque ovario glabris, staminibus 4, filamentis conjunctis differt.

Holotype: Reedy Creek, 3 miles east of Cann River, Victoria; J. H. Willis and K. A. Wakefield; 22/10/1948.

General Diagnosis: Stems long, slender, glabrous, reddish; leaves scattered, very shortly petiolate, lanceolate, cordate at the base, the apex bluntly pointed and bearing a tiny tuft of hairs, margins recurved to the broad midrib, the surfaces glabrous or with a few short minute bristles; flowers small, about 12 mm. across, pedicellate, axillary; pedicels slender, reddish, about 10 mm. long or more, subtended by several small broad thin bracts; calyx reddish, glabrous; stamens 4, anthers about 1.5 mm. long, the filaments completely united; ovary glabrous, carpels 2, the styles terminal. [See figure 3.]

Distribution: Eastern New South Wales, eastern Victoria and north-eastern Tasmania; apparently favouring a sedgy and heathy habitat near swamps.

Specimens of *H. rufa* are as follows. *New South Wales*—Paddy's River (near Wingello), *leg.* Louisa Calvert, "trailing low growth, margin of swamps"; Braidwood district, 3,200 feet, *leg.* William Bauerlen, No. 121, November 1886; Jenolan Caves (ex National Herbarium of N.S.W., without further data). *Victoria*—The type material from Reedy Creek. *Tasmania*—St. Helens (north-east), *leg.* W. Fitzgerald, 1892.

The Tasmanian specimen has almost sessile flowers but is otherwise quite typical. It was labelled "*H. acicularis* var. *triandra*" by Mueller (but the anther's actually number 4), resulting in the publishing of this varietal name by Ewart in *Flora of Victoria* 770 (1930).

There are also two New South Wales specimens—Walcha Road, *leg.* E. Betche, Oct. 1886; and "near Scone", *leg.* Miss Carter, 1884—of a divergent form of *H. rufa*, with the leaves longer and without cordate bases, and the leaves and sepals shortly bristly.

HIBBERTIA CISTIFLORA (Sieb. ex Spreng.) comb. nov.

Syn. *Pleurandra cistiflora* Sieb. ex Spreng. *Syst. Veg. (ed. 16)* 4: 191 (1827).

Part of Sieber's No. 148, labelled "*Pleurandra cistiflora*" has been examined and it agrees well with Sprengel's original diagnosis.

The typical plant is a sparse shrub, glabrous or almost so; with the leaves about 9 mm. long and 1 mm. wide, bluntly pointed and somewhat tuberculate; flowers sessile within terminal clusters of leaves, subtended by tiny triangular bracts; calyx glabrous; stamens about 6, filaments normally free; ovary glabrous, carpels 2, styles lateral.

It occurs about the Blue Mountains and Port Jackson, and in New England there is a form which has only 4 stamens with the filaments united.

For Victoria, there are several collections from the Grampians, but Mount Rosea (*leg.* Miss K. Cowie) and Mount William (*leg.* D. Sullivan, Nov. 1871 and 22/11/1873) are the only specific localities noted. This is a robust, erect form of the species, with the leaves up to 13 mm. long, rather sharply pointed and minutely pimpled. It apparently grows in very rocky places. [See figure 4.]

Previously, the New South Wales material of *H. cistiflora* was identified as a form of *H. stricta* (partly the var. *glabriuscula* Benth. *l.c.*: 27); while that from Victoria was noted on herbarium sheets, together with *H. erutiacies*, as a variety of *H. acicularis*. Reference to the accompanying illustrations will indicate the relationship of these species.

HIBBERTIA STRICTA (R. Br. ex DC.) F. Muell. *l.c.*

Syn. *Pleurandra stricta* R.Br. ex DC. *Reg. Veg. Syst. Nat.* 1: 422 (1818).

A duplicate of the type collection shows the typical form to be an erectly branched shrub with narrow, blunt leaves and small sub-sessile flowers with few (5-8) stamens; the vestiture on upper stems, leaves and sepals is of small, fine, stellate hairs. [See figure 5.] It extends from the Port Jackson area southward, growing in near-coastal heathlands; and it is found in eastern Victoria, near Orbost, Longford, Grantville, etc. The species extends too into Tasmania in a form not much different from typical.

A smaller-leaved form was described as *Pleurandra microphylla* Sieb. ex Spreng. (*l.c.*). This is the mountain and inland form, being found about the highlands and western slopes of New South Wales. In Victoria it is recorded from the upper Cann Valley in the east, as well as about the Goulburn, Loddon and upper Murray Rivers and in the Wimmera. It occurs too in several places in South Australia.

In inland Victoria (Broken River, Mt. Hope, Mt. Korong, Grampians, etc.), there is a long-leaved form with longer, greyish vestiture and with the flowers often quite stalked, which was described as *Pleurandra incana* Lindl. ex Mitch. (*Three Exped. Int. East. Austr.* 2: 156), from material collected on Mount Hope by Mitchell. This is the basis of *H. stricta* var. *canescens* Benth. (*l.c.*: 27); and he included also in this variety the *Pleurandra microphylla* and the Tasmanian form.

In south-western Victoria (Brisbane Ranges, Otway Ranges, Port Fairy, etc.) and in South Australia, there is a divergent form with much of the vestiture becoming simple and in some cases with hooked bristles also on the calyx. [See figure 6.] In north-western Victoria (Dimboola, Lake Hindmarsh, etc.) and in South Australia, there are tiny desert forms which are smaller in all parts and with very little vestiture.

All the above material constitutes a satisfactorily circumscribed species, but in the past there have also been included under the name *H. stricta* a number of entities which are apparently quite distinct specifically. Of the Victorian representatives of these, besides the *H. cistiflora* already dealt with, there are the two following species.

HIBBERTIA AUSTRALIS sp. nov.

H. stricta (R.Br. ex DC.) F. Muell. proxima, sed foliis latis tuberculatis, pilis stellatis robustis, pedunculis longis, sepalis intus nitidis differt.

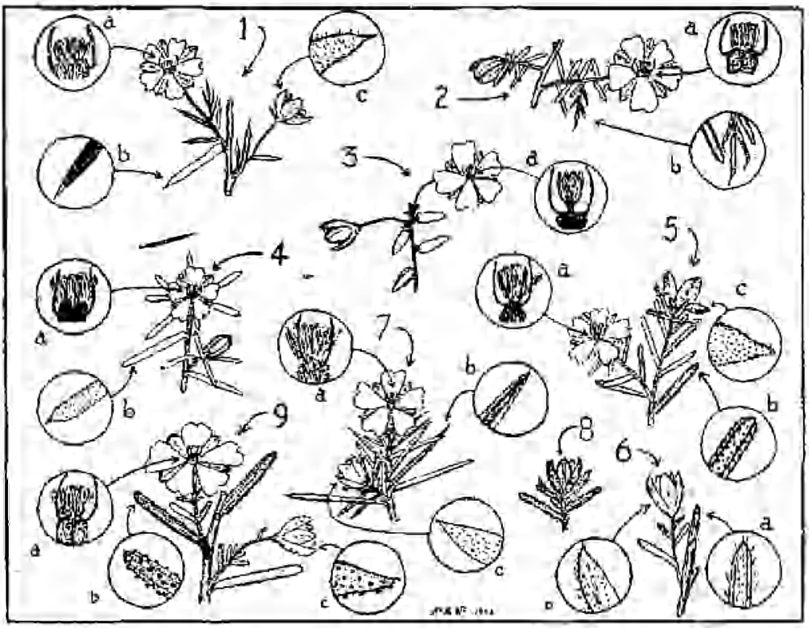
Holotype: Marrus Hill (4 miles north-west of Queenscliff), Victoria; *leg.* H. B. Wilson (No. 22), 1884.

General Diagnosis: Stems numerous, erect, little branched, stellate-pubescent; leaves thick, oblong-linear, up to 16 mm. long and 1.5 mm. wide, very obtuse, the margins recurved to the broad midrib, scabrous, the upper surface glabrous and dotted or bearing fine stellate hairs, the under surface tuberculate and bearing coarse stellate hairs; flowers appearing axillary but actually terminal on very short small-leaved branches; peduncles about 5 mm. long, with a narrow bract about midway along; sepals about 6 mm. long, stellate-pubescent on the outside, most of the inner surfaces glabrous and quite shiny; stamens 4-9 (usually 6), in a single bundle, anthers 1.2-2 mm. long, filaments free; ovary invested in very short felty vestiture, carpels 2. [See figure 9.]

Distribution: Victoria, mainly in southern and western parts (Shoal Inlet, Woodside, Wilson's Promontory, Heywood, Packenham, Emerald, Doncaster, Broken River, Queenscliff, Ballarat, Geelong, Steiglitz, upper Barwon, Ararat, Curdies Inlet, Victoria Range, Lower Glenelg, etc.), and in South Australia as far west as Eyre Peninsula.

Though *H. australis* was previously regarded as being a form of *H. stricta*, the two are not really closely related, the former having a different vestiture (coarse, flat, stellate hairs subtended by tubercles), different inflorescense (comparatively long peduncles subtended by tiny leaflets), different sepals (straw-like and shiny on the inner surfaces), etc.

A small South Australian form of the species, from Kangaroo Island, was described by J. M. Black in *Trans. Roy. Soc. S. Aust. 49*: 274 (1925) as var. *oblonga* of *H. stricta*. It was not considered desirable to adopt this varietal epithet as a specific name, first because Black's type material is abnormally small, and secondly to avoid confusion with the epithet *oblongata* which is in use in the genus.



1. *H. acicularis*, piece of typical plant, with enlargements of (a) ovary, styles and anthers, (b) needle-point of leaf, (c) apex of sepal, showing hooked hairs.
2. *H. crustiacies*, piece of type specimen, with enlargements of (a) ovary, etc., (b) young leaves with needle-points, and old leaf.
3. *H. rufa*, piece of typical plant, with enlargements of (a) ovary, etc., showing united filaments.
4. *H. cistiflora*, piece of specimen from Grampians, with enlargements of (a) ovary, etc., (b) apex of leaf.
5. *H. stricta*, piece of typical plant, with enlargements of (a) ovary, etc., (b) apex of leaf (under side), (c) apex of sepal.
6. *H. stricta*, piece of divergent form from Otways, with enlargements of (a) apex of leaf (under side), (b) apex of sepal.
7. *H. calycina*, piece of typical form, with enlargements of (a) ovary, etc., (b) apex of leaf (under side), (c) apex of sepal.
8. *H. calycina*, piece of villose inland form.
9. *H. australis*, piece of type specimen, with enlargements of (a) ovary, etc., (b) apex of leaf (under side), (c) apex of sepal.

(All illustrations which are not in circles are reproduced about natural size.)

HIBBERTIA CALYCINA (DC.) comb. nov.

Syn. *Pleurandra calycina* DC. *l.c.*: 422 (1818).

For the identification of this species, reference has not been made to the type specimen, but it is considered that the part of De Candolle's description of *Pleurandra calycina*—"foliis acutis; calycibus sericeovelutinis ovariis hirsutis", (as against "foliis subobtusis: calycibus subscabris ovariis velutinis" for *Pleurandra stricta*), leaves no doubt as to the identity of the former. Moreover, Bentham applied the name *H. stricta* var. *calycina* (*l.c.*: 27) only to material dealt with here as belonging to *H. calycina*.

The species differs from *H. stricta* in having pilose stems; leaves very narrow, acute, tuberculate, glabrous or with simple bristles or hairs, the midribs depressed beneath; flowers subtended by several short, broad, pointed bracts; calyx invested with more or less forward-appressed hairs, from almost glabrous to quite villose; stamens numerous (6-18), ovary shortly villose. [See figure 7.]

H. calycina in its typical form occurs in near-coastal heathlands of eastern New South Wales and eastern Victoria (Orbost, etc.). A short-leaved mountain form is found in eastern New South Wales; and a development with the calyx (and sometimes the leaves too) quite villose, is in inland New South Wales and Victoria, especially in the Murray River valley (Albury, Wodonga, Beechworth, Ovens River, Broken River, Avon River, etc.) [See figure 8.] Somewhat modified forms occur about the Grampians and in South Australia; while from near Lake Hindmarsh there is material which evidently represents a desert reduction—an almost glabrous plant with tiny leaves and flowers.

It is the intention of the writer to deal with other Victorian groups of *Hibbertia* in a future part of this series of papers.

Grateful acknowledgement is made here to Mr. J. H. Willis for his interest in this research, and particularly for the formulation of the Latin diagnosis of the new species.

BOTANICAL TRAVERSES BY MOTOR CAR IN CENTRAL AUSTRALIA

By J. B. CLELAND, C.B.E., M.D.

On the various Anthropological Expeditions under the auspices of the Board for Anthropological Research of the University of Adelaide and of the South Australian Museum, and on other occasions, the writer has kept notes of the kinds of vegetation passed and of the species of plants recognized as he sat in the front seat of a motor vehicle during these journeyings into the drier parts of South Australia and in Central Australia. The last occasion on which this was done was on the expedition to Yuendumu in Central Australia in August 1951, to which the Wenner-Gren Corporation for Anthropological Research Incorporated (previously the Viking Fund) of New York so generously contributed.

As the journeys were usually several hundred miles long, and these notes often were made every mile or so, each traverse forms a rather bulky document—too detailed and long to be published. Typescripts have been made of the notes: one copy is filed in the Waite Institute of the University of Adelaide and another has been presented to the National Herbarium, Melbourne. These copies will thus be available for consultation by anyone seeking such information as they may afford. The persons likely to wish to consult them are anthropologists (seeking information as to the kind of country in Central Australia occupied at one time by our natives), geographers (who may want to get a general idea of the country passed over), ecologists, botanists and those interested in general in our natural history. But these people must first know of their existence and they need be given

some idea of their contents in order to determine whether they are worth the trouble of consulting. By the publication of this short paper the first of these desirables is achieved, and the second can be obtained by presenting a short example from the last of these expeditions.

It is remarkable the amount of information that can be obtained on these journeys in spite of the roughness of many of the tracks and the difficulty of making pencilled notes that can be deciphered later. When one knows in general the trees, shrubs and undershrubs of the country being travelled over, the recognition of the various species of plants is usually not difficult, though some mistakes in identification must occur.

The following are the typescripts filed in the Waite Institute and the National Herbarium, Melbourne:

Bundey Creek, about 150 miles north-east of Alice Springs, to Alice Springs, Sept. 1930.

Alice Springs to Cockatoo Creek, 200 miles north-east, August 1931.

Alice Springs via Haast's Bluff to Mt. Liebig, 200 miles west, August 1932.

Oodnadatta to Ernabella (Musgrave Ranges), 276 miles, August 1933.

Marree to Pandi Pandi on the Diamantina near Birdsville, about 250 miles, August 1934.

Alice Springs to Henbury and Erldunda, 153 miles; to 70 miles W. of Erldunda; near Henbury to Middleton Ponds and Angas Downs, 103 miles; Angas Downs to Ayers Rock by camel, 100 miles. May 1935.

Alice Springs to Granites, 336 miles north-west, August 1936.

Oodnadatta to Everard and Musgrave Ranges, 300 miles, and Ernabella to foot of Mt. Woodroffe, April 1950.

Alice Springs to Yuendumu, 192 miles north-west, August 1951.

Yuendumu to Cockatoo Creek and Mount Denison, 24 miles, August 1951.

Yuendumu to Mount Doreen, 25 miles, August 1951.

Example of record, August 1951, "Yuendumu to Mt. Doreen":

702 m.—Leave Yuendumu. *Triodia* plain. Occasional Corkwood (*Hakea*). Bloodwoods and termite nests. Patches of witchetty bush (*Acacia Kempeana*), mulga. *Plectroma, Cassia.* Dead mulga. Open mulga scrub *Atalaya. Salsola.* Open mulga with dry grasses, witchetty bushes, *Eremophila.*

705 m.—Fairly dense mulga and witchetty bushes, *Cassia.* Bloodwoods, dry grasses, *Atalaya.* Occasional *Triodia. Trichinium obovatum.*

706 m.—Low rocky hill. Open mulga with much grass. *Atalaya. Hakea intermedia.* Open, grassy with shrubs. *Hakea lorea, Kochia aphylla* on open plain. Low hills on right. Open grassy plain, quartz pebbles, *Atalaya, Atriplex* on plain, *Themeda avenacea* and *Triodia.* Kangaroo grass. *Crotalaria,* Watercourse, *Eremophilae, Atriplex* and grass; open, *Kochia aphylla. Themeda avenacea,* watercourse. *Kochia* sp., witchetty bushes. Low flat-topped hill, grassy plain.

710 m.—Grassy plain with occasional *Eremophila, Kochia aphylla, Cassia.* Then open mulga with grass, *Cassia, Helipterum floribundum,* witchetty bushes. Becoming denser. Some dead mulga. Grass under mulga, occasional bloodwood.

OBSERVATIONS ON THE AGE OF THE AUSTRALIAN GRASS TREE, *Xanthorrhoea australis*

By C. F. Lewis

The Australian Grass Tree, *Xanthorrhoea australis*, is acknowledged to be an ancient form of plant life, but nothing appears to be generally known of its rate of growth. Observations over the last twelve years have been made by the writer in an endeavour to find out the age of living plants.

It has been found that mature plants grow fairly rapidly, but the rate of growth of young plants—up to, say, 5,000 years old—is much slower and variable.

Constant difficulties in observation occur, since a conspicuous mark on a plant attracts attention and vandalism, and, though the observed plants must be conveniently situated, they cannot be transplanted for the purpose, for though they survive for years, their growth rate changes considerably.

Methods used have now been reduced to a check of leaf growth. Mature trees are classed as those having a "trunk" above ground level. The "trunk" consists of a fibrous core, surrounded by thickened leaf bases, lying close together, radiating almost horizontally. It is comparatively simple to count the 8,000 or so leaves on such a tree, measure the rate of growth of the leaves, and by calculation, from their number and the dimensions of their bases and the "trunk", to arrive at an approximate growth rate for the tree. Such a calculation for a tree three feet high gives a growth rate of about one foot in 120 years.

Should the inquiry proceed no further, it would be simple to say that such a tree is 360 years old, but the inquiry pursued discloses that that figure is far from correct.

It has been found that the rate of growth does not proceed at the above rate until the tree's "trunk" grows above ground level. Observations are therefore being concentrated on plants having no such "trunk".

An interesting feature of young plants is that only their leaves project through the soil, in vertical growth from the crown, usually between three inches and eleven inches below soil level. It has not been determined whether the plants germinate at soil level or at a depth. Observations support the proposition that soil accumulation accounts largely for their depth and it is understandable that plants which grow slowly in light soil would require some growth mechanism adapted to variations in soil level over a long period.

Plants having from seven to 1,400 leaves have been checked; the average annual linear rate of growth of their leaves is 452 mm. and in each such plant, and the annual increment is approximately 2¼ leaves. The rate of leaf growth is not constant, but varies from 260 mm. to 655 mm. in observed plants, with an average of 452 mm. The variation is not seasonal or constant and no known factor is responsible.

It is possible to calculate the approximate ages of such plants, but between their ages and the ages of old plants, there is a wide gap where nothing is known.

The plant with 1,400 leaves was a very young plant, the youngest plant that could be found in an area. It was excavated and its crown was 280 mm. below soil level. The diameter of its leaf crown at soil level was 15 mm. Its growing crown was 25 mm. above its root crown and all its leaves, both living and dead, were counted, totalling 1,400. The distance between the tips of its two youngest leaves was 326 mm. (nearly twice the average of 170 mm. in other plants). Its annual increment of leaves was to that extent lower than the average of 2¼ of the plants to which the 170 mm. applied.

Even assuming that its average annual increment was as high as 2 leaves and that it had been constant, as it is in the other plants, then it

age of 560 years would apply. Its height of 25 mm. was one-twelfth of the distance it had grown towards the present soil level. It could therefore be 6,720 years old by the time it reached maturity at soil level, but in 6,160 years from now, where is the soil level likely to be? There was nothing unusual about the situation of the plant. The soil was sand and the site was the top of a hill.

Two other plants, the subjects of continuing observations, having 17 and 94 leaves, are regarded as being 7 and 18 years old respectively.

BOOKS FOR BOTANISTS

(Four Reviews)

By J. H. WILLIS, National Herbarium of Victoria

The past year has seen several authoritative publications of exceptional interest to Australian plant ecologists and systematists. Four of these are, in order of appearance:

1. A Study of the Ecosystems of the Monaro Region of New South Wales

By A. B. COSTIN [Govt. Printer, Sydney, 1954. 9½" × 7". 860 pages. 226 figures. Price £5/5/-]

The author was for five years (1946-50) a field officer in the Soil Conservation Service of New South Wales, stationed at Cooma in the centre of the Monaro district. The results of his intensive researches there are embodied in this, the most comprehensive ecological work on any part of Australia yet published; indeed, the magnitude of the survey is almost overwhelming. Six thousand square miles of tableland to alpine territory, embracing the vital water catchments of the Snowy and upper Murrumbidgee Rivers, have been covered in extraordinary detail. A foreword by the Minister for Conservation reminds us that: "The future progress of Australia is bound up with the conservation and development of our national resources. . . . The book is an invaluable addition to our knowledge of a unique and highly important part of Australia."

This excellent volume is divided into six parts—*Preliminary* (definition of area, exploration and early settlement, previous scientific investigation, and discussion of ecosystems); *Independent Variables of the Ecosystems* (physiography, geology, climate, etc.); *Dependent Variables* (the vegetation); *Dependent Variables* (the soils); *Aspects of Post-Cretaceous History*, and *Aspects of Land Use*. Naturally, the 300 pages of Part III, treating vegetation, are of paramount interest to a botanist. In this section there are 29 chapters, of which 25 each deal with a separate plant alliance (e.g. *Poa caespitosa*, *Eucalyptus niphaphila*, *Oxylobium ellipticum-Podocarpus alpina*, etc.) Every one of these major plant communities is discussed floristically and in relation to land usage; the animal populations are also mentioned and problems (such as grazing, fire and resultant erosion) are aired without reservation. Characteristic plant associations are portrayed by reproductions from many good photographs (some have lost a little clarity as text illustrations on rather poor-quality paper), and all available data are summarized in tabular form—composition, distribution, life form, pathogens, etc., of the various floristic groupings. A very detailed analysis of soils throughout the region covers 36 pages, as Appendix B, and the concluding author bibliography has 484 references.

Mr. Costin's book is certainly a "must" for anyone wishing seriously to study Australian alpine vegetation. Underlying the whole treatise is a solemn theme which should appeal to all mountain lovers (the author is obviously one of them) and all conservationists—*viz.* the accelerating destruction of our highland ecosystems through white man's careless exploitation. He gives warning (p. 139) that "unless protective action is soon taken, many unique features may be lost for all time".

2 **The Flora, Vegetation and Soils of Macquarie Island**

By B. W. TAYLOR. [Issued by the Antarctic Division, Department of External Affairs, Melbourne, as *A.N.A.R.E. Reports*, Series B, Volume II *Botany*, May 1955. 9½" x 7". 192 pages, 42 plates, 11 figures and 2 loose maps.]

Macquarie Island is no more than a mountain range (rising to 1,400 feet), subject to frequent gales, enjoying very little sunshine at any time of the year, wet (about 41.5" per annum), humid and uniformly cold—the mean yearly temperature is only 40.0°F., but the complete range is remarkably small (an absolute maximum of 52.7°F. and minimum of 17.0°F.). Such a small, bleak, isolated strip of land—46 square miles in extent, lying almost midway between Tasmania and the nearest point of the Antarctic Continent—might not be expected to offer much of botanical interest. Yet Mr. B. W. Taylor, who spent a year there with the A.N.A.R.E. land party of 1950-51, has found enough in the ecology of its 35 indigenous vascular plants, three introduced weeds and some 40 mosses, to compile a highly interesting and informative treatise which will take its place among the important ecological writings on the southern hemisphere.

A whole fascinating chapter is devoted to the "Origin of the Flora", and a strong case is presented for long-distance dispersal by migratory seabirds; the survival of any plants from pre-glacial times is shown to be highly improbable if not impossible. Another chapter concerns the "Effect of Animals and Man", and the steady destruction of vegetation by introduced rabbits—even on this frigid mountain range—makes very sorry reading. There are no trees or shrubs on the island, and the structure of its vegetation is very simple indeed: only three formations are recognized—*feldmark* (covering the greatest area), *sub-glacial herbfield* and *wet tussock grassland*.

The various plant alliances, their subordinate communities and ecotones are discussed at length. Many of these and all vascular species are illustrated by reproductions from the superb photography of Norman Laird who was at Macquarie Island with A.N.A.R.E. in 1948-9. Especially impressive are the pictures of *Stilbocarpa polaris*—the "polar cabbage", an aralioid herb and the largest to be found there—and *Cyprorma pumila* in berry. One of the few typographical slips, which evaded the proof-reader, concerns a tabular arrangement of plants on page 16: *Epilobium hmeoides* and *Stilbocarpa polaris* are inadvertently recorded for Heard Island instead of *Callitriche antarctica* and *Azorella selago* respectively.

3. **An Enumeration of Plants in the Albury, Holbrook and Tumbarumba Districts of New South Wales**

By E. J. McBARRON. [Published as Vol. 2, No. 2 of the *Contributions from the New South Wales National Herbarium*, Govt. Printer, Sydney, 1955. 9½" x 7¼". 160 pages, 1 text map.]

This is a modest title for what is actually a history of white man's influence on the vegetation of some 3,300 square miles of Riverina plains, Murray River lagoons and mountain slopes to 3,000 feet. It is one of the best and most detailed local floras yet to appear in the Commonwealth. The author was a veterinary officer at Albury and Holbrook for eight years, during which he made exhaustive collections from settled areas, waste land and roadsides, sending his specimens to the Sydney Herbarium for identification. His researches into district history involved combing the files of the Albury *Border Post* back to 1856, and reading all the available reports of explorers and travellers in the region—from Hume and Hovell onwards.

The enumeration covers not only 500 indigens and 258 naturalized aliens, but also 350 cultivated species which are "either ornamental trees and shrubs or common garden plants cultivated within the area." Moreover, the histories of individual kinds of trees, shrubs and herbs are given wherever known,

e.g. White Mulberry (*Morus alba*), Paterson's Curse (*Echium plantagineum*) and Wild Flax (*Linum marginale*). It is strange that no eucalypt is listed (doubtless an unintentional omission), nor any indigenous species of *Kochia* and *Olearia*; the absence of these groups from such a large area would be remarkable. A bibliography of 64 references completes this excellent compendium which should certainly be known and consulted by all local botanists or horticulturists in the Upper Murray region.

Kochia

4. A Handbook of the New Zealand Mosses

By G. O. K. SAINSBURY. [Published as *Bulletin No. 5* of the Royal Society of New Zealand, May 1955. 9¼" x 7¼". 490 pages. 76 plates.]

A moss flora dealing with a major part of the Australian region, giving adequate descriptive detail and accurate illustrations, has long been a desideratum. The only 20th century works available to students have been H. N. Dixon's invaluable "Studies in the Bryology of New Zealand" (*Bulletin No. 3* of the Royal Society of New Zealand, 1913-29) and L. Rodway's "Tasmanian Bryophyta—Mosses" (reprinted from *Papers and Proceedings* of the Royal Society of Tasmania, 1914); but both have been long out of print, and the latter (which is of limited use in the tropics) has many inaccuracies. Mr. Sainsbury has spent half a life-time intensively studying the moss flora of New Zealand; over a long period of years he has given freely of his great knowledge to budding bryologists on the other side of the Tasman Sea. No one is better qualified to write a modern handbook on the Dominion's *Musci*, and the small band of Australian moss students has cherished the hope that he might do so. Happily, that wish is now fulfilled.

Australian / desideratum /

The Royal Society of New Zealand is to be congratulated for publishing Mr. Sainsbury's lengthy *ms*. Both format and typography are excellently chosen. There are good keys to all genera and the 440 recognized species, the accurate descriptions are ample, the discussions lucid and helpful, while the whole work is enhanced by beautiful line drawings from the pen of Miss N. M. Adams who illustrates a selection of 215 species. The author admits that his "specific concept is a wide one", and under various species he gives the important synonyms that have been applied to the same plants by other writers on New Zealand *Musci*. There is manifest, throughout the pages, a very intimate acquaintance with species in all their puzzling variations and protean responses to environment—it is not to be wondered at that European botanists, working so often with scraps of material, should have described the same Australasian moss under a multiplicity of names. This book will stand for many years as a worthy monument to its author, and will serve as an invaluable guide for workers in southern Australia—197 species (about 82 per cent.) of Victoria's 240 known mosses are dealt with.

protean /

THE LATE EDWARD THOMAS DAKIN (1897-1955)

The sudden death of Mr. E. Dakin from pneumonia on July 8 came as a shock to his many friends in the Field Naturalists Club. Always a most enthusiastic supporter of the Botany Group, he had but lately assumed its chairmanship. "Ted" was born at Richmond and lived all his life in the metropolitan area, latterly at Surrey Hills; he never married, but is survived by a brother and two sisters (both married). During World War I (1914-18) he worked at G. Rimington's nursery, Kew, and there developed strong botanical leanings which led on to his membership with the F.N.C. in 1918. For the last 25 years he was an independent "jobbing" gardener. A natural gentleman, with a jovial disposition, Ted had a slight, but not distressing, stammer in his musical speech.

Although small in stature (about 5 ft.) he was an accomplished high diver

and bush walker. He tramped over many parts of the alps (Baw Baws, Lake Mountain, Cathedral Range, Mt. Buller and Mt. Cobbler), also Quail Island in Western Port, the Mitchell River gorge country, Kinglake-Mt. Disappointment area, Rushworth and the Grampians, with many excursions to Warrandyte—always on the trail of his beloved plants. But he had an eye for other objects of natural history interest too, and could entertain by reminiscences of his various encounters with snakes. All botanical specimens were brought to the National Herbarium for checking, and it was gratifying to see his eyes dance whenever the collection included some rarity, or occasionally a new record for the State! Ted would be all eagerness to revisit the spot—no matter how remote—and to gather more material in the cause of science.

Bryophytes were his particular interest, and he was the first to find *Lophocolea austrigena* (Lake Mountain), *Plagiochila biserialis* (Myrtle Creek near Kinglake West) and *Tortella dakinii* (Warrandyte) in this State. I had the pleasure of naming this last species of moss in his honour [*Vict. Nat. 72*: 6 (May 1955)], and am relieved that he lived just long enough to see its description in print; that was a proud occasion for him. He collected (also at Lake Mountain, and in fruit) the only really good example of *Sematophyllum tenuirostre* known from Victoria. Perhaps his most noteworthy discovery (6.2.1934) concerns the rare, endemic Graceful Swamp Wallaby-grass, *Amphibromus gracilis* P. F. Morris [*Vict. Nat. 51*: 145-6 (Oct. 1934)]. Dakin's single type specimen—from swamps toward the Yarra River at East Kew—remained the only known material until Chas. Bryant rediscovered this species in a similar habitat at North Balwyn, 4.11.1942. His numerous plant specimens are to find a resting place in the National Herbarium at South Yarra.

—J. H. Willis.

FAUNA SANCTUARY DIRECTOR

The Committee of Management of the Sir Colin MacKenzie Sanctuary, Badger Creek, Healesville, Victoria, invites applications in writing (with details of qualifications) by December 17, 1955, for the position of Director of the Sanctuary, salary up to £1,500 according to qualifications. The post requires a person with lively enthusiasm for public display and explanation of Australian fauna in a bush setting, with ability to achieve efficient management (including breeding of fauna), and to promote public interest. Full-time staff at present is seven adults. Attendance in 1954-1955 was 90,000. Intending applicants can obtain details from the Secretary (Mr. N. G. Wishart), Sir Colin MacKenzie Sanctuary Committee of Management, care of Premier's Dept., Treasury Gardens, Melbourne, Victoria.

WHAT, WHERE AND WHEN

F.N.C.V. Excursions:

Monday, December 26 to January 2—Excursion to Mt. Buller. Details in last month's *Naturalist*.

Preliminary Notice:

Saturday, January 21—River Trip. Leader: Mr. Dickens. Boat leaves Princes Bridge, 2 p.m. Fare: Adults, 5/-; children, 2/-. Tickets from Excursion Secretary

Marie Allender, Excursion Secretary.

The Victorian Naturalist

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PROCEEDINGS

The meeting hall was well filled for the Club's General Meeting at the National Herbarium on December 12. In response to a request from the Secretary of the Maranoa Gardens Committee, Mr. J. Seaton was appointed as this Club's liaison officer on that committee.

Mr. Swaby spoke briefly on several matters: He requested future exhibitors to note on cards the important points in connection with their exhibits. Mention was made of the need for members to consider forming a working group to organize future Club shows, otherwise show equipment might as well be disposed of. A request was made for short lecturettes by members at future meetings. And finally, note was made of the Club's sorry position in having no nomination or volunteer for the position of Secretary.

Mrs. Jennison's resignation from the position of Exhibits Steward was accepted with regret, and a letter is to be sent in appreciation of her service to the Club.

Mr. Haase delivered a short talk touching on the balance of nature—trees, insects and birds, and the drastic results of the introduction of the domestic cat.

The Meeting was then treated to an excellent set of Kodachrome slides, taken in various parts of eastern Australia, by Messrs. Burns and Neboiss, entomologists of the National Museum of Victoria. Some of the storm and sunset pictures, and one of a small frog on the flower of an *Hibbertia* were exceptionally good. The President thanked the speakers for a very instructive and enjoyable evening.

Six new members were elected: Mrs. Gordon, Mrs. Malouf, Mrs. Harwood and Messrs. Hahn, Bittner and Lewis. To these the President extended a hearty welcome to the F.N.C.V., inviting them to take full advantage of the library and to participate in excursions and other Club activities.

There was an array of exhibits much above average, in particular some tropical shells shown by Mr. Gabriel and insect specimens displayed by the speakers for the evening.

Mr. Hanks made a report on the bird life at Wyperfeld National Park, and he commented too on the large eels making their way northward along Outlet Creek, with no possibility of ever reaching the ocean.

The President then adjourned the meeting for the usual conversazione and perusal of exhibits.

CRITICAL NOTES ON AUSTRALIAN STYLIDIACEÆ

(with descriptions of three new species and two new varieties)

By Rica Erickson* and J. H. Willis†

INTRODUCTION

It has been found by one of us (R.E.), while preparing a monograph with coloured illustrations on the fascinating Trigger-plant Family (*Stylidiaceæ*), that no descriptions of certain West Australian species and varieties have ever been published; several adjustments to existing nomenclature are also necessary. We have already collaborated in a paper describing nine new species and two new varieties of *Stylidium* from Western Australia; this paper has gone to press and will shortly appear in Part 1 of a new botanical journal, "*Muelleria*", issuing from the Melbourne Botanic Gardens and National Herbarium. The following additional items are now dealt with, and their arrangement follows the systematic order of J. Mildbraed in *Das Pflanzenreich*, Heft 35 (iv. 278)—*Stylidiaceæ* (May 1908).

New species *Levenhookia octomaculata* and *Stylidium roseo-alatum*, are described and illustrated; *Stylidium streptocarpum* Sond. is synonymized under *S. divaricatum* Sond.; *S. streptocarpum* var. *macrocarpum* Benth. is raised to full specific rank and delineated; the new varieties, *S. macrocarpum* var. *planifolium* and *S. calcaratum* R.Br. *var. ecorne*, are described; the variety *glandulosum* Mildbr. is transferred from *S. luteum* R.Br. to *S. spathulatum* R.Br., and the name *S. breviscapum* R.Br. var. *erythrocalyx* Benth. is restored for the plant to which an illegitimate combination, *S. breviscapum* var. *involucratum* (F. Muell.) Mildbr. had been applied.

LEVENHOOKIA OCTOMACULATA *Erickson & Willis* [Text illust., fig. 1-6]; species nova elegans ex affinitate *L. stipitatæ* (Benth.) F. Muell quæ recedit foliis, bracteis et lobis calycis glanduloso-pilosis, petalis immaculatis, vagina quam longitudo columnæ plus dimidio; ab omnibus speciebus *L. octomaculata* differt petalis *duplo* maculatis.

Annua gracilis, 4-10 cm. alta, parce glandulo-pilosa. *Folia* pauca, glabra, prope basin 2-4 mm. longa, obovato-spathulata, graciliter petiolata, apicem versus longiora angustiora. *Scapus* tenebrosus, pergracilis, simplex vel parce ramosus, sparse glandulo-pilosus; flores tres vel numerosi, in 1-4 umbellis dispositi, pedicellis bi(-tri)formibus quam bracteis glabris sublinearibus (ad 1 cm. longis) duplo vel triplo longioribus. *Calyx* tenebrosus, globosus, circiter 1 mm. latus, tubo pergLandulOso; lobi glabri, liberi, quam tubus longiores. *Corolla* patens, late rosea, fauce alba; petala circ. 4 mm. longa, obovato-spathulata, ± apiculata, quodque prope basin maculas 2 saturate rubras gerens; labellum æquilongum, longe graciliter unguiculatum, lamina cucullata subobLonga lobis ("appendiculis") duobus ± triangularibus instructa. *Columna* æquilonga, gracilis, ad basin vagina brevi (quam longitudo columnæ minus dimidio) prædita, ad apicem (a maturitate) stigmatis appendiculis 2 gracilibus curvatis pilosis instructa.

A small sparsely glandular-hairy plant, 4-10 cm. tall, with simple or branched stem.

Leaves very few, glabrous, those near the base of the stem approximate, obovate to spathulate, the almost orbicular lamina 1-2 mm. wide and on slender petioles of equal length, those higher on the scape becoming longer and narrow. *Scape* dark-coloured, usually umbellate, the branches also; flowers numerous on long thread-like, sparsely glandular-hairy pedicels which are two or three times as long as the floral bracts; bracts glabrous, almost linear or wider in the upper half, to 1 cm. in length. *Calyx* dark-coloured, globose, about 1 mm. in width, the tube very glandular-hairy; the lobes glabrous, free, longer than the tube. *Corolla* bright pink, with white throat, each petal bearing two dark red spots near the base; petals more or less

* "Fairlea", Bolgart, W. Aust.

† National Herbarium of Victoria, S. Yarra, Vic.

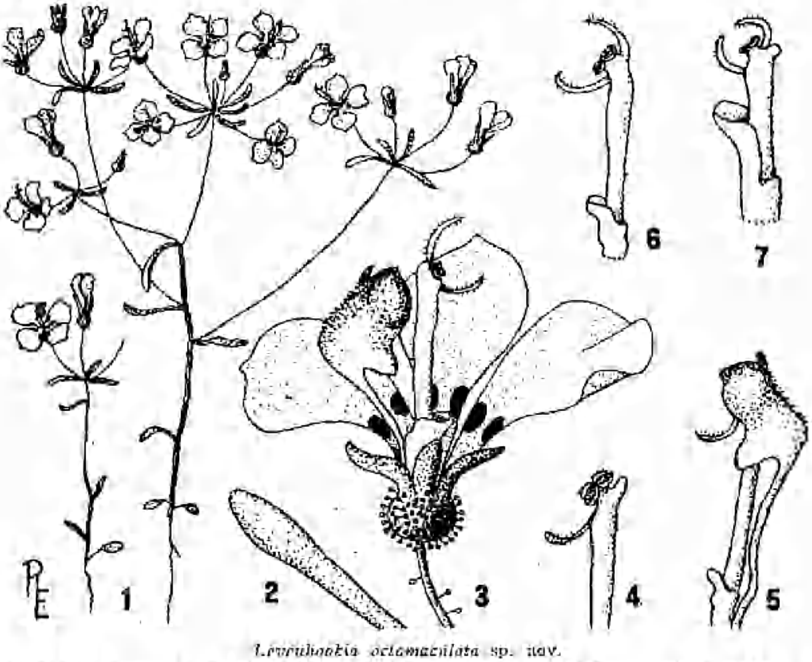
obovate, slightly pointed at the apex and narrowed at the base; labellum as long as the petals, on a long slender claw, the hood almost oblong with two more or less triangular flaps or appendages, cleft at the apex and surmounted by a short sensitive point. *Column* with short basal sheath (much less than half the length of the column), slender, erect, when mature bearing at the summit two slender, curved, hairy stigmatic appendages. *Capsule* globose.

Epithet: In allusion to the eight red spots on the corolla (2 at the base of each petal).

Vernacular name: Dotted Stylewort.

Habitat: Open Jam-tree (*Acacia acuminata*) and Wandoo (*Eucalyptus wandoo*) forest, in compact colonies.

Representative locality: WESTERN AUSTRALIA—Bolgart (HOLOTYPE in MEL, ISOTYPES in K and PERTH—*Rica Erickson*, 2 Nov 1953).

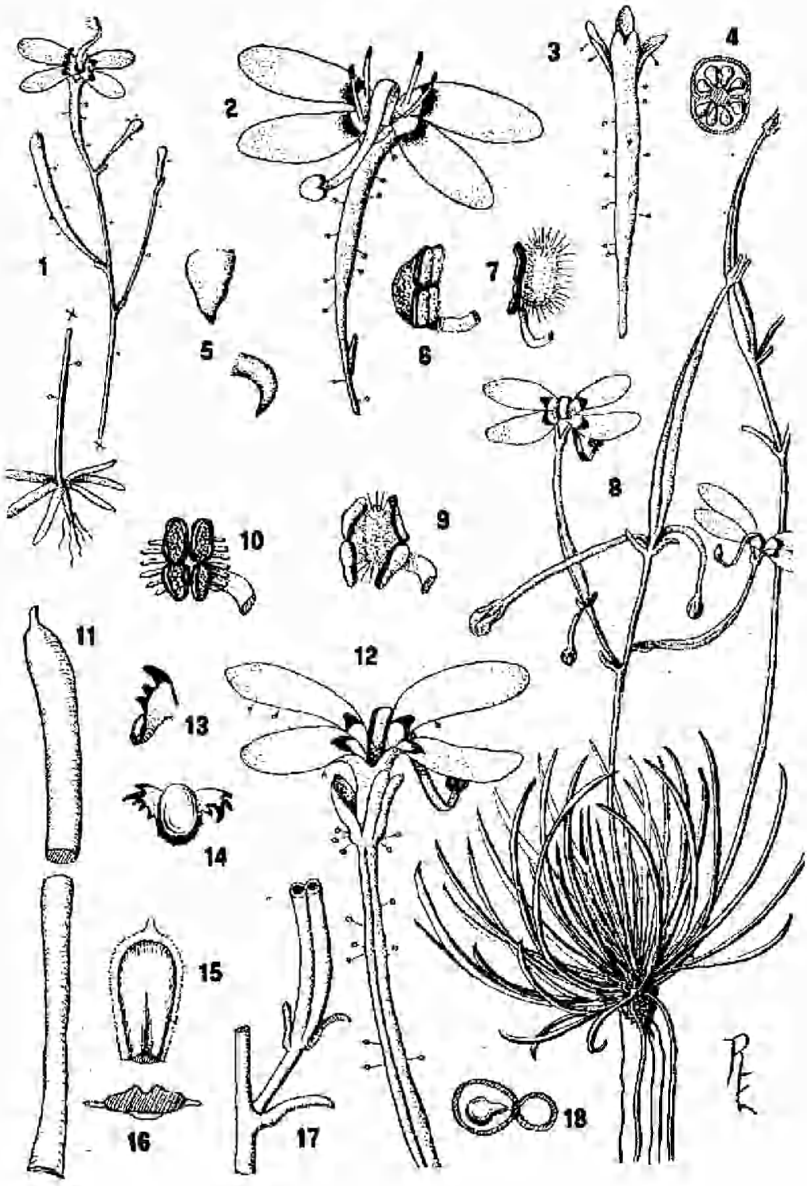


Levenhookia octamaculata sp. nov.

1. Habit of growth; 2. Floral bract; 3. Flower, with one petal removed; 4. Column, with one stigma appendage; 5. Column, enclosed by labellum; 6. Column, with both stigma appendages developed and showing the sheath at the base; 7. Column of *L. stipitata* (Benth.) Muell. for comparison, showing sheath at base.

The new species is close to *L. stipitata* (Benth.) F. Muell., and may in the past have been confused with it. *L. stipitata* is more glandular-hairy, including the leaves, bracts and calyx lobes; the petals are unspotted, and the column sheath rises to more than half the height of the column; the flowering period is earlier and, as a rule, it does not overlap that of the new species in the same area. Other species having spotted throats are *L. leptantha*, *L. preissii* and *L. pauciflora*; but these are more glandular-hairy, with non-umbellate inflorescences, shorter pedicels, and only a single spot at the base of each petal.

PLATE IV



(For details, see opposite)

In dried material, the glabrous leaves, bracts and calyx lobes of the new species are significant, while the doubly-spotted petals are seen to be a unique feature in fresh flowers; under a lens, the labellum shape and height of sheath are apparent and distinctive.

STYLIDIUM CALCARATUM *R.Br.*, var. ECORNE *F. Muell. ex Erickson & Willis*:

varietas nova, a forma typica differt calcare brevissimo vel nullo.

Differing from the typical form in having a very shortly-spurred or even spurless corolla.

TYPE from "mossy granitic rocks" at King George's Sound, Western Australia (ISOTYPES in MEL and PERTH *F. Mueller*, Oct. 1867).

By virtue of its spurless flowers, this variety has hitherto been much confused with *S. perpusillum* Hook.f.—a much more slender, minute plant with smaller and always white petals (rarely exceeding 2 mm.). *S. calcaratum* var. *ecorne* forms pure colonies in inland tracts, and ranges widely from near Geraldton, throughout south-western Australia to parts of South Australia and western Victoria (with outlying occurrences near Gembrook and Violet Town). A form in Bindoon district, W.A. (damp Wandoo slopes) and near Manjimup is remarkable for its vivid rose colouring, shorter acuminate upper petals, and almost rotund leaves. F. Mueller was apparently the first to recognize the distinctiveness of this spurless plant, and his *ms.* epithet *ecorne* has been taken up, as both simple and accompanying an excellent suite of material from the Albany district.

STYLIDIUM ROSEO-ALATUM *Erickson & Willis* [Pl. IV, fig. 1-7]; species nova Sectionis *Despectæ*, ob lobos corollæ lateraliter geminatos et folia radicalia rosulata ex affinitate *S. brachyphylli* Sond. et *S. exoglossi* Erickson & Willis, sed differt a hoc præsentia appendicularum (in fauce), ab illo situ labelli (haud externis) et ab utroque floribus comparate majoribus lætioribusque lobis corollæ subæqualibus.

Annua gracilis, 4-6 cm. alta, 1-5 flores gerens. *Folia* circiter 6, radicalia, ligulata, acuta, 3-6 mm. longa. *Scapus* gracilis, simplex vel parce ramosus, prope basin subsecens, perparce glandulo-pilosus; bracteæ florum minutæ. *Calyx* linearis, circ. 5 mm. longus (ad 1 cm. in fructificatione), parce glandulosus; lobi quam tubus multo breviores, obtusi, eorum 2 subconnati. *Corolla* patens, circ. 5-8 mm. (ad partem latiorem), læte rosea, fauce albidam versus saepe subito rubra satura; tubus calycem haud excedens; petala 2-3 mm. longa, subæqualia, lateraliter geminata, obtusa, anguste oblonga, unguibus latis; fauces appendiculæ 4, anguste lineares vel breves (dentiformes); labellum minutum, deltoideum, mucronatum, carnosum, leniter recurvum. *Columna* moderate gracilis, corolla æquilonga, pallida sed antheris nigris conspicuis prædita.

A small ephemeral, 4-6 cm. high, with 1-5 flowers.

Leaves about 6, rosulate at base of stem, ligulate, acute, 3-6 mm. long. *Scape* slender, simple or sparingly branched, with very scattered glandular hairs and minute floral bracts, slightly reddish toward the base. *Calyx* linear, about 5 mm. long (almost 1 cm. in fruit), sparingly glandular; lobes much shorter than the tube, blunt, two of them connate for more than half their

PLATE IV of *Stylidium roseo-alatum* and *S. macrocarpum* spp. nov.

1-7. *Stylidium roseo-alatum*: 1. Habit; 2. Flower enlarged; 3. Calyx; 4. Cross section of calyx tube; 5. Front and side views of labellum; 6. Side view of anthers; 7. Side view of empty anthers and developed stigma.

8-18. *S. macrocarpum*: 8. Habit, 9. Front view of empty anthers and developed stigma; 10. Front view of anthers; 11. Mature leaf; 12. Flower enlarged; 13. Side view of labellum; 14. Front view of labellum; 15. Juvenile leaf; 16. Cross section of juvenile leaf; 17. Portion of scape, showing bracts and base of calyx; 18. Cross section of calyx tube

length. *Corolla* about 5-8 mm. across at widest part, bright rosy pink and often suddenly deepening to red at the throat which is white; tube not exceeding the calyx; petals 2-3 mm. long, almost equal, disposed in lateral pairs, bluntish, narrowly oblong from broad claws; appendages 4, varying from long narrow-linear and erect with red tips (at Bolgart) to short, tooth-like and rather inconspicuous (at Palgarup swamp near Manjimup); labellum minute, deltoid, mucronate, fleshy and slightly recurved. *Column* moderately slender, equalling the corolla in length, pallid but with conspicuous black anthers; stigma rounded and cushion-like.

Pollination: By the "velvet fly" *Comptosia cuneata* Edw. (determined by Mr. Tarlton Rayment of Sandringham, Feb. 1955).

Epithet: In allusion to the spreading pink petals which somewhat resemble a dragonfly's expanded wings.

Vernacular name: Pink-wing Trigger-plant.

Habitat: On mud in drying swamps and creek beds.

Representative localities: WESTERN AUSTRALIA—7 miles west of Bolgart (HOLOTYPE in MEL—*Rica Erickson*, 17 Oct. 1948); Palgarup swamp near Manjimup (*Rica Erickson*, 18 Nov. 1953).

The new species belongs to the bulbless group of the Section *Despectae*; it is close to *S. brachyphyllum* Sond. and *S. exoglossum* Erickson & Willis in having laterally paired corolla lobes and in the presence of a basal rosette of leaves, but it differs from the former in having throat appendages, from the latter in the position of the labellum (*not* external) and from both in the rather larger, brighter flowers with almost equal corolla lobes. *S. utricularioides* Benth. differs in its paler, longitudinally-paired petals and non-rosulate leaves.

STYLIDIUM SPATHULATUM *R.Br.*, var. GLANDULOSUM (*Mildbr.*) *Erickson & Willis*, combinatio nova.

[*S. luteum* R. Br., var. *glandulosum* Mildbraed in *Pflanzenreich* Heft *35*: 57 (1908)]

Mildbraed's new variety was based on a collection by G. Maxwell from the Stirling District of Western Australia (without exact location). Duplicate material in Melbourne Herbarium has been critically examined, and it is considered that this south coast plant can not be allied with *S. luteum* R.Br. at all. It departs from the latter species in having glandular leaves, a more open racemose inflorescence, and completely glabrous calyx tube of different shape (oblong, instead of globoid and very glandular as in *S. luteum*); these characteristics all apply to *S. spathulatum* R.Br. from which the variety *glandulosum*—an unfortunate epithet under *S. spathulatum*—differs only in its very narrow-linear leaves. The range of the variety is now known to extend at least from Albany to the Mt. Barker area.

STYLIDIUM DIVARICATUM. *Sonder in Lehmann Plant. Preiss. 1*: 385 (1845)

[*S. streptocarpum* Sond. in Lehm. *Plant. Preiss. 1*: 385 (1845)]

Examination of duplicate types of *S. divaricatum* Sond. and *S. streptocarpum* Sond. in Melbourne Herbarium shows no essential difference; they must be referred to one and the same species, for which the epithet *divaricatum* has been chosen—as less likely to cause confusion. Mildbraed [*Pflanzenr.* Heft. *35*: 83 (1908)] was incorrect in ascribing a naked throat to *S. streptocarpum*, the type of which has definite filiform appendages both on the corolla throat and labellum—albeit rather difficult to detect in dried specimens. In the succeeding paragraph Bentham's *S. streptocarpum* var. *macrocarpum* is raised to full specific rank; cogent reasons are given for this change of rank.

STYLIDIUM MACROCARPUM (*Benth.*) *Erickson & Willis*, status novus [Pl. IV, fig. 8-18].

[*S. streptocarpum* Sond., var. *macrocarpum* Benth. *Flora Aust.* 4: 28 (1869)]

A tufted perennial with 2-6 scapes; stock short and woody, on several stout rigid roots which change from red to black in old growth.

Leaves numerous, densely tufted at base, terete, usually 2-5 cm. long and about 1 mm. wide, mucronate, glabrous, slightly furrowed when dry; inner juvenile leaves much shorter, flattened and with hyaline margins. *Scapes* 10-20 cm. (or more) high, green, glabrous, with several to many flowers arranged in broad panicles; floral bracts small. *Calyx* linear (but usually broader at base, especially in fruit), 1-2 cm. long, slightly twisted, often curved in fruit, sparingly glandular (more so in some Murchison River collections); lobes free, about 2 mm. long, broadish and blunt; subtending bracts 2-3 mm. long, broad and blunt. *Corolla* 8-10 mm. across at widest part, rosy-pink with yellow throat, slightly glandular on the outer surface; tube equal to the calyx lobes; petals almost equal, 3-4 mm. long, disposed in lateral pairs, oblong-elliptic and very blunt, internally pink and each with a conspicuous red spot at the claw, externally whitish and with median red stripes; appendages absent; labellum minute, almost round, with broad laciniate appendages. *Column* moderately slender, slightly exceeding the corolla; stigma a narrowly ellipsoid cushion.

Epithet: In allusion to the comparatively long fruits (2 cm.).

Vernacular name: Flagon Trigger-plant.

Habitat: Low heathland on calcareous sand-hills not far from the sea.

Representative localities: WESTERN AUSTRALIA—Swan River (LECTOTYPE in MEL, PARATYPE in K—*J. Drummond* 2nd coll., No. 271, PARATYPE in K—*J. Drummond*, No. 131, not examined), Murchison River (incl. PARATYPE in MEL and K—*A. Oldfield*); 30 miles north of Murchison River (MEL—*F. Mueller*, Oct. 1877); Coogee (MEL—*A. Oldfield*, No. 1258); Yanchep (*Rica Erickson*, 4 Nov. 1953); Swan River (PARATYPE in K—*Collie*, not examined), Lower Swan River (MEL—*Mrs. Gribble*, 1887); Middle Swan River (MEL.—*Julia Sewell*, 1894); Upper Swan River (MEL—*Julia Sewell*, 1885), north of Albany (PERTH—*C. Andrews*, 26 Sept. 1902).

This plant was doubtfully placed by Bentham (1869) as a variety of *S. streptocarpum* Sond., which has now been proved identical with *S. divaricatum* Sond.—a species distinguished by its flabelliform corolla with filiform appendages on both labellum and throat. The manifestly *lateral* pairing of corolla lobes and *absence* of throat appendages in *S. macrocarpum* amply justify its recognition as a distinct species, and the foregoing diagnosis supplements the very inadequate varietal description given in *Flora Australiensis* (4: 28).

S. MACROCARPUM (*Benth.*) *Erickson & Willis*, var. PLANIFOLIUM *Erickson & Willis*:

> varietas nova, a forma usitata speciei differt foliis multo longioribus (usque ad 10 cm.) manifeste complanatis atque calycis lobis acutis.

Differing from the usual form in its much longer leaves (to 10 cm.) which are distinctly flattened, and in the acute calyx lobes.

TYPE from stony slopes near Billerango Hills, SW of Morawa, Western Australia (ISOTYPES in MEL, K and PERTH—*Rica Erickson*, 10 Sept. 1953).

This plant may eventually prove to be identical with *S. leptophyllum* DC. var. *glabrescens* Mildbr. [*Pflanzenr.* Heft. 35: 91 (1908)] and, if so, a new combination "*S. macrocarpum* var. *glabrescens*" will need to be made.

STYLIDIUM BREVISCAPUM *R.Br.*, var. ERYTHROCALYX *Benth.* Flora Aust. *4*: 31 (1869)

[*S. breviscapum* R.Br. var. *involucratum* (F. Muell.) Mildbr. in *Pflanzenr.* Heft *35*: 92 (1908); *S. involucratum* F. Muell. *Fragm. Phyt. Aust. 1*: 154 (1859)].

Mildbraed's new varietal combination in 1908 was superfluous and therefore illegitimate; Bentham's epithet *erythrocalyx* must be restored, if the plant is to be considered as of varietal, not specific, rank. This variant differs from typical *S. breviscapum* R.Br. chiefly in its looser inflorescence and rather longer leaves. It is not uncommon on the south coast of Western Australia, and in Melbourne Herbarium is a collection from "Sources of the Swan River" (*Alice Eaton*, 1889) with an even more etiolated inflorescence. Some botanists favour the restoration of this plant to full specific rank, as *S. involucratum* F. Muell.; but from G. Maxwell's note on some very typical material from Cape Le Grand ("growing under rocks") we suspect that the diagnostic peculiarities may well have been induced by shade and extra moisture. Certainly, examples of *S. breviscapum* from Naremben (rainfall 13 in.) and other dry inland areas have far more congested inflorescences than is usual near the coast.

PROPOSED RESERVE AT MOUNT RICHMOND, S.W. VICTORIA

By C. BEAUGLEHOLE and N. LEARMONTH

Perhaps few members of the F.N.C.V. are aware that their club, with other kindred societies, recently sponsored a movement inaugurated by the Portland F.N.C. to reserve a large area in the Portland district for wildflowers. The Lands Department was requested to reserve from settlement 1,100 acres of bush country near Mount Richmond until such time as the proposed National Parks legislation made it possible to administer a reserve. The Department replied that no more land in the vicinity of Mount Richmond would be alienated, and "the proclamation of a reserve should be deferred until the Government has reached finality regarding the proposed National Parks legislation". So the area is safe and the next move is with the legislature, and the "National Park and Tourist" Bill now drafted should be brought before the House as an urgent measure.

Mount Richmond is fourteen miles WNW from Portland and rises to 700 feet above sea-level. From the summit can be seen a fine stretch of lonely coast along Discovery Bay and, in other directions, the placid lakes of Bridgewater and the high, wild headlands of Capes Bridgewater and Nelson. The mount is an extinct volcano "of fine-grained olivine basalt and is buried beneath a thick mantle of dune sand that reaches to the summit" (Coulson—"Volcanoes of Portland District"). The proposed reserve will include the mount and its slopes, the undulating open heath, the stringybark forests, and the thick sedge and tea-tree swamp country surrounding it. Though far from acknowledged roads, a good bush track—following the interstate telegraph line—passes diagonally through the area, and can be safely used in all seasons.

The botanical wealth of the area is such that to date over 400 species of native flowering plants have been listed thereon, including 9 ferns, 32 grasses, 51 rushes and sedges, 19 lilies, 58 orchids, 6 sundews, 9 wattles, 20 peas, 3 boronias, 7 rice-flowers, 5 eucalypts, 3 tea-trees, 3 *Melaleuca*, 14 hearths, 4 speedwells, 3 lobelias, 3 blue-bells, 3 goodenias, 4 trigger-plants, 4 daisy-bushes and 6 everlastings.

Among the most interesting plants in the area are the Peat Leek-orchid, *Prasophyllum beauglioleii*, named by the late W. H. Nicholls after its discoverer; and Leafless Beard-orchid, *Calochilus saprophyticus*, rediscovered here after being lost to science for many years. Soft Bush-pea, *Pultenaea mollis*, is the show-piece of the area, with soft, drooping foliage often fifteen

feet high and massed bloom in season. Oval-leaf Logania, *L. ovata*, is known in Victoria only from the Mount Richmond area.

To date, ninety-four species of birds have been listed in the area. The two summer visitors, Rufous Fantail and Satin Flycatcher, nest in the thick tea-tree belts; and there are the King Quail, Chestnut-tailed Ground-Wren, Striated Field-Wren, Fantail-Warbler, Southern Emu-Wren, Rufous Bristle-Bird and Black-capped Sittella. The eight local honeyeater species include the Tawny-crowned and the Crescent, and the Beautiful Firetail is not at all uncommon.

In general, the Mount Richmond area holds much of interest for the naturalist—a year round of bush flowers, uncommon and beautiful birds, and many unusual species of insects. The reservation of such a locality is well worth achieving.

STUDIES ON AUSTRALIAN CHAROPIDAE

Part 3—Planate Genera

By ROS. C. KERSHAW

The genera discussed include shells, the apical whorls of which are planate or but slightly raised or depressed. Growth stages in certain species are described.

The majority of the charopid genera may be described as more or less planate on the upper surface, and they may be conveniently grouped on the basis of the presence or absence of protoconch sculpture. Before defining these groups, and in order that the relation between protoconch or juvenile sculpture may be made clear, it is proposed to describe the various growth stages as seen in certain species. The species selected include a "convex", a "planate", and a "concave" form, one of which has a dentate aperture. In addition to these factors, they have been selected in order that concentric and radially sculptured, and smooth protoconchs are described. The terms used are those defined by Kesteven (1912) for gastropod mollusca.

Eudadnata bairnsdalensis (Gabriel): This shell has the initial whorls a little raised above the ultimate, but is planate rather than convex. The first sculpture is radial, and there are two lamellae within the aperture.

The nucleus is a small shallow pit, the primitive shell gland. This is followed by the Nectoconch of one and a half whorls. Initially it is hard to determine the presence of sculpture, but there is a rapid development of riblets which, though radial, are oblique to the adult sculpture and are at first spaced comparatively widely. There is a space between each equivalent to the width of two riblets. This continues for perhaps half a whorl when the sculpture becomes much more crowded for the remaining one whorl of the veliger or embryo, until there intervenes an ill-defined varix or rib. This appears to be intermediate in structure between the embryonic and subsequent growth. This is the Nepioconch or metamorphic stage representing a pause in growth, but such is not always as readily observable as in the present species. In this instance there is a small but marked space between the varix and the initial rib of the following sculpture, in which sculpure is apparently absent. The neanic or juvenile stage which follows is modelled on the adult sculpture of spaced ribs, in the interstices of which there are numerous radial lirae crossed by microscopic spiral striae. This sculpture is at first closely packed, but the spaces between the primary ribs gradually becomes wider and there is a slow transition to the adult sculpture when the spirals may be seen to cross the primary ribs. For a little more than a whorl from the Nepioconch the width between sutures is more or less uniformly narrow, but the width rapidly increases from a point where two primary ribs are closer than normal. The relationship between these two ribs does not seem necessarily constant, however from this point the sculpture is definitely adult. This space of one whorl appears to represent the neanic

stage to which Kesteven applies the term, Ananeanoconch. Subsequent whorls represent the ephibric or adult stage, which is terminated by the gerontic or stage of old age. This is sometimes seen as a thickening of the lip or as callus deposits, while in the present species a short basal lamella may be a gerontic feature. There is also a long entering palatal lamella, which is apparent in the adult but difficult to trace to earlier whorls.

The various stages are defined in this species but they are not always so clear, and sometimes the protoconch seems to merge into the juvenile. However, careful study under the microscope will usually reveal the extent of each period of growth.

Gyrocochlea vinitincta (Cox): This shell has not been examined by the writer, but Hedley's (1924) description is so clear that it is taken as an instance of a shell with smooth protoconch and concave form. The growth stages described above are as readily defined in this shell, though the sculpture differs. The Nectoconch is smooth and terminates in a slightly "everted lip", the Nepioconch. Following this, again for a little more than a whorl, the sculpture is of spaced riblets not "conformable" with the protoconch, the width of the whorl being uniform. The termination of the juvenile sculpture is marked by the appearance of finer and increasingly more closely packed riblets, the width of the whorls steadily increasing. It seems clear then that the youthful shell extends to this point, that is, some two to two and a half whorls from the nucleus. From that point there is stronger and more rapid growth of two or more whorls to full maturity. Most of the species of *Gyrocochlea* figured by Hedley (1924) show the stages just described more or less clearly.

Pernagera stanleyensis (Petterd): This specimen was collected in the Central Highlands of Tasmania, just north of Tarraleah, on the fringe of the temperate rain forest. *Pernagera* has an elevated apex of which Iredale says the tip is smooth. One is in some doubt of this in the present specimen. Within a very slight distance of the nucleus there appears a wrinkling of the shell which develops into the Nectoconch sculpture of faintly raised striae which are radial and terminate abruptly after a whorl and a half. The Nepioconch is not represented in this case by a varix but there is a defined transition, very brief, to the following sculpture. The whorl is immediately a little wider and the primary sculpture, of numerous radial riblets with secondary of fine decussate striae extending over them, continues for the remainder of the shell. There is no noticeable difference in the sculpture defining a youthful stage as has been noticed in other species; the whorls very gradually increase in size, perhaps a little more rapidly at the last. The shell is yellow with reddish chestnut streaks, the pattern commencing at some ill-defined point on the embryonic shell. It is not an adult feature.

Pillomena dandenongensis (Petterd): The shell selected is one of a series from Sassafras in the Dandenong Ranges of Victoria, not far from the type locality. The nucleus of this shell is represented by a very shallow depression from which springs the Nectoconch sculpture of six to eight (6-8) spiral riblets. These are crossed by very numerous extremely fine radial striae. This sculpture ends abruptly after approximately one and a half whorls and the juvenile sculpture begins. There is a faint widening of the shell and the first juvenile sculpture to appear is the secondary, of spiral striae, which continues over the primary sculpture of radial riblets. After one whorl at a point adjacent to the termination of the Nectoconch (Nepioconch), there is a sudden widening of the shell. From here the whorls continue to increase, and from somewhere in the same vicinity also radial striae commence. These radial striae gradually become stronger until they dominate the secondary spirals. They may also be observed on the radial riblets. There is then in this shell a definite neanic or juvenile

stage following the Nepionic stage which is not itself represented by definite sculpture. The appearance, as in the last species, is more in the nature of a transition from one form of sculpture to another. Another feature of this shell is the gradually weakening of the initially dominant spiral sculpture and the strengthening of the radials, particularly in the adult.

The Charopid protoconch reveals three features: a nucleus, a Nectoconch of more or less uniform sculpture, and a Nepioconch consisting of a varix or other evidence of metamorphosis from the embryo. There is then a juvenile stage which may be called the Anneatoconch where it is defined, and finally an adult phase. The adult sculpture often exhibits each of the different forms of sculpture found in varying combinations. The juvenile has usually simpler sculpture or combinations. In some instances there appears a tendency for the juvenile sculpture to be weak or obsolete, or even absent altogether, but the adult sculpture almost always has a reasonable degree of strength. In this work the aim is to assist identification, hence some importance is given to the different types of protoconch sculpture. It would be dangerous to assume that the protoconch should take precedence in assessing the value of the various features, moreover, one feels that the true value of the features of sculpture, etc., are not yet well understood in these tiny shells.

The following genera may be divided into series according to the nature of the protoconch. Thus three series may be recognized:

Series A—Shells which have concentric protoconch sculpture.

Series B—Shells which have no protoconch sculpture.

Series C—Shells which have radial protoconch sculpture in which 1, apertural dentition is absent; 2, apertural dentition is present.

Series A—Protoconch Sculpture Concentric

Roblinella Iredale 1937: This type of sculpture influenced Australian workers to use the genus *Alladiscus* Pilsbry. However, Iredale has shown that this procedure was incorrect and genera have been set up to replace this usage, *Roblinella* has a large protoconch sculptured with spiral striae. The adult sculpture consists of regular fine radial striae, often with the interstices smooth. However, the species *R. mathinnae* Petterd 1879, is described as possessing striately reticulate interstices, while *R. speranda* Iredale 1937 has finely striate interstices. Most species are southern but there appears to be a North Queensland representative in *R. intermedia* Odhner 1917. The type of the genus is *R. roblini* Petterd 1879.

Distribution: Tasmania, Victoria, South Australia, N. Queensland.

Luinodiscus Iredale 1937: Iredale remarked regular fine radial sculpture, wide umbilicus, small thin mouth, and spirally lirate protoconch. Later (1939) he added, "while the type of *Luinodiscus* is a small shell, other species, referred for the present to this group, are large and more bulky."

In this group the spire may be slightly raised; one species, however, having a concave protoconch, was separated by Iredale (1939) under a subgeneric title *Corinowala* already referred to in an earlier section. This helps to illustrate the inter-relationships which exist in this group and that all the features will need to be carefully valued before stability can be achieved. The type of *Luinodiscus* is *L. cupreus* Cox 1868, and all species are from Western Australia. Iredale remarks that most Western Australian species have concentrically striate apical whorls, which vary from verging on lirae in *L. cupreus* Cox to almost smooth in *L. sublestus* Benson 1853.

Distribution: Western Australia.

Pillomena Iredale 1933: These small thin shells have an adult sculpture of numerous fine evenly-spaced radial riblets, while the protoconch is microscopically concentrically striate, the umbilicus is small narrow and deep. The type *P. meraca* Cox and Hedley 1912 has the apical whorls slightly elevate; other species have these whorls slightly sunken. The species *P. daudenongensis* Petterd has a large umbilicus, half the diameter of the shell. The species *P. scindocaturacta* Gabriel 1930 has "microscopic radial riblets . . . visible to the extreme apex", and it has thus apparently both spiral and radial sculpture on the protoconch, the concentric being extremely fine. The habitat of this species near the waterfalls at Lorne in the high rainfall Otway area, is related to that of other species which are mountain forms, one being from 4,500 feet on Mount Kosciusko, but there is also *P. acmula* Tate 1884 from Penny Springs, George Gill's Range, Central Australia. Some species have a tendency towards decussate interstitial sculpture.

Distribution: Victoria, South New South Wales, Central Australia.

Oreomava Iredale 1933: A genus of small shells with sculpture of fine close radial ribs, with their interstices decussate, a concentrically lirate protoconch, imperforate or subimperforate, with slightly elevate spire. The type is *O. otwayensis* Petterd 1879. Petterd recorded from Tasmania the var. *alpina* Johnston (ms.), but that was a much larger shell differing in other ways, too, so it was named *O. johnstoni* Iredale 1933, the epithet *alpina* being preoccupied. The third species is *O. cannaflumatilis* Gabriel 1929, a shell with fewer ribs and a small umbilicus.

Distribution: Victoria (Cape Otway; E. Gippsland); N.W. Tasmania.

Series B—Protoconch Smooth

Discocharopa Iredale 1913: The type of the genus is *D. exquisita* Iredale from Kermadec Islands. The shells are very small, discoidal, with planate spire, and the sculpture of close fine regular rib-striae with finely striate interstices. The apex is noticeably large and smooth. Iredale (1937 b) states that the Tasmanian species, *D. bassi* Legrand 1871, agrees closely with the type, conchologically. This shell is figured by Petterd and Hedley (1909, page 289, text fig. 16). Some southern shells, apparently congeneric, appear to differ in some respects. *D. insularis* Cotton 1939 from Reevesby Island, South Australia, is an example, the figure showing a very different shell from *D. bassi* Legrand. The species *D. inexpectata* Gabriel 1947, appears nearer typical and probably belongs to this genus, as also perhaps does *D. problematica* Gabriel 1947, which, although very much larger than is usual in *Discocharopa*, agrees in other respects.

Distribution: Tasmania, Victoria, South Australia (Reevesby Island), Central Australia, Queensland (Bundaberg).

Elsothera Iredale 1933: This genus was introduced for shells with a minute umbilicus, fine sculpture, and subglobose form. Iredale (1939 b) remarks the apex apparently smooth, observing that in South Australian shells, the umbilicus was more open, the sculpture bolder. The form of *Elsothera* is very distinctive, so that although two series at least seem recognizable, they do not appear generically distinct on present knowledge. The typical form of the shell is rounded above but flat on the apex, with the rounded aperture oblique. The type is *E. sericata* Pfeiffer and the series with this includes *E. inusta* Cox, *E. birstracta* Mousson, *E. ricei* Brazier, and, with slightly more noticeable umbilicus and sculpture, *E. reteporoides* Tate and *E. mesana* Iredale. An interesting species, *E. colliveri* Gabriel 1947, appears to be correctly placed in this genus, but the sculpture is much bolder than in the typical series although other features would associate it there. It is at once both distinctive in itself, and a seeming link between the two series.

The second series has the form similar, but the sculpture bolder, the umbilicus larger, and appears to include the species *E. murrayana* Pfeiffer, *E. submurrayana* Cox and Hedley, and *E. funerea* Cox. Two Victorian species, *E. illustra* Gabriel 1947, and *E. sturoyensis* Gabriel and Macpherson 1947, have similar form but even bolder sculpture and wider umbilicus. These may belong to a new group but could be associated with the above second series if future interpretation held these as distinct, otherwise they can remain in *Elsothera* only temporarily if at all.

Distribution: South Queensland, New South Wales, Victoria, South Tasmania, South Australia.

Torresiropa Iredale 1933: The type of this genus, *T. spaldingi* Brazier 1876, has sculpture of irregular oblique rugose striae with smooth interstices, and a wide umbilicus. It is a translucent, whitish shell of three and one half whorls. One other species, *T. mello* Iredale 1933, is included.

Distribution: Cape York and the Islands of Torres Strait.

Series C—Protoconch Sculpture Radial

Allocharopa Iredale 1937: Iredale's definition indicates planate, widely umbilicate shells, like *Discocharopa* but not so flat, with both the adult and protoconch sculpture regular fine radials. The secondary or interstitial sculpture consists of decussate striae. In the type, *A. brazieri* Cox 1868, this sculpture is fine with the spirals stronger than the radials, while in the species, *A. torrevillensis* Gabriel 1930 and *A. erskineusis* Gabriel 1930, the radials are the stronger. The species *A. hershawi* Petterd 1879 has strongly decussate interstices, while *A. legrandi* Cox 1868 and *A. belli* Cox 1868 appear to have no interstitial sculpture.

Distribution: Tasmania, Victoria to Mid. New South Wales.

Charopa jemmysensis Gabriel 1947: This shell is dealt with separately here, for while the protoconch sculpture is radial, it is not otherwise close to *Allocharopa* and will not fit satisfactorily into any other known genus, although there are affinities worth discussing.

The shell is depressed, the spire slightly sunken, the umbilicus wide and shallow; the aperture is slightly oblique, rounded below and a little flattened above the periphery. The protoconch sculpture is of fine radial ribs; the adult sculpture is of spaced, prominent radial ribs, the interstices of which are very finely striately reticulate.

Gabriel observed the rather similar sculpture of *Kaanaropa subrugosa* Legrand (Brazier ms.). There does appear to be a similar arrangement, the sculpture being of bold primary "striae", the secondary being very fine. The spire is, however, raised, the umbilicus exceptionally large, while there is a marked depression on the last whorl near the aperture. *Kaanaropa* as at present defined, applies only to its type, *K. subrugosa*, in this case the relative value of sculpture and form, here rather unusual, has to be assessed. *Egilodonta burnsdalensis* is also not unlike *C. jemmysensis*, having rather bold sculpture and protoconch sculpture radial. In this case, however, there are apertural lamellae in addition to some difference of form. The genus *Egilomen* includes a series of shells of bold sculpture, most of which have the apex concave, so that they were dealt with on that basis in this work. In fact, however, the type has a slightly raised apex and *Egilodonta* may be compared. There is an association of fine and coarse ribs and wide umbilicus, but the protoconch is smooth.

Thus the study of such a shell as *C. jemmysensis* Gabriel raises the question of the true value of such factors as protoconch sculpture, apertural lamellae, furrowed whorls, or for that matter other fine differences of form. These factors require intensive study.

Protoconch Sculpture Radial, Aperture Dentate.

Egilodonta Iredale 1937: Although the apex is prominent it is flattened above and not really convex as in *Pernagera*. The protoconch sculpture has been described above when dealing with growth stages, it consists of fine radial riblets while the tip of the apex seems smooth, recalling *Pernagera*. However, apart from these very general resemblances in the protoconch, there are no real affinities of other factors.

The adult sculpture of sharp distinct radial ribs, with fine radial riblets crossed by microscopic striae in their interstices, has also been described above. The shell is very fragile, the umbilicus wide, the aperture rounded and with a "long entering palatal lamella and a short basal lamella". The type is *E. bairnsdalensis* Gabriel 1930.

Distribution: South-eastern Victoria.

KEY TO THE GENERA OF GROUP (*b*), THE PLANATE GENERA

Shell with spire planate, aperture not dentate.

Protoconch spirally striate or lirate.

Adult sculpture regular radial striae.

Interstitial sculpture absent or obsolete, umbilicus moderately wide, apex large .. .. *Roblinella*

Interstitial sculpture absent, umbilicus wide, deep, protoconch lirate *Luinodiscus*

Adult sculpture fine radial riblets.

Interstitial sculpture extremely fine, umbilicus small, narrow, protoconch obsoletely striate .. .. *Pillomena*

Interstitial sculpture minutely decussate, umbilicus absent or very small, protoconch lirate .. .. *Oreomarva*

Protoconch smooth.

Adult sculpture close, fine, radial rib-striae.

Interstitial sculpture fine striae, umbilicus very wide, shallow, apex large .. .. *Discocharopa*

Interstitial sculpture absent or decussate, umbilicus minute, apex roundly elevate .. .. *Elsothera* 1

Adult sculpture close, strong, radial riblets.

Interstitial sculpture decussate, umbilicus small, apex roundly elevate .. .. *Elsothera* 2

Adult sculpture irregular oblique, rugose striae.

Interstitial sculpture absent, umbilicus wide, apex slightly raised *Torresiropa*

Protoconch radially ribbed.

Adult sculpture fine, close, radial rib-striae.

Interstitial sculpture decussate striate, umbilicus wide and deep *Allocharopa*

[Adult sculpture bold, spaced, radial ribs.

Interstitial sculpture reticulate striate, umbilicus moderately wide, shallow .. .. *Charopa jennysensis* Gabriel]

Spire planate, aperture dentate.

Adult sculpture wide spaced, fine radial ribs.

Interstitial sculpture fine radials, faint spirals, umbilicus wide, apex prominent .. .. *Egilodonta*

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EXHIBITS AT THE DECEMBER MEETING

Marine shells from Heron Island, Great Barrier Reef, by Messrs. T. H. Sarovich and C. J. Gabriel. These included *Astraea aureola* Hedley, *Cypraea helvardi* Iredale, *Cymbiola pulchra* Sowerby, *Strombus lambis* Linn., *Ianthina violacea* Bolt, *Haliotis asinina* Linn., *H. ovina* Gmel, *Conus textile* Linn., *Corbis fimbriata* Linn., *Pinctada margaritifera* Linn., *Tellina lata* and *Amoria caroli*.

Orobanche cernua var. *australiana* F. Muell., by Mrs. S. I. Bayley. This is the Broom Rape, a root parasite rare in Australia, but it is in considerable numbers on her property at Kalorama, Mount Dandenong.

Garden-grown Australian native plants, by Messrs. A. E. Brooks and A. J. Swaby. Of these, Mr. Brooks strongly recommends *Melaleuca pulchella* for adaptibility to any soil and for long flowering period, from November to September.

Insects related to the topic for the evening:

By Mr. A. Neboiss—a drawer of Trichoptera (Caddis-flies), all Australian, some rare and several almost certainly new species.

By Mr. A. N. Burns—three specimens of the archaic Big Bladder Cicada, *Cystosoma saundersii* Westwood and cast skin of nymph, from Montville, Queensland; three specimens of the rare *Argiolestes chrysoides* Selys (Zygoptera) from Montville, rediscovered after a lapse of 40 years; two males, three females and cast skin of pupa of rare Lycaenid butterfly *Pseudamenas chlorinda burringtonensis* Waterhouse, the only previous specimen of which had consisted of four wings found on the snow many years ago; four specimens of *Heterithone fulva* (?), Neuroptera, Ithonidae, from Stradbroke Island, Queensland, the larvae of which feed on grubs of a cockchafer beetle; and a local race of the Sword-grass Brown Butterfly (*Tisiphone abeona ravensleyi* Waterhouse), found only in the Palmwoods-Gympie rain-forest areas.

NATURALISTS' NOTEBOOK

(Reserved for your Notes, Observations and Queries)

BLUE-TONGUED LIZARDS AND INSTINCT

This happened quite some time ago, but it is worth while putting it on record before it is lost with the passing of the years. It was in about 1928, and the scene was by the railway line at Buninyong, eight miles south of Ballarat, where a boy and a large collie dog were setting out on a ramble to the Union Jack Forest about a mile from the township. The dog pounced on a large Blue-tongued Lizard, caught it up, and, with a toss of the head, killed it by wrenching it in two. Four fully-developed young lizards fell to the ground from their unfortunate mother. They certainly had not been born, for there was still some membranous tissue adhering to them. They

were not harmed and were quite active, and, when the boy proceeded to gather them up, they greeted him by opening their mouths wide, spreading their blue tongues, and hissing strongly—exactly as do adult "blue-tongues".

That was an outstanding example of hereditary knowledge or instinct, and consideration of the incident might provide a clue as to a possible contributing factor to the bushman's belief that some reptiles swallow their young when danger threatens.

—N. A. WAKEFIELD

[This section of the *Naturalist* has fallen away in recent months, owing to lack of contributions from readers. If you think it worth continuing, use it as a medium for sharing your thoughts and experiences with others, and make the "Naturalists' Notebook" once more a feature of your journal.—Editor.]

ERRATA

(*Vict. Nat.* Dec. 1955, p. 127):

Line 4, for "*Kockia*" read *Kochia;* line 12, for "Australian" read Australasian; line 14, for "desideratiou" read desideratum; line 37, for "protein" read protean.

WHAT, WHERE, AND WHEN

F.N.C.V. Excursions:

Sunday, January 15—Botany Group Excursion to Ferny Creek. Subject: Fern Gully vegetation. Leader: Mr. K. Atkins. Take 8.55 a.m. Ferntree Gully train, then Olinda bus. Alight at Sherbrooke Junction. Bring one meal.

Saturday, January 21—River Excursion. Leader: Mr. Dickens. Boat leaves Princes Bridge, 2 p.m. Fare, 5/- adult; 2/- children. Tickets from Excursion Secretary or on the boat.

Saturday, February 4—Geology Group excursion. Subject: Silurian Structures. Leader: Mr. McInnes. Meet at Tooronga Railway Station, 2 p.m.

Saturday, February 11—Botanic Gardens. Subject: Pond Life. Leaders: Microscopical Group. Meet 2.30 p.m. at Lake edge near Kiosk. Bring hand lens and a jar.

Group Meetings:

(8 p.m. at National Herbarium).

Wednesday, January 18—Microscopical Group.

Wednesday, January 25—Botany Group. Dicotyledons, by Mr. Atkins.

Wednesday, February 1—Geology Group. Holiday Reminiscences.

Preliminary Notice:

Sunday, February 19—Parlour coach excursion to Upper Yarra Dam. Leader: Mr. Jennison. A guide will also be provided by the M.M.B.W. Coach leaves Batman Avenue, 9 a.m. Fare, £1. Bring two meals.

MARIE ALLENDER, Excursion Secretary

The Victorian Naturalist

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PROCEEDINGS

About 75 members and friends were present at the General Meeting held at the National Herbarium on Monday, January 9, 1956. The President announced that the 1955 award of the Australian Natural History Medallion had been made to one of our Club members, Mr. S. R. Mitchell.

Mr. F. S. Colliver was welcomed as a visitor, and comment was made upon his wonderful service to the Club in the past, as Secretary. He conveyed greetings from the Queensland Naturalists Club and invited Victorian naturalists to attend meetings should they be in Brisbane at the appropriate time—the second Monday in the month.

Mr. Colliver then gave the Meeting a talk entitled "Here and There in Queensland", illustrating it with lantern slides. He dealt with a great number of localities and touched on points of interest, mainly in the fields of geology and meteorology. Of particular interest was the story of the discovery of the footprints of a dinosaur at Albion. Mr. Colliver was thanked by the President, who remarked that it was such enthusiasts who so assist mankind by their contributions to science and knowledge.

Mrs. B. M. Doughty and Mr. F. G. Swindley were elected as Ordinary Members of the Club; and the President extended them a cordial welcome.

Mr. E. T. Muir, a Country Member from Dimboola, was welcomed to the Meeting. He spoke of the recent formation of a Wimmera Naturalists Club, and gave details of the history of the reservation of areas as a sanctuary for the Lowan.

Mr. N. A. Wakefield commented on the new F.N.C.V. fern book, mentioning several complimentary letters which had been received from officials of other naturalists clubs; and he told of a proposal by the Traralgon people to form a local Field Naturalists Club there.

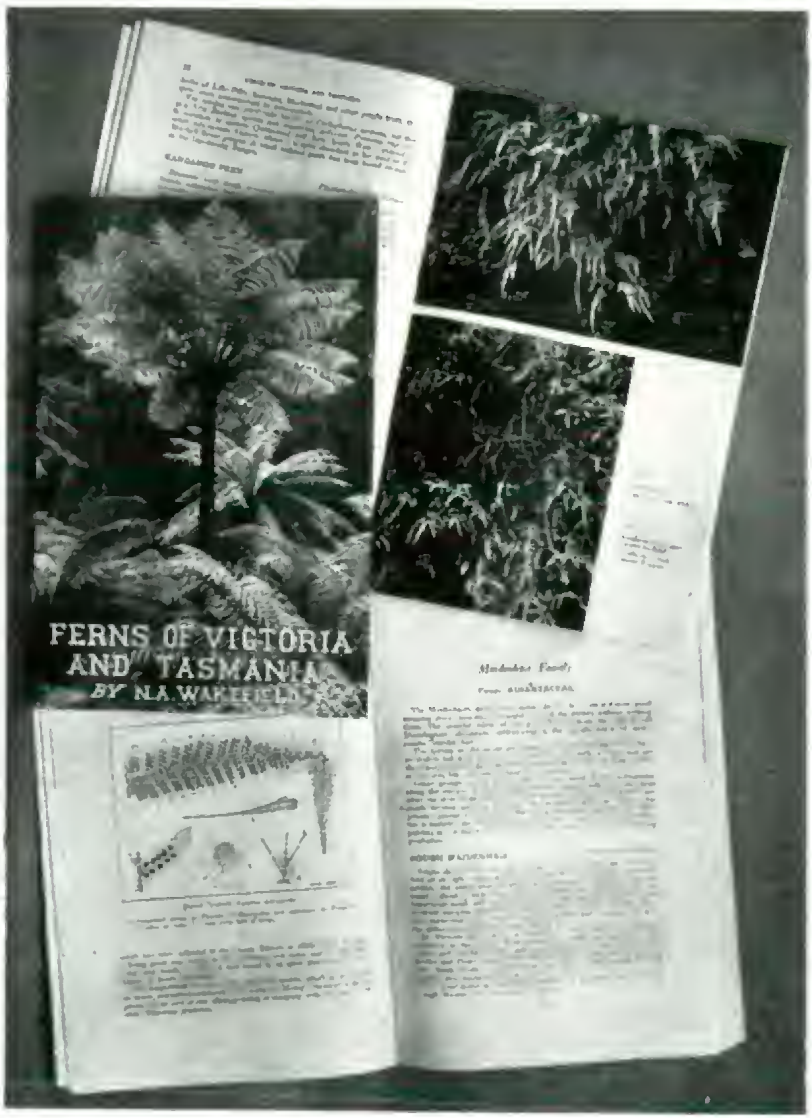
The Meeting was then adjourned for the usual conversazione and examination of exhibits.

KODACHROME SHOW

On behalf of the Native Plants Preservation Society of Victoria, Mr. Crosbie Morrison will show slides selected from the work of photographers who search the byways for beauties of the bush. These slides come from several districts, but there has been some emphasis on Gippsland, with some of Mr. Morrison's views of Wilson's Promontory.

The show will be held in the School Hall, M.C.E.G.G.S., Anderson Street, South Yarra, at 8 p.m. on Wednesday, March 14. Admission 2/-.

PLATE V



The F.N.C.V. Fern Book

REVIEW: "FERNS OF VICTORIA AND TASMANIA —BY N. A. WAKEFIELD"

The new fern book, produced in December 1955 by the F.N.C.V., is now available for general distribution. Details of the publication are contained in the following extracts from the preface:

In 1934 the Field Naturalists Club of Victoria published the handbook entitled *Victorian Ferns*, and thereby opened the way for nature lover and student to make a knowledgeable acquaintance with fern species likely to be met with in the State.

The new book has been more durably bound and a stiff cover has been provided. This is the first book of its kind to be produced by the F.N.C.V., and it represents an ambitious project for a natural history club of limited financial resources. During its preparation there has been close liaison with the Victorian Education Department, resulting in the book being recommended for use in connection with school nature study.

The original handbook dealt with 73 local species, and it included also a few which are now known to have been erroneously recorded for Victoria. Subsequently, no fewer than 18 species were added to the official list for the State, a few by revisionary studies of certain groups but the majority by their discovery in remote parts of the State, mainly in the far east. The scope of the present book has been further enlarged, first by the addition of groups of fern allies and secondly by the inclusion of the several species necessary to make the work comprehensive of the *Pteridophyta*, or "fern flora", of Tasmania as well as Victoria.

The chapters are arranged, mainly according to families, in easily recognized groups. The description of each species is worded as simply as possible, and an accurate account is given of the places it favours, districts in which it is found and its complete geographical range. No "key" has been included, for every species is figured in the text illustrations with sufficient detail for correct identification.

In preparing the illustrations for the book, use has been made of several of the sets of drawings by the late H. B. Williamson. Some others of the text illustrations appeared in the *Victorian Naturalist* during recent years, accompanying revisionary studies of groups of Victorian ferns. The remainder were drawn for the present work. As far as was practical, species were illustrated in their natural groups; where this is not so, appropriate reference is made in text and caption.

In overall measurement this book has been made a little larger than the F.N.C.V. publications of the past, the purpose being to display to much better advantage the half-tone illustrations.

Ferns of Victoria and Tasmania comprises 77 pages of letterpress and text illustrations, together with 15 pages which show an aggregate of 30 photographs averaging about 5 by 4 inches in size. The overall measurement of the book is 9 by 6 inches, and the style of production may be seen in the accompanying photograph of the book and samples of its pages. It is moderately priced at 7/6 and may be obtained from leading booksellers, or by mail order (post free) from the Honorary Editor, *The Victorian Naturalist*, P.O. Box 21, Noble Park, Victoria.

THE LIFE AND WORK OF HERBERT WARD WILSON

O.B.E., M.C., C. de G., M.Sc. (29/9/1877–1/10/1955)

By F. C. Elford

By the passing of Major Wilson on October 1, 1955, the Field Naturalists Club was bereft of one of its oldest members and of one of its most distinguished and colourful personalities. Directly and indirectly, during his forty-seven years of membership, he aided the Club, as well as other naturalist organizations, probably more than any other individual during this century. As one who was privileged to know him personally and intimately during the last thirty years of his life, I consider it a very great honour to be able to prepare this record of his service to natural history, and present it as an example to present and future members of the good that can emanate from an individual of high ideals who works assiduously and unobtrusively for the benefit of his fellow men, and in furthering an appreciation of native fauna and flora.

AS A YOUNG NATURALIST

Herbert Ward Wilson was born on September 29, 1877, at Bradford, Yorkshire, England. At the age of six he migrated with his family to Adelaide and, two years later, to Melbourne. The family finally settled at Dimboola, then the end of the railway line, and Wilson senior became established as one of the pioneer farmers and builders of the district. Thus, it was on the frontiers of settlement in the Wimmera that Herbert Ward made his first acquaintance with native flora and fauna. Nature-study was not a subject of the school curriculum in those days and no reference books were available. But Wilson had an innate interest in all things natural and, by first-hand observation, acquired much of that wealth of nature knowledge that was the foundation of his future career.

Before formally joining the Education Department on February 13, 1894, Wilson served as a monitor, or "pupil teacher not attached", at the Dimboola school. His first twelve years in the Department were served in various city and country schools. Some of the latter were in very remote areas, access being by bullock-dray and, once there, it was well-nigh impossible to leave while winter rains made roads impassable. But young Wilson was undaunted, in fact such adventures served only to challenge his pioneering spirit and provide opportunities for his exploration of the great unknown.

AS A PIONEER IN NATURE-STUDY

While at Allenby South, Mount Taylor, and Raymond Island, Wilson received great help and encouragement, particularly in his botanical studies, from H. B. Williamson—one of the pioneer teacher naturalists of this State. Reference books, particularly those dealing with insects and birds, were practically non-existent.

Sleeman's *Ten Lessons on Plant Life* and, later, books by Wm. Gillies and Robert Hall, were almost the sum total available. However, when the nature-study movement in elementary schools began in 1900, Wilson was more than well prepared to take advantage of opportunities that were to come his way.

Probably because of its very active Naturalists' Club, Geelong was selected as the centre of the first Schools' Nature-study Exhibition in 1905. Frank Tate was then at the helm as Director of Education. J. A. Leach had been appointed Organizing Inspector of Nature-study. As a result of the success of this exhibition in fostering the teaching of nature-study, further exhibitions were organized in other inspectorates. In 1906, Bairnsdale was chosen as the site. Wilson was then Head Teacher at Raymond Island, and, at the same time, was furthering his studies at the Bairnsdale School of Mines. The Raymond Island exhibit attracted considerable attention, chiefly because of the manner in which it was organized to show the application of nature-study to the fishing industry of the island inhabitants.

The best exhibits from each inspectorate were gathered in Melbourne for the State Schools' Exhibition held in the Exhibition Building. A most significant decision was made by the Bairnsdale Teachers' Association—they selected Wilson to take charge of the Bairnsdale Court. Thus, he had the opportunity to further demonstrate nature-study as applied to local industries—fishing, timber, dairying, etc. His organization of the Bairnsdale district exhibit attracted widespread attention, and Director Tate, in particular, was most impressed by this new approach to the teaching of nature-study. No longer was it necessary for nature-study to beg respect as a school subject.

It was not surprising that Wilson, in 1907, was selected as one of "the insects"—teachers (ten from Victoria, two from South Australia and two from Western Australia) chosen to undergo a special course of training in nature-study at Melbourne Teachers' College under the direction of J. A. Leach. To Wilson this was a wonderful adventure, especially his meeting with the outstanding naturalists of the day—Baldwin Spencer of the University, T. S. Hall of Geelong, Dunn of the Geological Survey, and C. C. Brittlebank of Bacchus Marsh. Although, unlike other members, he had not the advantage of prior Teachers' College training, Wilson completed the course at the head of the class, and, as a consequence, was selected to assist and understudy Leach as a lecturer at the Teachers' College.

AS ASSISTANT TO J. A. LEACH

Leach was a brilliant scholar who, at this time, had graduated M.Sc., and was working on the thesis that was to gain him a doctorate. He was an organizing genius, had unlimited drive and energy for hard work, and a passion for exactitude. But Wilson had

identical aptitudes, and was equal to the responsibilities now thrust upon him. I have every reason to believe that clashes occurred between these two great personalities, but it is to the credit of both men that these did not prevent the successful accomplishment of the colossal projects they undertook and for which naturalists have since been, and always will be, intensely grateful. Wilson often referred to this period of his life (1908-14) as one which almost killed him, and one during which Leach's health was so undermined that it resulted in his premature death at 59 in 1929.

Although Wilson passed the Matriculation Examination in December 1896, he did not sign the Matriculation Roll until 1910 and become eligible to undertake a degree course at the University. However, for reasons I was never able to discover, in 1908 and 1909 he undertook and successfully completed the first and second years of the course for the Diploma of Agriculture (for which formal matriculation was not essential), gaining honours in Agricultural Botany. Ten years were to elapse before he had the opportunity to complete his university studies. But, in addition to studies in 1908 and 1909, he had other work to perform, as will be seen from the following summary.

In 1908, Wilson assisted Leach in compiling "A Descriptive List of the Birds Native to Victoria, Australia", published as Circular of Information, No. 12, as a supplement to *The Education Gazette* of 16/12/1908. In the following year, he assisted in the preparation of the illustrations for the articles on birds which appeared as a series in *The Education Gazette*. During the next two years, he superintended the paintings of birds for the colour plates, and assisted in preparing half-tone illustrations, for *An Australian Bird Book* which Leach published in 1911. Wilson was also responsible for seeing this book through the press. Those who realize how the illustrations were obtained from mounted specimens, and how the photographs had to be arranged in each plate to show comparative sizes as accurately as possible, will appreciate the amount of work involved. Although Leach acknowledged Wilson's assistance in other publications, for some reason which I was unable to determine definitely, he made no reference to Wilson's work in the preparation of the bird book. Having seen much of the preparatory material (in fact I still have some of it in my library), there is no doubt in my mind as to the magnitude of Wilson's contribution in this publication.

By the end of 1908, Wilson had been admitted to membership of the Royal Australasian Ornithologists Union, the Bird Observers Club, the Microscopical Society, and the Field Naturalists Club of Victoria. At the Adelaide Congress of the A.O.U. in 1909, he was appointed Honorary Secretary and, subsequently, became responsible for the organization of the 1910 Congress at Brisbane when the Union received its Royal Charter and the Articles of

Association were amended to provide for a committee and local secretary in each State. Owing to ill health, he resigned from the secretaryship in June 1911.

Wilson's greatest contribution to Australian ornithology arose from his membership of the B.O.C. It was his organizing genius and tireless efforts that resulted in the successful foundation of the Gould League of Bird Lovers in Victoria, and the subsequent

Herbert Ward Wilson, 1877-1955

establishment of leagues in other States. It must be remembered, of course, that Leach was a tower of strength in all these natural history organizations during this period. But, in Wilson, he had an able and indispensable assistant in all of these spare-time activities, as well as in official duties at the Teachers' College. For example, although Leach was the first Honorary Secretary of the Gould League, Wilson was the Organizing Secretary who saw that

things were done. One of his most treasured possessions was a copy of Campbell's *Nests and Eggs of Australian Birds* presented to him by the B.O.C. and bearing the following inscription: "To H. W. Wilson, from members of the B.O.C., in recognition of assistance rendered in the successful formation of the Gould League of Bird Lovers of Victoria, September 21, 1910."

It was at this time, too, that Wilson began to take a friendly personal interest in any youngsters who displayed a keenness for natural history, and young bird observers, in particular, received his encouragement and expert guidance. Littlejohns and Lawrence, of lyrebird fame, were two such persons. As will be mentioned later, many prominent naturalists were to receive inspiration and assistance from Wilson, and, in this direction, his indirect contributions to natural history are inestimable.

Arising from the Education Department's Summer School which Leach and Wilson organized at Portsea in 1911, and which was attended by some 400 teachers, Donald Macdonald's Nature Notes became a regular weekly feature in *The Argus*. At the Teachers' College, Wilson prepared specimens for photographing, and took many original photographs to illustrate the numerous articles and notes by Leach in *The Education Gazette*. He visited schools and gave demonstration lessons for teachers. He answered innumerable items of correspondence on specimens sent in for identification by teachers throughout Victoria. At the same time, he lectured in nature-study and the art of teaching to all classes of students. Those doing University courses including botany, zoology and geology, were tutored by him, and so successful were these students and so great was Wilson's prestige as a teacher that, to the trainees of this pre-World War I period, he was familiarly known as "Prof. Wilson" or "The Prof.".

AS A NATURALIST AT THE FIRST WORLD WAR

Many know that in World War I Wilson became a major, and they have a vague idea that he had something to do with gas warfare. Few realize that, during the 1915-18 period, Wilson did things in war no less stupendous than those he had done to date in peace-time.

Enlisting in his 38th year on March 11, 1915, as a private, Wilson left Victoria in June and served at Gallipoli, in Egypt, and in France. He returned home in May and was demobilized in July, 1919, as a major with a Military Cross, an Order of Officer of the British Empire, the Croix-de-Guerre *avec Palme*, two Mentions in Despatches, the 1915 Star, General Service Medal, and the Victory Medal as his honours and decorations. From Gas Officer of the 5th Division Headquarters he became Chemical Adviser to Anzac Corps H.Q., and was finally transferred as the only Aus-

tralian officer to the permanent staff of the British 5th Army H.Q. under General Birdwood.

Two books which accompanied him throughout the war were *An Australian Bird Book* and Gadow's *The Wanderings of Animals*. His reputation as a naturalist was widespread among the Diggers. At Gallipoli and in Egypt and France, "Old Stinks", as he was popularly known, was eagerly sought when any specimen was found. Troops would gather at his tent for discussions. He gave popular lectures to H.Q. staffs. Birdwood, having served in India, was very interested in the flora and fauna of that country, and nature-study was the means of fostering a close friendship between him and Wilson. The Field Marshal was the proud possessor of a copy of *An Australian Bird Book* he received from Wilson, and the two exchanged greetings at Christmastide until the former's death. One of Wilson's great disappointments was his inability to accept an invitation from Birdwood to visit the home of a famous English naturalist. Wilson was aboard ship about to leave England when he received the invitation.

Following the Armistice in November 1918, Wilson organized an Agricultural Chemistry School at Lille for officers and N.C.O.s and, early in 1919, acted as Commandant of a Special Conference of Soldier Teachers of the Dominions which was held in London under the auspices of the League of Empire. He visited many universities and teachers' colleges in England and Scotland, making a study of the organization and teaching of biological science and geography. He established a close friendship with Professor Ashworth of the University of Edinburgh and, after his return to Victoria, procured, preserved and despatched to the professor specimens of the giant Gippsland earthworm and of *Lepidurus*.

On his way home from England, Wilson made a collection of plankton by trawling from the liner. The results of this work were presented in a lecture to the Microscopical Society. Frederick Chapman, a world authority on these lowly forms of marine life, expressed amazement at the large number of forms collected.

AS A TEACHER AND SCHOLAR

Resuming his work at the Teachers' College after the war-time interruption of just over four years, "The Major", as he now became to almost everyone for the rest of his life, again teamed with Leach and assisted him with the preparation of, and ultimately the publication of, *Australian Nature Studies* in 1922. In 1924, Leach was promoted to the position of Assistant Chief Inspector of Primary Schools and left the College. Wilson then became Lecturer-in-Charge of Nature-study and ultimately was promoted to a Senior Lectureship, which position he held until his retirement at the end of 1942.

But the post-war period was to provide more fields for the Major's talents. Although he did not return from the war until May 1919, and was not demobilized until July, he immediately grasped the opportunity to resume University studies after a lapse of ten years, even though the Academic Year had started in March. Transferring from Agriculture to Science, he qualified for the degree of B.Sc. at the end of the year, securing 2nd Class Honours in Botany Part III and 3rd Class Honours in Zoology Part II.

During the next three years, in whatever time could be spared from his College duties, he carried out research in botany. In 1922, he shared the MacBain Research Scholarship in Botany, and the results of his research ultimately formed the substance of a paper "Studies on the Transpiration of some Australian Plants, with Notes on the Structure of their Leaves", which was read to the Royal Society of Victoria in December 1923, and subsequently published in the Society's *Proceedings*. The Major was an Associate Member of the Royal Society for some thirty years. His thesis on transpiration was passed by the examiners for the degree of Master of Science and the Major graduated as a Master in December 1925.

When, from August 1923, until February 1924, Professor Ewart was granted leave of absence by the University Council to carry out investigations in the Northern Territory on behalf of the Federal Government, the Major took over the Professor's lectures in Botany Parts I, II and III. At this time he was Chairman of the Botany Sub-committee of the Schools Board and planned a new syllabus in botany for the Intermediate Certificate. He was also a member of the Schools Board Committee responsible for planning the first syllabuses in general science—a subject being introduced into secondary schools to replace the formal studies of physics and chemistry during the first four years of secondary education. The Major realized the importance of biological and earth sciences being incorporated in the science teaching in secondary schools. But it was to take nearly twenty years for general science to become fully accepted to the Intermediate Certificate standard in these schools.

In 1926-7, Wilson was on the panel of lecturers of the Workers' Educational Association (later to become the Council for Adult Education), and he also gave University vacation lectures in botany. Naturalists such as Edith Coleman, her daughter Dorothy, and Jean Galbraith were members of these classes and received the stimulus, guidance and encouragement, then and in subsequent years, which enabled them to make their outstanding contributions to natural history as recorded, for example, in *The Victorian Naturalist*.

In succession to Bishop Stephen Hart, the Major was appointed Lecturer in Botany at the Victorian College of Pharmacy and Examiner to the Pharmacy Board of Victoria in 1927. Thus, until

he resigned in September 1952, he had much to do with the training of pharmaceutical chemists for some twenty-five years.

In preparing his life story, one is inclined to emphasize all of the Major's achievements of his spare time. It must be remembered that his official duties were concerned with the training of teachers for a period of thirty years (1908-42), not including his four years of war service. His influence in the educational system of this State, and beyond, especially in the field of natural history, is completely beyond estimation. His skill as a teacher, the depth and breadth of his scholarship, his versatility of mind, as well as his marked individuality, his robust and unconventional personality, and his wise and kindly philosophy of life, were such that he made a spectacular success of his chosen profession. The successful teacher is he whose pupils furthest outdistance him. Thus, those who know the ultimate careers of the Major's pupils have no doubt of his success as a teacher and a trainer of teachers.

At the Teachers' College, he trained infant teachers in nature appreciation. For primary teachers, it was nature-study. For secondary teachers undertaking university courses, it was tutorials in botany and zoology. From 1924 until 1942, he was a member of the Method Staff of the University School of Education as Lecturer on Methods of Geography and the Biological Sciences. Thus, he held the unique position of combining scholarship with the art of teaching at all stages of the educational ladder from the kindergarten to the post-graduate stage. Surely he must be one of the last of the great all-round men who were more numerous until this modern age of specialization dawned.

In all his work he was a fundamentalist. He was not satisfied until he had sifted the grain from the straw. And the things that interested him most were fundamental structure-function relationships. But rather than being a mere materialist in such matters, the artist in him enabled him to appreciate the wonder and grandeur of the universal intelligence he found evidenced in all things. In all his work, he was not satisfied until he had shared this wonder and grandeur with others. That is why "The Major" meant something to all who knew him.

AS A GUIDE, PHILOSOPHER AND FRIEND

The Major's greatest service to his fellow men was probably the time and patience he devoted to individuals who sought his advice. His stimulus and encouragement, his sound advice and material assistance proved to be stepping stones in the lives and careers of these people. Relatively few men have used their talents so wisely and have given of them so fully and generously to make so many stepping stones for so many. Very few really know of the sum total of his contributions in this respect. I have mentioned already the

names of a few who found in the Major, a guide, philosopher and friend, and I hasten to make humble and respectful acknowledgment in this regard.

There are many medical practitioners whose introduction to the microscope at the hands of the Major steadied their faltering footsteps at the very start of their careers. The help and encouragement that he gave to ex-service students taking pharmacy after the Second World War was outstanding.

Then it must be remembered that during his years at the Teachers' College the Major was in charge of all students selected to undertake university courses. His wide cultural background and knowledge of all subjects made him an ideal counsellor for these students, irrespective of the courses they were taking. He had the knack of detecting a student's natural aptitudes and encouraged and directed students into fields of research, administration, lecturing, and other specialized careers if they were obviously better fitted for such vocations than for teaching. Thus, many who have reached leading positions in educational and scientific spheres will acknowledge the Major as their early counsellor. Professor Stephen Roberts, the noted historian and Vice-Chancellor of the University of Sydney; the late Dr. Charles Fenner, who was Director of Education in South Australia, and, at one time, assistant to Wilson at the College; Mr. A. Jessep, Government Botanist and Director of the Botanic Gardens, Melbourne; Dr. Donald Thompson, Research Fellow in Anthropology, University of Melbourne; Dr. B. J. Grieve, Reader in Botany, University of Western Australia; Mr. L. A. Thomas, in charge of the C.S.I.R.O. Experimental Station, Stanthorpe, Queensland, are but a few former College trainees who come to mind in this category.

David Fleay, probably our outstanding naturalist of today, was another of the Major's former students. The Major saw Fleay's place in the educational system of Victoria as a specialist teacher with a roving commission introducing our unique native fauna and flora to the youngsters of this State in a way which only Fleay could do. But the Major's visionary ideas did not find favour with the higher authorities and Fleay was lost to the teaching service. Today, a more enlightened administration provides for specialist teachers for forestry, the Young Farmers' Club, the Gould League, and other special educational activities.

Many other prominent members of the F.N.C.V., such as P. F. Morris, J. H. Willis and N. A. Wakefield, will acknowledge some interest, encouragement, or other form of assistance in their endeavours to the Major. He gave of his best to everyone who was trying to do something, great or small, for the good of humanity in the field of natural history. Miss Fletcher of Eaglehawk Neck, Tasmania, with her hand-painted Christmas cards depicting native wildflowers, and Miss Dorothy Coleman with her modelling powder

"Nucraft", are typical of people with relatively minor projects who received the Major's kindly advice and encouragement.

The Field Naturalists Club always had a special interest for the Major. And the Club interested him particularly because it covered the whole field of natural history. He believed in such broad interests. Furthermore, its members, like himself, believed in doing things that would benefit others without any thought of personal gain. The various publications of the Club always pleased the Major. Consequently, his support was always forthcoming. For many years he arranged for his students to give demonstrations with the microscope and to supply specimens for the exhibitions held in the St. Kilda Town Hall. During his retirement, he gradually resigned from membership of all the organizations to which he had subscribed for so many years. The one exception was the F.N.C.V., which received his support to the end.

The culmination of his life's work was the award of the FOURTH Australian Natural History Medallion in 1942, as the nominee of the F.N.C.V., "for his great work in furthering the knowledge of our Australian fauna and flora". He was justly proud of this most deserved award but accepted it with characteristic modesty from Mr. J. A. Seitz, Director of Education, at a meeting of the F.N.C.V. on September 13, 1943.

AS A MAN

Very few, even his closest friends, knew anything of the Major's private life. In view of the work he accomplished, it is difficult to imagine that he had any private life. But he had personal problems about which he said nothing. Yet, his private domestic achievements must surely be counted as his greatest. Only Wilson the Man really knew about these, for they were his own personal affairs.

It puzzled many of his students and friends that he had so little published work to his credit. The volumes of published contributions to science and to natural history which he helped others to write are stupendous. He was often asked why he did not write a book. He replied that he never had the time. But no one really understood the significance of his reply.

He did not spend his war years pioneering gas warfare unscathed. No one but himself knew the sufferings he experienced for the rest of his life as a result of the after-effects of gas "burns". His wife was a semi-invalid for most of his married life and finally became a total invalid for some years before her death shortly after his official retirement. The devoted and efficient manner in which, unaided, he nursed his wife, reared their son, and managed his household, while still carrying out his official duties and his numerous spare-time gestures of goodwill, could only be done by a man such as Wilson.

His son, Bruce Ward, graduated M.Sc. in Chemistry and is now a Research Officer of the C.S.I.R.O. Recently, he attended a conference in Arizona, U.S.A., with reference to the future possible use of solar radiation as a practical source of industrial and domestic power.

The Major enjoyed his retirement to the full. His interest in natural history and in his fellow men did not wane in any way. During the evening of his 78th birthday we discussed his health and his well-being for as long as he would allow. He was far more anxious to ask me about a number of things that interested him more—about a former trainee mentioned in *The University Gazette*, about Wakefield's new Fern Book being published by the F.N.C.V., and who pruned my roses this year. When I mentioned that I had finally succeeded in having an old petrological microscope converted for use as a biological microscope, with all the enthusiasm and interest of a boy being introduced to a microscope for the first time, he assured me that he would be seeing me to try it out as soon as the weather permitted. Two days later, on the morning of October 1, his son rang to inform me that the Major had passed away peacefully in his sleep.

May this brief record of a useful life serve as a guide to those who would aspire to be truly great.

AUSTRALIAN RAIN-FROG IN ENGLAND

(From *Country Life*, July 14, 1955)

Additions to the vertebrate fauna of this country (England) are always of interest, and the following account of the successful introduction of a small frog from Australia a few years ago is worth recording. Early in June 1951, twelve specimens of a small tree-frog were brought over by air from Melbourne and liberated in a garden at St. Ives in Cornwall. They were a species known as *Hyla ewingi*, Ewing's Tree-frog, and called by the people of south-eastern Australia "rain-frog", on account of its habit of calling when rain is about to fall.* The specimens brought over were not much more than half an inch in length, and were evidently born a year before. The garden in which they live has a small pond surrounded by vegetation, mainly bushes. For three and a half months after their introduction nothing was seen or heard of the frogs until on October 1, two were heard croaking. The call of this frog is a fast, bird-like note, but there is considerable variation in their voices, some being deeper in tone than others. They call only at night, but when several are in song together they may continue all through the hours of darkness. They are most noisy in March and April, but continue calling all through the summer, and there is not a month in which they have not been heard. Not only do they call when rain is about to fall, but when the breeding impulse is on them their croaking is almost continuous. In April 1952, the frogs bred and they have bred regularly every year since. Spawning occurs more than once in the season. At St. Ives it has been observed in February, March, April and May.

—Contributed by Miss J. W. Raff.

* Some children know this little tree-frog as the "wet-wet", a name suggested by the call itself as well as its forecasting of rain.—Editor.

NEW COMBINATIONS IN SOME AUSTRALASIAN FERNS—2

By N. A. Wakefield, Noble Park

PTERIDIUM YARRABENSE (Domin) comb. nov.

Basic Synonym: *Pteridium aquilinum* var. *yarrabense* Domin *Prod. Farnflora Queenslandz*: 161 (1915).

There are in Australia three well distinguished species of *Pteridium*. The widely distributed north-temperate and tropical *P. aquilinum* (L.) Kuhn occurs in north-eastern Queensland; it has very numerous, close pinnules, the upper edges of which are a little surcurrent along the rhachises; the vestiture is of very fine, whitish, woolly hairs; and the under surfaces of the pinnules are devoid of exudation. The Australasian and Polynesian *P. esculentum* (Forst.) Diels ranges from south-western Australia to north-eastern Queensland, Tahiti and New Zealand; it has fewer, rather distant pinnules, the lower edges of which are decurrent (usually forming long wings which finally become detached from the pinnules to form numerous free lobes on the rhachises); the vestiture is of stout, often bicolorous (reddish) hairs; and the under surfaces of the pinnules are pale, due to a covering of exuded substance. *P. yarrabense* ranges from Queensland to south-eastern Asia; it has decurrent pinnules but no free lobes, the vestiture is fine but hardly woolly, and there is no exudation on the under surfaces of the pinnules.

[The genus *Pteridium* comprises five species, the other two being *P. caudatum* (L.) Maxon of central American countries and *P. pseudocaudatum* (Presl) Maxon of central and South America.]

BLECHNUM COLENSOI (Hook. f.) comb. nov.

Basic Synonym: *Lomaria colensoi* Hook. f. *Ic. pl.* T.627-628 (1844).
Equivalent Synonym: *Lomaria heterophylla* Colenso *Tasm. Journ.* 2: 175 (1844); [non *L. heterophylla* Desv. (1811)].

The fronds of *B. colensoi* are always pinnate and are thick in texture, with the barren pinnae each about 2 cm. broad; and the stipes bear several free lobes or wings (up to 5 mm. long and with a base 1 cm. wide), the lower ones being progressively smaller. The typical form is endemic in New Zealand; the somewhat similar Fijian plant is probably a distinct species.

B. colensoi has hitherto been confused in New Zealand botanical literature with the Australian *B. patersonii* (R.Br.) Mett.; the latter however has fronds *simple* or pinnate, and thin in texture; the pinnae are narrower; and the stipes has continuous wings, not a series of free lobes. There is a Javanese plant which is similar to, if not identical with, the Australian *B. patersonii*.

HYPOLEPIS RUFOBARBATA (Colenso) comb. nov.

Basic Synonym: *Polypodium rufobarbatum* Colenso *Trans. N. Zeal. Inst. XVI*: 347 (1884).
Equivalent Synonym: *Polypodium viscidum* Colenso *Tasm. Journ.* 2: 164 (1844); [non *P. viscidum* Roxb. (1816)].

H. rufobarbata has the stipes and larger rhachises dark purple and bearing some large and many small reddish hairs; the leaflets are invested with numerous, small, erect, bristly hairs on both surfaces and usually on the margins too; the sori are unprotected. Apparently the whole plant is often quite viscid. The species is confined to New Zealand.

H. rugosula (Labill.) Sm., with which *H. rufobarbata* has hitherto been confused, occurs both in New Zealand and Australia, it has larger, broader fronds; its vestiture is sparse and of larger hairs; the rhachises have large, red tubercles; and the sori are somewhat protected by a reflexed lobe.

It is possible that *Cheilanthes ambigua* A. Rich. *Fl. N. Zel.*: 84 (1832) may apply to *H. rufobarbata*, but this cannot be determined from the pub-

lished description of the former, and reference to Paris indicates that no type specimen of Richard's species has been preserved.

[*CRASPEDOPHYLLUM ARMSTRONGII* (Baker) Copeland: In making this new combination, in *Genera Filicum*: 33 (1947), Copeland attributed it to F. J. Rae, who was then the Victorian Government Botanist. However, the placing of this species in the genus *Craspedophyllum* originated from a suggestion put forward by the present writer and communicated to Copeland through official channels by J. H. Willis, botanist at the National Herbarium of Victoria. The letter was signed by Rae as Director of that institution, but he had no specialized knowledge of the subjects discussed therein. In the circumstances, it is now suggested that Copeland be cited as the sole authority for the combination.

Although the combination *Craspedophyllum cheesemanii* (Baker) N. A. Wakefield was made in *Vict. Nat.* 66: 59 (July 1949), the author is now very doubtful as to whether this plant should be regarded as distinct from *C. armstrongii*.]

WHAT, WHERE AND WHEN

F.N.C.V. Excursions:

Sunday, February 19—Parlour-coach excursion to Upper Yarra Dam. Leader: Mr. Jennison. A guide will also be provided by the M.M.B.W. Coach leaves Batman Avenue at 9 a.m. and returns at approximately 8 p.m. Fare, £1. Bring two meals.

Saturday, March 3—Cheltenham Park. Leader: Mr. Brooks. Inspection of progress made in converting park into reserve for native flora. Meet at Cheltenham Railway Station, 2.15 p.m.

Group Meetings:

(8 p.m. at National Herbarium.)

Wednesday, February 15—Microscopical Group.

Wednesday, February 29—Botany Group. Native Noon-flowers, by Mr. Burke.

Wednesday, March 7—Geology Group. Geology in Colour.

Preliminary Notice:

Sunday, March 18—Parlour-coach excursion to Macedon and district with the Bendigo Field Naturalists Club. Leader: Mr. Robbins. Subject: Geology and General. Coach leaves Batman Avenue at 9 a.m. and returns at approximately 8 p.m. Fare, 18/-. Bring two meals.

MARIE ALLENDER, Excursion Secretary

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PROCEEDINGS

The hall at the National Herbarium was filled to capacity for the General Meeting of the Club on February 13 last.

The President introduced to the meeting Mr D. C. McDonald who had agreed to act as Honorary Secretary, and Mrs. F. Curtis who would act as Honorary Assistant Secretary. These officers were elected by acclamation.

Mr. and Mrs. Freame were elected as Honorary Members, in recognition of their long service to the Club, and their work in connection with the Hawthorn Junior Naturalists Club.

Mr. McDonald gave a short talk on bats, his interest in them having arisen from a meeting he had with Dr. Alwin Novack of Harvard University while on a recent visit to the Philippines.

Dr. G. Christensen spoke on Alpine Gardens and illustrated his talk with a series of excellent colour slides. A vote of thanks to Dr. Christensen was moved by Mr. F. Lewis, seconded by Mr. E. S. Hanks, and carried by acclamation.

Dr J. M. Agar of Geelong and Mr. W. Middleton of Forrest were elected as Country Members of the Club.

Exhibits included Fan Shells and Scallops by Mr. Gabriel, a rabbit skin showing myxomatosis scars by Mr. Sarovich, and native fan-flowers by Mr. Brooks. Mr. H. Stewart reported on his recent visit to Mount Buller with members of the Victorian National Parks Association.

Because of the Labour Day holiday it was decided to hold the next General Meeting on Tuesday, March 13.

The President thanked Miss L. Young who had acted as Honorary Secretary of the Club for several months while that office was vacant.

The meeting was adjourned at 10 p.m. for the usual conversazione and perusal of exhibits.

TARADALE EXCURSION, 1955

Sunday, October 2, 1955, was a cool day with a light breeze, and about sixty members of the Field Naturalists Clubs of Bendigo and Melbourne assembled under the leadership of the Bendigo Club President, Mr. F. Robbins, for a ramble along the roads that run along the ridges of the Taradale hills.

The dominant tall timber has been cleared for about a chain on each side of the roads and a rich array of low vegetation has sprung up. The gold-

fields form of *Grevillea alpina* was laden so heavily with its orange and red blossoms that many bushes had fallen over. There were patches of mauve Tetratheca, masses of Gorse Bitter-Pea with its orange and brown flowers, and clouds of the misty white beard-heath (*Lencopogon ericoides*).

Along the road were two phases of the attractive Fairy Wax-flower, one white-flowered and with smooth light green foliage, the other with pink buds and flowers and pimpled dark green leaves. Beyond the fire tower there was a remarkable form of Golden Wattle, having stiff, thick, upright phyllodes with a conspicuous whitish margin.

The timber was mainly Messmate, with a mixture of Cherry Ballart, Peppermint, Candlebark Gum and Long-leaf Box, and harboured numerous birds. There were four kinds of honeyeaters—the White-eared, White-naped, White-plumed and Yellow-faced; and the Crested Bellbird was heard calling. Alongside the native plant sanctuary recently established in the area, the party admired a nest of the Striated Thornbill, a neatly woven, lichen-covered structure with a hooded entrance.

—K. W. Atkins.

A TRIBUTE TO THE LATE SIR RUSSELL GRIMWADE

By J. H. Willis, National Herbarium of Victoria

Few men have excelled in so many avenues of service, or enjoyed life more zestfully, than Wilfrid Russell Grimwade who passed from our midst on November 2 last, after a sudden illness. A son of the late Honourable F. S. Grimwade, M.L.C., he was born at Caulfield on October 15, 1879, educated at Melbourne Church of England Grammar School and Ormond College where he took the Bachelor of Science degree. On October 12, 1909, he married Mabel Kelly, now Lady Grimwade, who survives him and to whom the F.N.C.V. extends deep sympathy. As noted in the December *Naturalist*, Sir Russell joined this Club in 1913 and was elected to Honorary Membership in July 1953; but his extremely busy life precluded attendance at meetings and permitted only a very occasional article for the journal—usually on his pet botanical theme of the eucalypts. He published *An Anthography of the Eucalypts* in 1920 (2nd edition 1930), and built up over the years a remarkably comprehensive collection of eucalypt capsules.

He will always be remembered as one of Victoria's outstanding businessmen and philanthropists, and among his many gifts to the nation were: Captain Cook's cottage at the Fitzroy Gardens, £50,000 to the Bio-chemistry School at Melbourne University, £15,000 to the Commonwealth Forestry and Timber Bureau for a research fellowship, and £5,000 to the Forest Products Laboratory (C.S. & I.R.O.). With his three brothers, he presented the old Grimwade family home in East St. Kilda to Melbourne Grammar School as a preparatory college. He received the C.B.E. in 1935 and was knighted (Kt.) in June 1950. Chairman of the Drug Houses of Australia, he was also chairman of numerous chemical companies, and he held membership on the Melbourne University Council, the Board of the Walter and Eliza Hall Institute and the

Felton Bequest Committee. He was President of the Trustees of the Melbourne National Museum and a Past President of the Australian Forest League, numbering forestry, arboriculture, carpentry and photography among his pastimes. He travelled extensively and visited Britain on several occasions, the last time only a few weeks before his death.

My own associations with this nestor were almost entirely botanical; yet, plant identities and functions were but one of the many facets through which his personality sparkled. During World War II he was an official botanical adviser to the Army Department and, after the conclusion of hostilities, he conceived the idea

Photos.: By courtesy P. Crosbie Morrison

The Late Sir Russell Grimwade in pensive and jocular moods (during the Grimwade Expedition, 1947)

of a travelling holiday, through the best southern wildflower country of Western Australia, during early spring. He would charter a bus and travel right across Australia from Adelaide, taking with him as guests a few friends who would be able to give information on the floristic, forestal, entomologic, ethnologic and general natural history features of the area traversed. It fell to my happy lot to join this select band as botanist in August 1947, and never has a month been more crowded with interest, enjoyment or good fellowship. The full report of the "Grimwade Expedition" (as this journey came to be known) was published in the *Memoirs* of the National Museum of Victoria [No. 17, March 1951]. The

tally of novelties discovered then embraces three spiders (including a new genus *Prionosternum*), four insects, a mollusc and at least ten as-yet-undescribed species of vascular plants—four belonging to *Acacia*. The 870 collections of flowering plants are now housed in the Melbourne Herbarium. Our host was the life of the party, and he seemed to us like a kindly father. It was quite touching to note his solicitude for each member of the team—even for a frantic botanical collector who was habitually late in boarding the transport after every halt along the trail! Is it any wonder that I remember him with gratitude and affection?

Sir Russell could not abide dissimulation of any kind, and sometimes, upon receiving an evasive answer to his query, he would look you straight in the eye and say disconcertingly, "How do you know that—did *you* figure it out all by yourself, or did you read it somewhere?"

A visit to his country home, "Westerfield" between Frankston and Mooroodue, was always a delight. He would proudly show the fruits of his own skill at woodwork: the ornamental bowls he had turned on a lathe, the big door he made and fitted with such titanic lock and wrought-iron hinges, the flooring he laid of incredibly wide Mountain Ash boards—so well-seasoned, cramped together and polished that you couldn't distinguish the joins. Then there was his form of drug and perfume plants, and the drying room with its compressed bales of *Digitalis* leaves ready for export, of *Bursaria* or *Duboisia* foliage for chemical analysis. During the drug shortages of the war, Sir Russell grew and processed several important plant sources. I remember one incident that could have ended in disaster. He came to the Melbourne Botanic Gardens with orders for a quantity of the bulbs of medicinal squill (*Urginea scilla*), and was directed to the place where these grew. By some accident, the label had been moved to a neighbouring clump of bulbs, and it was not until several days later that the dreadful truth emerged—he had taken away a liberal supply of useless *Ornithogalum caudatum* instead of squill! Meanwhile Sir Russell has sliced up the wrong bulbs and become thoroughly exasperated by their failure to dry out in the customary manner; valuable time and effort were thus lost.

Among the eulogies pronounced by prominent citizens at his passing, none more simply expresses the truth than those of Mr. Daryl Lindsay, Director of the National Gallery—"To all who knew him Sir Russell was a wise and loyal friend"—and Sir John Medley, former Vice-Chancellor of Melbourne University, who said: "Sir Russell Grimwade did the country more good in more ways than most of his contemporaries." His name is perpetuated and honoured in a magnificent West Australian orchid *Prasophyllum grimwadeanum*, in the beetle *Omolipus grimwadei* and spider *Storena grimwadei*.

ALPINE BLUEBELLS

Some Further Comments and Descriptions of Two New Species of Wahlenbergia

By N. Lothian

In 1947 the present writer published, in the *Proceedings of the Linnean Society of New South Wales* (Vol. LXXI, pages 201-235), a preliminary revision of the Australian species of *Wahlenbergia*. Later that year, notes and descriptions were given in *The Victorian Naturalist* (Vol. 63, pages 229-235) covering the species known then to occur in Victoria. These papers cleared up some outstanding problems, but they did not delimitate all the species. It is estimated that there are a further 20-25 species still requiring description.

Recently it has been possible to recommence investigations into the genus, and a review of the collections made in Central and South Australia has been commenced. My friends, Messrs. J. H. Willis and N. A. Wakefield, have forwarded to me several collectings made by them in the alpine regions of Victoria and New South Wales; the present paper deals with these collectings and some others kindly loaned to me from the National Herbarium of Victoria by the Government Botanist, Mr. A. W. Jessep.

Evidently our alpine species of *Wahlenbergia* are all perennials possessing a widespread and ramifying root-stock (of rhizomes) from which numerous erect and usually unbranched shoots arise. The shape of the foliage varies with each species, but all possess large blue flowers (pale or dark) often measuring up to an inch and a half in diameter.

As with species from lower elevations, considerable variation has already been noted in all vegetative parts. Collections made from shady sites yield plants which have developed long straggling stems; the leaves are longer, thinner and flaccid, and the whole plant less hairy. These features are usual in plants receiving an excess of water.

At the end of the growing season there are sometimes sterile shoots several inches high. Because these are usually produced during the "dry", the stems and leaves are thicker and they are densely covered with hairs. In the following spring, fresh growth occurs from the crowns of the plant, and the new stems are more slender, the leaves are thinner and without thickened margins, stems and leaves are usually entirely, or almost, glabrous. These and also the sterile shoots (which produce similar spring growth) will ultimately flower and it is therefore possible to collect what appear to be two distinct "species" from the one plant.

This mode of growth is likely to occur with the alpine species only when plants are in sheltered sites. From what is known of the following species, they are usually deciduous through the winter months, i.e. all aerial parts die back to a common root stock which in the following spring throws up fresh shoots.

A watch should be kept in alpine regions for further species, collectings of which the writer would be pleased to receive.

To the afore-mentioned gentlemen my thanks are offered for receipt of notes and specimens on which this paper is based; Mr. Willis also offered helpful criticism and supplied the formal Latin diagnoses.

W. GLORIOSA N. Lothian [*Proc. Linn. Soc. N.S.W. 71* (3-4): 224-5 (1947)].

This species is easily recognized by its perennial habit, compact habit of growth, almost always opposite sub-cartilaginous ovate to oblanceolate crenulate-dentate leaves which, especially on the under surfaces, are frequently densely hairy (as are the lower parts of the stem), thin glabrous peduncles and large deep blue flowers.

In its typical form it is unlikely to be confused with any other alpine or lowland species. Sometimes the leaves appear as a tight rosette (which may be a winter resting stage). When these throw up a flowering shoot, a few leaves are produced on the basal portion of the stem. Thus it is possible to obtain flowering specimens possessing a rosette only, or a rosette and several pairs of ovate-oblong opposite or sub-opposite leaves on the lower portion of the flowering peduncle, or flowering shoots which lack the rosette entirely.

Usually the flowering peduncle remains unbranched, but, when it does branch, two or three side pedicels are produced each from a cauline leaf on the primary peduncle.

This species makes a glorious rock-garden subject. In 1953 field collections were made by the writer in Bumbunga Mountains to the south-west of Canberra. Rhizomes were brought back to Adelaide where, under glass, they flowered during the following season. The growth habits noted above were very frequently displayed in these cultivated plants. Some of the shoots were very lax and thus varied from the collections made in the field from the same plants. The leaves were often sub-opposite and even alternate along the stem and the thickened margins were less developed. Thus, field characters noted in shady and moist habitats were induced in a similar artificial environment.

Distribution—

VICTORIA: Haidinger Range, 5,000 ft.-6,000 ft., (*F. Mueller*, March 1861—MEL); the springs half-way between Tawonga and Mt. Fainter, ca. 5,000 feet (*A. J. Tadgell*, January 1928—MEL); between Harrietville and Mt. St. Bernard, 5,100 feet (*A. J. Tadgell*, March 1935); Mt. Buffalo, among granite rocks on east bank of Lake Catani (*J. H. Willis*, January 1938—MEL); Mt. Buffalo, at Long Plains (P. N. S. Bibby, Jan. 1946—MEL); (*P. R. H. St. John*, March 1930—TYPE—MEL); Mt. Torbreck, 62 miles north-east of Melbourne, grassy places between rhyo-dacite rocks at 5,000 ft. (*J. H. Willis*, March 1943—MEL); Mt. St. Bernard (*C. Walter*, January 1890—MEL); Omeo, on metamorphic rocks (*A. W. Howitt*, 1883—MEL). [Noted by J. H. Willis also at Cobboras Mts., Mt. Bogong, Mt. Feathertop, Dargo High Plains, Barry Mts., Mt. Cobbler, Mt. Stirling and Mt. Buller.]

AUSTRALIAN CAPITAL TERRITORY: Bumbunga Mountains southwest of Canberra, ca. 4,700 ft., on roadside amongst *Pteridium*, *Veronica*, *Holcus*, and other grasses (*N. Lothian*, January 1953).

NEW SOUTH WALES: Kosciusko Plateau (*A. B. Costin*, April 1947); Snowy Mountains, 5,000 ft. (*W. Baeuerlen*, January 1890—MEL).

W. CERACEA N. Lothian

> Species nova proxima *W. gloriosa* Lothian, a qua recedit: habitu pene glabro, foliis planis lanceolatis vel lineari-lanceolatis (inferis late oblanceolatis), marginibus foliorum fere integris atque corolla dilute cærulea. Pedunculi longi robusti. Flores ⌀ 2.5 cm. lati, ante expansionem conspicue nutantes.

Root-stock perennial. *Rhizomes* thin, often producing secondary aerial growths. *Scapes* one to many, arising from a common base, 5 in.-12 in. high, erect and slightly decumbent at the base or scrambling and long if in the shade, stout, unbranched, glabrous except for a few scattered short hairs on the angles or leafy parts, becoming terete and glabrous above. *Leaves* often forming a simple rosette, but more frequently an extended rosette with leaves extending along the lower 2 in.-4 in. of the stem, alternate or sub-opposite. Lower leaves spathulate to oblanceolate or broad lanceolate, glabrous except for a few hairs on the leaf edges close to stem,

6-12 mm. long and 3-6 mm. wide. Upper leaves sub-cartilaginous, almost lanceolate, 12-30 mm. long and 4-6 mm. wide, glabrous or (rarely) with few scattered hairs near leaf axils, sessile, slightly decurrent, margins barely thickened, minutely crenulate-denticulate, slightly recurved; mid-rib channelled above, prominent below. *Peduncles* stout, erect, slender and nodding in the bud stage, glabrous, 3 to 5 times the length of the leafy portion of the scape, rarely branched, or with an off-shoot immediately above the leafy portion. Cauline leaves limited to the basal portion of peduncle, the remainder of it naked. *Pedicels* shining, waxy (as are the calyces of fresh flowers—hence the epithet). *Flowers* large, up to 1.5 in. in diameter, pale blue, always nodding in the bud stage. *Calyx* shining and waxy (in fresh flowers), glabrous, attenuate; the 5 deltoid sepals acute, erect, 4-6 mm. long, shorter than the corolla tube. *Corolla* pale blue, attaining a diameter of 1.5 in.; lobes spreading, broad-lanceolate; tube about half the length of the lobes, whitish inside. *Stamens* 5; filament base broad-triangular, 1.5 mm. high and wide, somewhat curved; upper ridge with shoulder densely ciliate, but long hairs absent on the exterior face of the filament. *Style* erect, stout, exserted well beyond corolla tube, with scattered prominent glands. *Stigmas* 3, broad. *Capsule* glabrous, broad, ovoid, prominently nerved, up to 6 mm. long and 4 mm. wide; lobes ½ to ⅔ the length of the capsule. *Seeds* numerous.

Distribution—

NEW SOUTH WALES: Kosciusko Plateau, on moist grassy slopes at Chalet, ca. 5,700 feet, (*J. H. Willis*, 5 February 1946—TYPE in MEL).

VICTORIA: Bogong High Plains at Basalt Hill near Wallace's and S.E.C. Hut, ca. 5,500 ft.—very common in moist grassy places, (*J. H. Willis*, 17 January 1947), Nunniong Plateau, ca. 4,000 ft.—in damp, lush, grassy, more open forest situations, (Dr. *R. Melville & N. A. Wakefield*, January 1953—K); Bidwell, Upper Delegate River, ca. 3,000 ft.—in wet grassy margin of bog, (*N. A. Wakefield*, No. 2332, 20 January 1948); Rocky Plain, S. of Cobboras Mts., ca. 4,500 ft.—wet grassy places, (*N. A. Wakefield*, No. 3039, 28 January 1949).

[Although at present known from Victoria and New South Wales only, it should certainly be looked for in the alpine regions of Tasmania, because it has affinities to *W. saxicola* Hook. f.]

Discussion—

A handsome plant differing from previously described alpine species of *Wahlenbergia*—e.g. *W. gloriosa*—by its taller and stout habit, and by its longer and almost glabrous plane lanceolate leaves. It lacks the crenulate margins of *W. gloriosa*. The flowers are pale blue, waxy and shining as are the calyx lobes and pedicels in fresh flowers (J. H. Willis obs.). Certain of the material previously included in *W. gloriosa* N. Lothian [*Proc. Lin. Soc. N.S.W. 71*: 225 (1947)] has been transferred to this species, as the discussions in the above-cited paper indicate. Barrington Tops material should be re-examined, as this is most likely the present species.

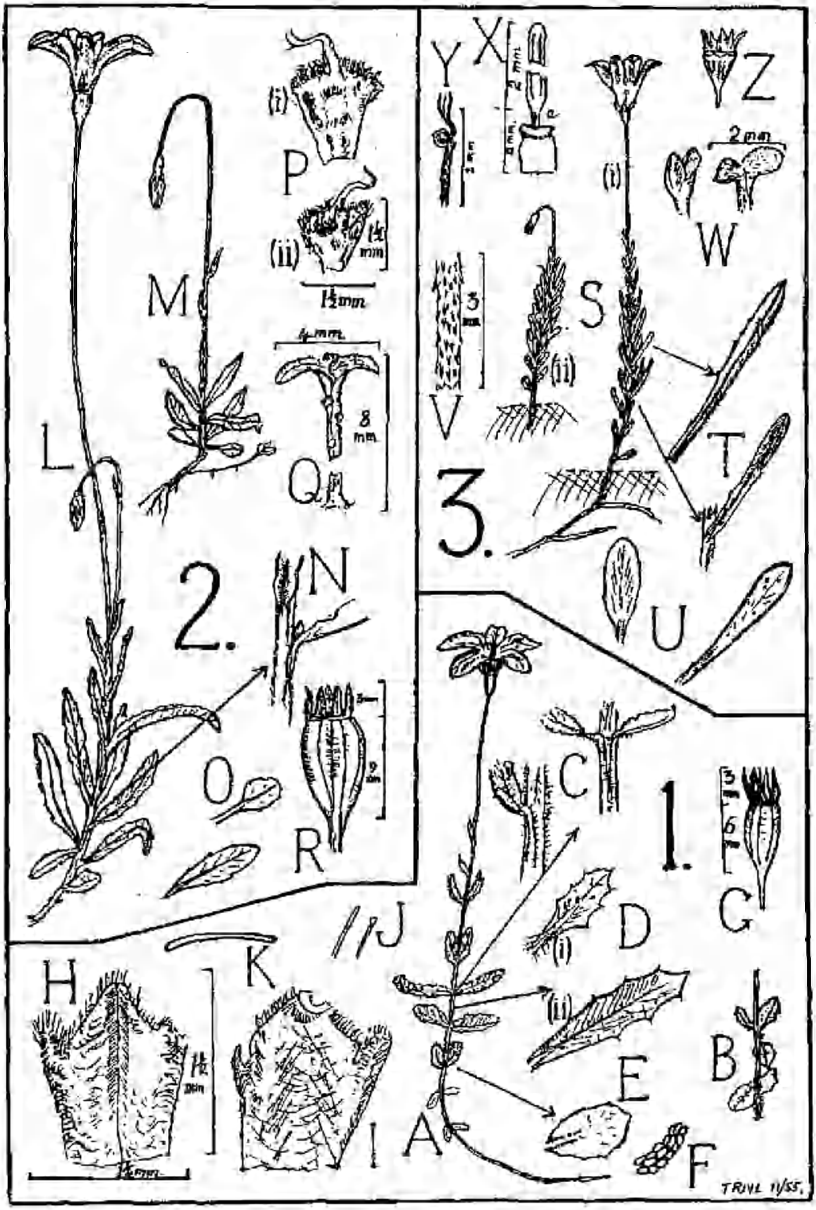
W. ceracea is an ideal plant for rock- or wall-garden culture, as is *W. gloriosa*.

W. DENSIFOLIA N. Lothian

> Species nova distinctissima, ab omnibus aliis speciebus australiensibus differt foliis parvis angustis confertissimis atque scapo brevi qui florem unicum comparate magnum caeruleum gerit.

Root-stock perennial, thin and branching, ramifying 2 in.-3 in. below the soil level. *Scapes* many per root-stock, but each unbranched, 2.5 in.-5 in. high, erect, rarely decumbent at the base, lower portions scabrid (covered with minute narrow-triangular sharp white hairs), glabrous above. *Leaves*

PLATE VI



Details of Alpine Bluebells

confined to the lower third of the stem, crowded, alternate to sub-opposite (rarely opposite or verticillate), sessile, mostly linear, membranous to cartilaginous, almost glabrous except for scattered scabrid hairs on both surfaces (especially along the midrib and concentrated toward the leaf-base). Lower leaves spathulate to oblanceolate, gradually changing to linear, 3-10 mm. long and 1-2 mm. wide; slightly incurved; margins cartilaginous, entire or remotely and minutely dentate. Cauline leaves very few, or absent. *Flowers* one per scape, borne on a long thin usually naked peduncle which is 1 in.-2 in. long, deep blue inside, light blue externally, 12-18 mm. in diameter. *Calyx* glabrous; the 5 sepals to 3 mm. long, narrow-triangular, acute to sub-acute, three-quarters the length of the corolla tube, medial vein visible; tube (ovary) obconic, equal in length to the calyx lobes when corolla is fully expanded, obscurely ribbed. *Corolla* 12-18 mm. in diameter, lobes spreading, 6-8 mm. long and 3 mm. wide, with prominent medial veins; tube short, broad, barely half the total length of the corolla. *Stamens* 5; filaments 1 mm. long, with prominent non-ciliate shoulders; anther attachment somewhat sigmoid; anther long (to 2.5 mm.), linear. *Style* simple, exserted above rim of corolla tube, branching into two broad stigmatic lobes, 1 mm. long. *Capsule* obconic, stout, ribbed, 2.5-5 mm. long and 3 mm. wide; valves protruding well above the rim of the capsule. *Seeds* brown.

Distribution—

NEW SOUTH WALES: Wragge's Ridge, Kosciusko Plateau, ca. 5,000 ft., (*A. B. Costin*, 18 April 1947—TYPE in MEL).

VICTORIA: Dargo High Plains, amongst older basalt rocks at southern end of Lankey's Plains, 5,400 ft alt., (*J. H. Willis*, 29 January 1946), Nunniong Plain on Nunniong Plateau, ca. 4,000 ft.—amongst very low, sparse grass (*Poa* sp.) with no nearby shrub or eucalypt growth, (*Dr. R. Melville*, No. 3104, & *N. A. Wakefield*, 25 January 1953—in K & MEL).

Discussion—

This species is known only from the high alpine areas of New South Wales and Victoria, and it was first collected by J. H. Willis who exhibited it at the Field Naturalists' Club of Victoria on 11 March 1946. It is quite distinct and unlike any other species so far described from Australia and New Zealand. The crowded narrow-linear leaves on short scapes, graceful habit and comparatively large deep-blue corolla are distinctive features, and such a dainty plant would be most attractive in rock-gardens.

KEY TO PLATE VI

1. *W. GLORIOSA* N. Lothian: A, Flowering stem (x½); B, Leaf arrangement (x½); C, Attachment of leaves to stem (x2); D, Leaves (x1) showing (i) upper surface and (ii) lower surface (note mucronate teeth); E, Lower leaf (x2); F, Tessellated leaf-surface (much enlarged), prominent in dried material; G, Mature capsule; H, Stamen filament, interior surface; I, Stamen filament, exterior surface; J, Two types of cilia found on shoulders of filaments (much enlarged); K, Cross-section of filament (much enlarged).

2. *W. CIRACEA* sp. nov.: L, Flowering stem (x½); M, Typical growth, showing nodding bud (x½); N, Leaf attachment at portion indicated (x1½); O, Lower leaves (x1); P, Stamen filaments: (i) exterior view (ii) interior view; Q, Style (with prominent glands) and stigma; R, Capsule.

3. *W. DENSIFLORA* sp. nov.: S, Stems (x½): (i) with flower and (ii) with bud; T, Mature leaves from middle of leafy portion (x1); U, Lower and basal leaves (x1); V, Portion of stem, showing rigid white hairs; W, Two-branched style, with glandular stigmatic surfaces; X, Anther and filament; Y, Side view of filament; Z, Mature capsule (x1½).

FOLIAGE

SOME BIRDS OF A NORTHERN TASMANIAN ORCHARD

By Ron. C. Kershaw

At times during the year, and particularly after harvesting when there is a certain amount of fruit on the ground, birds are plentiful in the apple and pear orchards. The situation in this instance on the West Arm of the River Tamar is favourable as there are still considerable areas of bushland and houses are not plentiful. The number and variety of species visiting the orchard is intriguing and when there is fruit on the ground I have counted seven native species, as well as several introduced, within a twenty or thirty-foot radius. Several of the species were in considerable numbers.

Some birds from the adjoining bushland are frequent visitors to the orchard, others rarely if at all appear. One bird, the tiny Silvereye, lives almost constantly in the orchard and nests in the pear trees. This little fellow is really a good friend though he does damage the fruit. There are several types of habitat near at hand. Firstly the proximity of the West Arm brings gulls and swans in flight overhead, a pelican or two, and even a sea eagle. On the banks of the Arm and the slopes of the hill ridge above where there is no orchard, there is sclerophylous forest with *Eucalyptus amygdalina* as the dominant, while patches of dense tea-tree scrub occur in the wetter hollows. In one area the stringybark *E. obliqua* replaces the peppermint.

At the top of the ridge where the soil is gravelly, the association is a more open one with *E. amygdalina*, certain wattles (as on the slopes) and various heath species. Hence there is normally a variety of birds in the vicinity at any one time, and at least thirty species have been seen more or less frequently in the area, not including the introduced species.

Parrots and "jays" (currawongs) are plentiful when the fruit is ripening, while the ubiquitous so-called "crow" is always about. This fellow is responsible for so much damage that it is sometimes hard to recall that he is also useful. From time to time a few Black Cockatoos appear. The Spur-winged Plover nests in the orchard, as does the Welcome Swallow, and these two species are the most plentiful to be seen, with the exception of the Starling.

Occasionally a flock of Yellow Wattle-Birds will appear and remain for a few weeks. These birds are apparently not as common in this area as they were at one time. The Brown Hawk is fairly plentiful, and once or twice the large Swamp Harrier has been observed. Another large bird is the Native Hen—sometimes very plentiful and always very shy here where these birds are not used to being disturbed to any extent.

Among the small birds the Red-breasted Robin, the Pink-breasted Robin, and the Stump Robin (or Dusky Robin) are fairly plentiful, as is also the delightful little Blue Wren. The tiny birds of the bush and scrub rarely come beyond the fringe of the bush, but the Brown Thornbill is sometimes about. The Yellow-throated Honeyeater is very plentiful at times, while the Fire-tailed Finch is seen in family groups, sometimes of seven or eight near the edge of the orchard. The gyrations of the Grey Fantail always fascinate, and if one watches with care the insects which it is capturing may be seen.

The Black-faced Cuckoo-Shrike or "Summer Bird", an open forest bird, is an infrequent visitor, usually singly, but sometimes two have been seen. The Whistling Shrike-Thrush, or more popularly "Whistling Dick", is often about, though not more than a few birds at a time as a rule; its song is always a delight. The Pallid Cuckoo is common in summer, but usually singly.

These are the most common birds, several others often seen or heard in the bush nearby could be mentioned, but they usually do not come into the orchard. Introduced from the mainland, the Kookaburra is fairly plentiful, while the little Goldfinch appears sometimes in very large numbers. Of foreign birds the Sparrow is fortunately not common, nor is the Black-bird, but the Starling appears in vast flocks numbering thousands and is unfortunately extremely destructive.

NOTES ON TWO WEST AUSTRALIAN STYLIDIA

(the description of a new species and reduction of another to synonymy)

By Rica Erickson* and J. H. Willis†

STYLIDIUM CHOREANTHUM *Erickson & Willis*.

species nova Sectionis "*Repentes*" inserenda, habitu *S. repentem* R.Br. appropinquans atque ob scapum *S. adpresso* Benth. (Sect. "*Appressæ*") simillima, sed petalis perinæqualibus ab omnibus speciebus harum sectionum differt—corolla in aspectu saltatricem eleganter simulans.

Planta perennis, stolonifera, per arenam repens. *Caules* 1-13 cm. longi, filiformes, glabri, nudi, in partibus vetustioribus efoliati, caulibus novis pallido-brunneis foliosis. *Folia* subcarnosa, griseo-viridia, secus caulem appressa dispersaque sed apicem versus imbricata et acervos terminales formantia, 2-3 mm. longa, oblongo-lanceolata, mucronata, ad margines incurvos dentibus paucis albis prædita, ad basin calcarata (ut in *S. repente*). *Scapus* quam fascis terminalis foliorum circiter duplo longior, saturate ruber, pilis aureis glanduligeris instructus; inflorescentia subcapitata, floribus paucis breviter pedicellatis. *Calyx* circ. 3 mm. longus, subturbinatus, atroruber, glandulifer; lobi tubum æquantes, liberi, subglabri, margimibus scariosis. *Corolla* patens, albida, petalis omnibus extrinsecus pilos glanduligeros dispersos atque lineam conspicuam gerentibus et petalis duobus majoribus a nota saturata (ad basin) erubescentibus; tubus quam calycis lobi brevior; faux viridans, sine appendiculis definitis sed corona breviter 5-lobata prædita; petala perinæqualia, duobus anterioribus erectis linearibus ad apices emarginatis circ. 3 mm. longis sed non 1 mm. latis, duobus posteroribus extentis irregulariter crenulatis circ. 3 mm. longis et 5 mm. latis (unguiculis angustis in flabella lata subito dilatantibus); labellum minutum, anguste triangulare, saturate rubrum. *Columna* gracilis, pallida, antheris viridibus; stigma rotundum, pilosum, pulviniforme.

A stoloniferous perennial, creeping through sand.

Stems 1-13 cm. long, very slender and wiry, glabrous, greyish or black, leafless in the older parts, the new stems pale brown and leafy. *Leaves* grey-green, rather fleshy, scattered and closely pressed to the stem, becoming more congested and overlapping toward the apices where they form dense clusters in terminal rosettes of about 12 leaves, 2-3 mm. long, oblong-lanceolate, with a fine mucro and usually with several white teeth on the incurved margins, the base produced into a "spur" (as in *S. repens*). *Scape* about twice as long as the terminal rosette, dark red, with golden glandular hairs; inflorescence almost capitate, with few flowers (or up to 8) on short pedicels; floral bracts about 1 mm. long, lanceolate and somewhat glandular hairy. *Calyx* almost turbinate, dark red, glandular hairy, about 3 mm. long (including the lobes); lobes about equal in length to the tube, free, pointed, almost glabrous, with scarious margins. *Corolla* whitish, with glandular hairs and a dark stripe on the outer surface of the petals, the larger petals with reddish suffusion spreading from the dark blotches near their bases; tube shorter than the calyx lobes; throat greenish, without definite appendages, but with shallowly 5-lobed corona having the two anterior lobes slightly longer than the four posterior ones; petals very unequal, the two anterior erect, linear, about 3 mm. long but less than 1 mm. broad, slightly notched at the apices; the two posterior petals extended, each about 5 mm. wide and 3 mm. long, on narrow claws which fan out suddenly into broad laminae with irregularly crenulate margins; labellum dark red, minute, narrowly triangular. *Column* slender, pale, with green anthers; stigma rounded, hairy, cushion-shaped.

Epithet: In allusion to the form of the flowers which fancifully resemble a female ballet dancer, on tip-toe and with arms outstretched.

Vernacular name: Dancing Trigger-plant.

Habitat: Scrubby red-sand plains, growing with *Grevillea paradoxa*, *Loudonia aurea*, *Cyanostegia microphylla* and *Pityrodia carnea*.

* "Fairlea", Bolgart, W. Aust.
† National Herbarium of Victoria, S. Yarra, Vic.

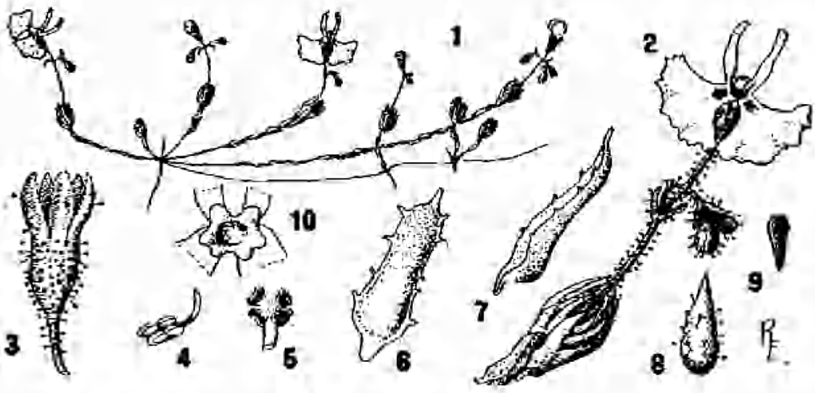
Representative locality: WESTERN AUSTRALIA—By the roadside along Great Eastern Highway, east of Southern Cross and probably between Boorabbin and No. 7 Pumping Station (HOLOTYPE in MEL, PARATYPES in K and PERTH—*Mrs. J. A. Woollard*, Oct. 1955)

This striking addition to the small Sect. *Repentes* bears a close resemblance to *S. repens* R.Br. in its habit of growth and has a scape similar to *S. adpressum* Benth.; but the corolla is quite different from that of any species in these groups—its petals are disposed in very unequal pairs, as in several of the ephemeral species (e.g. *S. asteroideum* Erickson & Willis and *S. bolgartense* Erickon & Willis, description of which are in the press).

STYLIDIUM STOWARDII *M. B. Scott* in Kew Bull. 91 (1915)

= **S. breviscapum** *R.Br.* Prodr. Flor. Nov. Holl. 572 (1810)—forma.

In the *Victorian Naturalist 72*: 136 (Jan. 1956) we discussed *S. involucratum* F. Muell. and expressed the opinion that it is no more than a coastal variant of *S. breviscapum* R.Br. We now relegate *S. stowardii* M. B. Scott



Stylidium charranthum sp. nov.

1, Habit of growth; 2. Terminal rosette of leaves, with flowering scape; 3. Calyx; 4. Column, showing anthers; 5. Stigma; 6. Dorsal view of leaf; 7. Lateral view of leaf; 8. Floral bract; 9. Labellum; 10. Corona of throat.

to synonymy as another form of the variable *S. breviscapum*. *S. stowardii* (based upon Dr. F. Stoward's No. 121 from Nangeenan near Merredin) is supposed to be distinguished from *S. breviscapum* in its glandular inflorescence—the original diagnosis states: "A *S. breviscapo* R.Br. inflorescentia glandulosa differt." This is nonsensical in view of Robert Brown's detailed manuscript (and as-yet-unpublished) description of his *S. breviscapum*:

> Scapus . . . glandulo-pubescens; calyx . . . glandulosо-pilosa; corolla marcescens extus glanduloso-pilosa.

A collection by one of us (R.E.) from the Merredin area—186 miles along the Great Eastern Highway, Oct. 1955—has been compared with the type of *S. stowardii* in the Kew Herbarium and pronounced identical. It departs from typical *S. breviscapum* only in having paler (whitish), rather smaller and slightly pedicellate flowers, and we consider that it does not merit even varietal rank—Mondurup and other material of *S. breviscapum* frequently have flowers of a pale yellow colour.

NEW SPECIES OF BEES AND WASPS—Part XXV

By Tarlton Rayment, F.R.Z.S.*

EXONEURA BAXTERI sp. nov.

Type, male.—Length, 6·5 mm. approx. Black with ferruginous abdomen.

Head transverse; face excavated laterally, raising the median ocellus on a high platform; frons constricted to a high ridge; clypeus long, entirely cream colour, with a few long pale hairs; supraclypeal area convex and black; vertex with longer pale hair; compound eyes large, converging below; genae polished, with a few long pale hairs; labrum ivory-coloured; mandibulae ivory, but black basally; antennae not long, black, only obscurely brown beneath.

Prothorax black; tubercles black; mesothorax polished black, with considerable long pale-ochreous hair; scutellum and post-scutellum similar; metathorax with tessellation very evident, with much long pale hair, abdominal dorsal segments apricot-colour, 1 practically black only the posterior margin pale; 4, 5, 6 darker, with a median black patch; ventral segments pale-ferruginous; caudal hair amber and wavy.

Legs black basally, apical half of femora, all tibiae and tarsi ferruginous a black streak on posterior tibiae; hind basitarsus stout; claws red; hind calcar amber; tegulae black and shining; wings subhyaline; nervures sepia; cells normal for the genus; pterostigma with darker margin; hamuli five or six weak.

Allotype, female.—Length, 7 mm. approx. Black and apricot colour.

Head black transverse; face excavated laterally; frons elevated to a longitudinal ridge; clypeus entirely black, except for narrow anterior margin; supraclypeal area elevated, black; vertex with smoky hair; ocelli large; compound eyes converge slightly below; genae polished; labrum amber; mandibulae amber, red apically, black basally; antennae black, scape with red line anteriorly.

Prothorax black, a few white hairs; scutellum similar; post-scutellum rougher; metathorax with a transverse lineation; abdominal dorsal segments apricot colour, with a black margin on 1, and a black mark extending dorsally over 4, 5, 6; ventral segments clear apricot colour.

Legs light-ferruginous, slender, a line of blackish suffusion on the posterior femora and tibiae, where the hair also is blackish; it is otherwise pale straw-colour; posterior basitarsi stouter; other tarsi pale ferruginous; claws amber; calcar testaceous, long and slender; wings subhyaline.

Locality: Gorae West, Portland, Victoria; leg. Clifford Beauglehole.

Type and allotype in the collection of the author.

Through the translucent abdomen of the female could be seen a number of internal parasites resembling Planidia.

A POPULOUS COLONY OF SIMPLE SOCIAL BEES

On January 31, 1955, Clifford Beauglehole took a very long series of adult bees, 9 males and 17 females, together with 10 pupae, from one small gallery which had been bored, probably by a beetle, in a dry branch of *Eucalyptus baxteri*, at Bats Ridges, near Portland, Victoria. This was a particularly populous colony of these simple social bees.

A critical examination of the two sexes showed that they are close to *E. illustris* Rayn. from Western Australia, although much larger. They differ from *E. perpensa* Ckll. which has a yellow line on the clypeus, but they have the light apricot coloured abdomen of that species; the two males are very different.

E. illustris Rayn. has a yellow line on the scapes, and the mandibles are creamy coloured (darker in new bee); the male has much less long yellow

* Hon. Associate in Entomology, National Museum, Melbourne.

hair on head and thorax, and the posterior tibiae are much stouter than those of the new species. It approaches *E. excavata* Ckll. which has the face very different, being basin-like all over; that of the new bee is excavated only on each side, leaving the middle "rib" very elevated above the rest of the face.

There are only two generations in *Exoneura* for the season, and the colony from Bats Ridges had undoubtedly reached the apex of activity with its first brood. A comprehensive account by the author of the life-cycle of *Exoneura*, together with many illustrations of the biology and its remarkable feeding habits appears in *Australian Zoologist* 11: 285-312 (1951).

NATURALISTS' NOTEBOOK

(Reserved for your Notes, Observations and Queries)

INSECT ENDURANCE

On Tuesday, December 20, 1955, two astonished members of the staff of the Forest Products Division, C.S.I.R.O., watched a large rusty brown moth (? gum hawk moth) fly out of a high-pressure cylinder after the following treatment:

> A jar of toxic liquid with timber immersed in it was placed in the cylinder from which the air was then removed to give a twenty-minute vacuum of 28 inches. This was immediately followed by 2½ hours pressure at 200 lb. per square inch. These operations were at room temperature.

The fact that moths often need neither food nor drink shows they are remote in their metabolism from us. But apparently they need no air either. It would be interesting to know at what stage of evacuation the air would become too thin to support flight and whether total lack of oxygen would kill them.

Mr. Bob Watson, who has been operating the cylinder for years, was the more suprised of the two. His companion, Dr. Mirams, recalled that attempts made in New Zealand to destroy the wood wasp (*Sirex*) by vacuum and pressure were fruitless. Mr. N. Tamblyn of the Division also recalled that years before he had received a salutory lesson on the subject after he had hastily advised the treatment of weevil-infested wheat by vacuum; it had no effect on the weevils.

It seems fair to conclude, then, that these insects ignore the low pressure of air and consequent poverty of oxygen whether they require nutriment of other kinds or not and the occurrence or absence of insects at high altitudes is therefore not necessarily governed by the air pressure.

—N. E. M. WALTERS.

TAWNY FROGMOUTHS

The sight of four Tawny Frogmouths in a Mahogany Gum at Buchan Caves National Park last December prompts me to write a paragraph about these interesting birds. As three of the Frogmouths were on one branch, spaced at intervals of about a foot, the camouflage effect was not as good as usual because three short "dead branches" so close together did not seem quite right, and tended to give the show away. When one or two of these birds rest near the end of a branch, the disguise is almost perfect. During a heavy shower three of the Frogmouths were seen huddled close together on the same branch but close to the trunk. If these were mother and two young, the latter must have hatched early in the season which extends from about August to December. The fourth *Podargus* was well out on another branch. Tawny Frogmouths are nocturnal, eat insects, utter an "oom, oom" sound repeated many times, and build a flat nest of loose sticks in which two or three round white eggs are laid.

—A. E. BROOKS.

FANTAILS NESTING

During the New Year holiday period (December 30 to January 2 last) while at my "shack" on the Ten-mile Creek near Cape Liptrap in South Gippsland, I had the pleasure of watching at close range a Grey Fantail building her nest. The site she chose was on a horizontal branch about three feet above the creek and overhanging the water. The weather at that time was very rough with cold winds and frequent rain-storms. But despite the inclement conditions she persisted in her endeavours to complete the job. As far as I could see, the male bird did absolutely nothing to help his hard-working little spouse, apart from sitting on a branch and occasionally twittering a song of encouragement to her. She soon became aware that I was an interested spectator, but carried on even though I stood within a few feet of her. Every move she made could be seen quite plainly. On our wood-heap a few yards away was an old log, and with her beak she stripped from it tiny lengths of bark. After a couple of trips with bark strips she would fly to a tall banksia and collect spider webs which she wove deftly into the coarser material, always using her beak on the outside of the nest, at the same time rounding the structure with her breast. To help the good work along, I scraped the bark on the log with a knife, providing her with a plentiful supply of building material. After that, she conducted a regular shuttle service between the log and her nest, and it was amazing to see how fast the work progressed. Thinking that cotton-wool might be useful as lining, I placed a few small pieces on her log, but to my surprise she rejected the offering. Contrary to the usual practice, this particular nest had a very short tail. When we left to return to Melbourne, the stage was all set for the egg-laying ceremony.

—R. M. Wishart.

BUTTERFLY ORCHIDS

In 1938, by the upper Combienbar River, the writer found a plant of the Butterfly Orchid (*Sarcochilus australis*) with a spectacular pendant raceme of fourteen flowers. But the late W. H. Nicholls commented that he had seen a specimen with sixteen flowers on a raceme. It was therefore interesting to find, along a small tributary of the Mitchell River near Glenaladale, in December last, what must be a record growth of this same species. There were a great number of these plants on the mossy limbs of the Kanooka trees (*Tristania laurina*), some with leaves as much as seven inches in length. The largest plant had twelve falcate leaves and its roots could be traced for a distance of two feet in either direction along the limb to which is was clinging. There were the remains of twelve racemes, three belonging to last spring and nine to previous years, evidently three per year for a period of four years. The last season's flowers had all fallen, but a count of the scars left by their pedicels and of their subtending bracts, showed that a month before there had been an aggregate of thirty-six blooms on the plant, the three racemes bearing six, twelve and eighteen flowers respectively!

Though Victoria has five species of epiphytic orchids, the Butterfly Orchid is the only one of them to extend to central Victorian areas. It is known to survive in one spot in the Dandenong Ranges, and some healthy plants were seen flowering in early December last in the vicinity of the Calder River in the Otway Ranges. The occurrence of the species in the Otways is a reminder that it is (or was) also on King Island and in north-western Tasmania; just as another epiphyte, the Streaked Rock-orchid (*Dendrobium striolatum*) is found in East Gippsland, on Flinders Island and in north-eastern Tasmania. Thus Tasmania's two epiphytic orchids show nicely where the old land bridges were when the island State was connected to the mainland of Australia many thousands of years ago.

—N. A. Wakefield.

BIRD LITERATURE AVAILABLE FOR ORNITHOLOGISTS

Following the policy of the F.N.C.V. in making available subject sets of the *Victorian Naturalist*, the following back numbers of the journal are offered for sale at half original price. Set A is made up of major articles with copious illustrations, by such noted ornithologists and photographers as C. L. Barrett, A. H. Chisholm, D. Dickison, R. T. Littlejohns and R. K. Munro; it contains special issues dealing with the Helmeted Honeyeater, Lowan and Lyrebird. Set B consists of articles and reports of less outstanding nature, but of vital interest to the student of bird-lore nevertheless.

Set A: Vol. XLVIII—No. 11; L—5, 7, 8, 9; LI—2, 4, 5; LII—7, 9, 10, 11; LIII—1, 12; LIV—4, 6, 11, 12; LV—5, 6; LVI—4, 7, 12; LVII—3, 4, 5, 8, 9, 10, 11; LX—9; *61*—1, 10; *63*—2, 3, 4, 6, 9; *69*—5. 39 numbers, price £1.

Set B: Vol. XLVII—11, 12; XLVIII—7, 10; XLIX—1, 6, 9; L—3, 11; LI—8, 10, 12; LII—5, 6; LIII—3, 8, 11; LIV—2; LV—9; LVI—2, 9; LVII—2, 7, 12; LVIII—1, 3, 4, 5, 6, 7, 8, 9; LIX—4, 12; LX—4; *61*—4, 8; *62*—2, 3; *63*—5, 7, 10; *64*—4, 9, 10; *65*—1, 2, 10; *66*—1, 3, 6, 7; *67*—7; *70*—3, 6, 9. 56 numbers, price £1/17/9.

Those who have some of these copies already may supplement their files by purchasing individual numbers or any sections of the above sets. Those with interests additional to ornithology may obtain complete volumes, from Volume 10 (1894-5) to the present, with only occasional numbers lacking.

A set of the *Victorian Naturalist*, from January 1884 to April 1953 (Volumes 1 to 70) is available for £14/10/-; it lacks 51 of the 112 parts of the first 9 volumes, but from volumes 10 to 70 there are only 8 of the original 732 parts missing.

Orders should be addressed to Mr. K. W. Atkins, c/o National Herbarium, The Domain, South Yarra, S.E.1, Victoria.

WHAT, WHERE, AND WHEN

F.N.C.V. Excursions:

Sunday, March 18—Parlour coach excursion to Macedon and district with Bendigo F.N.C. Leader Mr. F. Robbins. Subject: Geology and general. Coach leaves Batman Avenue 9 a.m., returns approximately 8 p.m. Fare, 18/-. Bring two meals.

Sunday, March 25—Botany Group excursion to Sherbrooke. Leader: Mr. K. Atkins. Take 8.35 a.m. train to Upper Ferntree Gully, then Olinda bus to Sherbrooke Junction. Bring one meal and a snack.

Saturday, April 7—Yering Gorge. Geology Group excursion. Take 8.25 a.m. Healesville train to Yarra Glen, or meet 9.50 a.m. at Yarra Glen station. Bring two meals. Walk of about 8 miles.

Group Meetings:

(8 p.m. at National Herbarium).

Wednesday, March 21—Microscopical Group. "Botany Night". Commentator: Mr. Ken Atkins. Projection of slides by Mr. C. Middleton.

Wednesday, March 28—Botany Group. Subject: Fungi, by Mr. K. Atkins.

Wednesday, April 4—Geology Group. Subject: Physiography of Yering Gorge. Speaker: Mr. R. Hemmy.

Preliminary Notice:

Sunday, May 13—Parlour-coach excursion to Murrundindi and Wilhelmina Falls. Leader: Mr. R. Hemmy. Coach leaves Batman Avenue 9 a.m., returns approximately 8 p.m. Bring two meals. Fare, £1.

MARIE ALLENDER, Excursion Secretary.

The Victorian Naturalist

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PROCEEDINGS

The President, Mr. Tarlton Rayment, occupied the Chair, and about 80 members and friends attended the General Meeting at the National Herbarium on March 13 last. Welcome was extended to Dr. Cunningham of California, to Miss B. Perrott, a former member returned from U.S.A., and to Mr Ian McCann, Secretary of the Stawell F.N.C.

Letters were received from both the Anthropological Society of Victoria and the Frankston F.N.C., accepting invitation to meet with the F.N.C.V. at the April General Meeting, for the presentation of the Australian Natural History Medallion to Mr. S. R. Mitchell.

Mr. E. S. Hanks then spoke on Victorian trees, and showed a series of excellent Kodachrome slides. He was accorded an enthusiastic vote of thanks by the meeting.

Mr. and Mrs. E. G. Webb of Kalorama were elected as Joint Country Members, and Mr. A. G. Mathews of Hampton as an Ordinary Member. Four nominations for membership were received.

After a number of nature notes, the President adjourned the meeting at 9.50 p.m. for the usual conversazione and perusal of exhibits.

WIMMERA FIELD NATURALISTS CLUB FORMED

On November 8, 1955, an inaugural meeting was held at Dimboola. Eleven persons were present. The Club was formed with Mr. T. E. Arthur of Dimboola as President. Messrs. K. Hately and A. Hicks were elected as Vice-Presidents and Mr. E. Muir as Secretary.

Meetings are to be held in turn in various towns in the district, and excursions are to be arranged (e.g. to Wyperfeld National Park and Little Desert). In this way interest should develop and the numbers in the Club increase.

REQUEST FOR MATERIAL OF ALISMATACEAE

J. T. Baldwin, Jr. (Chairman, Department of Biology, College of William and Mary, Williamsburg, Virginia), requires seed (and herbarium specimens as vouchers for the seed) of representatives of this family in Australia. These are needed to grow for cytological study, and it is advantageous to have the same species from various localities.

THE BROWN WARBLER IN EASTERN VICTORIA

By N. A. Wakefield

This little avian sprite has several claims to distinction. It is one of the tiniest of Victoria's birds, usually under four inches in length; it is the only bird in the State confined to the far-eastern "jungles", so that few observers ever see it; and its scientific name has been badly confused with that of one of its inland cousins. Apart from all that, it builds a nest of really wonderful design, it has a variety of intriguing little call-notes, and it is otherwise a most entertaining individual.

Let us first sort out its name. If you turn to page 124 of the earliest editions of J. A. Leach's *Australian Bird Book*, you may read, under the genus *Gerygone*:

> 252 SOUTHERN FLYEATER (Western) White-tailed Bush-Warbler, *G. culicivora*, E.A., S.A., C.A., W.A. . . . v.r. *forests, scrubs.*
>
> 253 BROWN FLYEATER, Brown Bush-Warbler, *G. fusca*, E.A. Stat. c. *forests, scrubs.*

Later editions list the same birds as:

> 252 SOUTHERN WARBLER (Western) White-tailed Flycater, *G. culicivora.*
>
> 253 BROWN WARBLER, Brown Flycater, *G. fusca.*

And in the latest editions is the final word to date:

> 252 WESTERN WARBLER, Southern, *G. fusca.* W.A. (Perth)—N.W.A.—S.A.—N. & N.W. Vic.
>
> 253 BROWN WARBLER, Flycater, *G. richmondi.* S.Q.—E.V.

How all this came about was indicated by Gregory Mathews in 1917 (*Birds of Australia* Vol. 8, p. 141), in discussing the present *Gerygone richmondi*, when he wrote:

> For this species the name *Gerygone fusca* has long been in use, but North many years ago pointed out that this was not the bird originally so named by Gould, but did not emphasise the point nor make the necessary emendation.

So the point was duly emphasised and the emendation took effect thereafter. We unscientific naturalists may be thankful that the numbers remained unchanged in Leach's book, and that the bird with which we are concerned remained brown!

The published records of the occurrence of the Brown Warbler in Victoria have so far all been rather indefinite. In 1900, in *Nests and Eggs of Australian Birds*, A. J. Campbell commented:

> The Brown Gerygone appears to possess a somewhat limited habitat, being confined to the scrubs of the coastal region from South Queensland to Eastern Victoria

Why did Leach indicate that this bird was common, in his first edition of *An Australian Bird Book* in 1911?

The next record followed the Royal Australasian Ornithologists Union campout at Mallacoota in 1914, after which S. A. White reported, under the title "The Birds of Mallacoota", on page 140 of *The Emu* of January 1915:

> *Gerygone*, sp. (?)—There was certainly a species of this genus in the district, but all efforts to identify it failed.

The same thing almost occurred twenty years later, on the occasion of the second R.A.O.U. campout in eastern Victoria, but in that instance nests saved the situation. In "The Excursion to Marlo" (*Emu* Vol. 35, p. 228) C. E. Bryant reported:

> On one occasion two members of the party reported, within a few minutes of each other, hearing the distinct song of *G. olivacea*. A local resident told of long, pendant nests, built by "brown" birds, and found a few years previously. That suggested the Brown Warbler (*G. richmondi*) and the production later, by the local man, of one of the nests referred to, confirmed the identification. . . . During October (just prior to the camp) my brother found the Brown Warbler nesting at the Thurra River a little further eastwards.

The present writer's first acquaintance with our little brown bird was made in 1935 or 1936, when a nest was found in a patch of jungle on the western bank of the Snowy River about six miles downstream from Orbost. It was in a clump of Lilly-pilly (*Acmena smithii*), about twenty feet from the ground, suspended from a slender twig, and there were three eggs in it.

In 1940 and 1941, close observation was made of the Brown Warbler in the small scrubby gullies about Mallacoota Inlet, particularly in such "pockets" on the northern bank of the Genoa River opposite Gipsy Point. This was recorded in "Bird Notes from Croajingolong", in August 1942 (*Vict. Nat. 59*: 70).

It seems that only one museum specimen of the Brown Warbler has ever been collected from Victoria; it was taken by D. L. Serventy and J. A. Tubb and it is in the Serventy-Whittell collection in Perth. Of it we read in "Notes on the Food of Australian Birds", by Keith McKeown, in *The Emu 43*: 191 (January 1944):

> *Gerygone richmondi* (Meth.)—Brown Warbler. Wingan Inlet, Vic. Sept. 24, 1942. Stomach crammed with very finely comminuted remains of Coleoptera and other insects, but nothing identifiable.

In the *Bird Observer's Club Monthly Notes* of April 1952, David Morgan contributed a report on the "B.O.C. Christmas Trip. Birds of Bairnsdale and Mallacoota". Under the heading "Brown Warbler (*Gerygone richmondi*)", he threw considerable doubt on the identity of three pairs of birds and of their two nests seen in a gully at Mallacoota. He said:

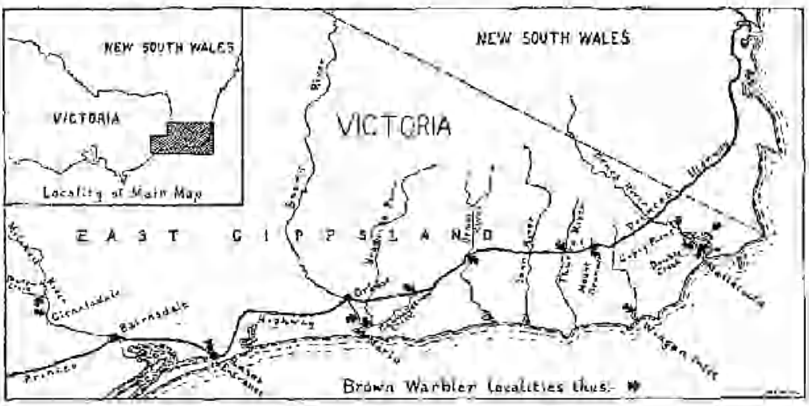
> Mathews . . . limits its distribution to the Richmond River district of N.S.W. The R.A.O.U. Checklist lists it as occurring in Southern Queensland and Victoria as well, though under what authority we do not know. The National Museum had no specimen of *G. richmondi* . . .

Then in the *B.O.C. Notes* of June 1952, he stated further that "The evidence is such that it is still possible that the birds recorded at Mallacoota were *Gerygone fusca*".

However, the Western Warbler (*G. fusca*) has never been authentically recorded for Victoria south of the Dividing Range; and it is tolerably certain that the birds at Mallacoota were correctly reported as the Brown Warbler. (See also note appended on page 186.)

The nests of the little birds are certainly masterpieces of construction. Campbell thought so, and his comment in *Nests and Eggs of Australian Birds* could hardly be improved upon:

> Some of the nests were simply marvellous for shape and beauty, being lengthened and elegant in form, with a small, cunningly wrought, hooded entrance at the side, and neatly composed of the most beautiful of rich emerald moss, decorated fantastically nearly all over with shields of aesthetic-coloured lichen.



Victorian Localities for the Brown Warbler

On some of Campbell's books, an illustration of this nest is used to adorn the spine. On January 24, 1947, J. H. Willis and the present writer found another such nest, suspended four or five feet from the ground, in a jungle patch by the Brodribb River not far from Marlo. Though about nine inches in overall length, the diameter of the entrance is only about $\frac{3}{4}$ of an inch—a tight fit for one's little finger. This illustrates nicely the tininess of its builder.

On January 3, 1954, Brown Warblers were heard and seen at "The Spring", by the Princes Highway at Mount Drummer, in the dense tangle of Lilly-pilly, Blackwood (*Acacia melanoxylon*) and Gum Water-vine (*Cissus hypoglauca*). The following day a nest was located by Double Creek, five miles west of Mallacoota. It was hanging from a single strand of Clematis (*C. glycinoides*) under a mass of foliage on an old tree-stump, about twelve feet above the water of the creek.

The two adult birds were moving about in the dense foliage of shrubs and trees—Kanooka (*Tristania laurina*), Lilly-pilly, etc.—flying out, hovering, taking an insect, flying in again, fanning the tail occasionally, and uttering a single soft "cheep", repeated at intervals of about four seconds.

It was noted that the male bird had conspicuously white bores, but such was not the case with the female. This point has been confirmed by similar observation since, and by examination of museum specimens; but all reference books examined by the writer indicate that the sexes are identical in colouration.

The birds are of a general rich greyish-brown colour, paler underneath, a little yellowish on the sides of the abdomen and buff on the flanks. The tail when fanned shows an incomplete black band towards the end, and it is white at the tip.

This nest apparently contained eggs. After the initial disturbance accompanying its discovery, the female came back to reconnoitre, flying direct to the spout but leaving again at once. The male came next, hovered a full second about six inches from the spout, and then flew off. The female then flew to the nest, moved in immediately, and could be observed through the lacy upper half as it settled down.

The call of the bird is described by Neville Cayley, in *What Bird is That*, as "a feeble, though pleasing twitter, resembling "What is it? What is it?" repeated several times". The same "translation" was given by Leach; but the Double Creek birds introduced variations such as "What is it? What is it? No it isn't! No it isn't! What is it?" in a fast trill. The same sort of thing was since heard elsewhere.

A year later, on New Year's Day 1955, the site of this nest was found to have been completely wrecked by the fall of a large tree. On this latter occasion, the remains of an old nest was noted, about six feet from the ground in a shrub of *Baeckea virgata* on the creek bank; and about fifty yards further upstream there was an occupied nest suspended from the end of a Lilly-pilly branch about ten feet from the ground. In the same tree was an old nest of the Black-faced Flycatcher, and in the same clump, the remains of yet another Brown Warbler's nest.

On this occasion there were Eastern Shrike-tits and Crescent Honeyeaters in the vicinity, while a little downstream a Rufous Fantail was busy building a nest.

On January 2, three long poles were cut, lashed together to form a tripod, and cross-pieces were fixed to two of them to form a ladder. While this was being built at the nest, both parent birds were much in evidence and were busy feeding the young ones in occupation. At times each came to the nest when the writer was on the ladder within two or three feet of it.

One bird stayed in the spout of the nest (as shown in Plate VII)

PLATE VII

Nest of Brown Warbler at Double Creek, Victoria. When feeding the young, an adult bird often stayed in the entrance for several minutes.

for about a quarter of an hour, then entered the structure, stayed for a few minutes, then flew away. Later, one was timed to stay in the spout for eleven minutes, then it backed out and flew off.

The next day, further observations were made and a few photographs taken. It was a windy day and the nest was often tossed violently, the parents keeping away at such times. They paid the nest nine visits during a period of one and a half hours (from 2.30 to 4 p.m.), often staying in the spout for several minutes at a time. It was obvious that both parents were busily concerned with the feeding of the young, for on two occasions they were at the nest together.

The time spent in the spout on each occasion varied from one to twelve minutes. This indicated that the food often consisted of a great number of small insects which were fed to the youngsters a little at a time. Finally, one bird stayed in the nest, apparently to keep the young ones warm as the afternoon became cooler.

On March 1, 1955, Mr. and Mrs. J. R. Wheeler of Ballarat found a Brown Warbler's nest by Cabbagetree Creek, 19 miles east of Orbost. It was situated about nine feet from the ground and was empty. This nest was collected, and the present writer was able to examine it before it was placed in the museum of the Ballarat Field Naturalists' Club.

On December 21, 1955, an excursion was made to the Mitchell River area to determine whether the Brown Warbler extended westward to the jungles of the sandstone gorges there. They were found to be quite plentiful, and some very interesting observations resulted.

In a small, very short gully, lateral to the river, about a mile upstream from the Glenaladale bridge, a pair of birds were seen and an old nest located hanging from a clump of Clematis. Of much greater interest however was a more recent nest, in a rather open situation, hanging from a strand of creeper (*Smilax australis*, the Austral Sarsaparilla) which was scrambling about in a Silver Wattle tree. In this case, the spout and tail had been torn off and a small hole pierced through the dome; it contained one egg, and no adult bird was seen nearby.

A little further on, a medium-sized creek came down to the Mitchell, and along it was a dense jungly growth of Kanooka, Lilly-pilly, Sweet Pittosporum (*P. undulatum*), Blackwood, etc. and numerous large lianas. Again the Brown Warbler was much in evidence. There was a nest about fifteen feet from the ground, hanging from a strand of the liana known as Stalked Doubah (*Marsdenia rostrata*). A nearby tree was climbed, and the nest investigated. It contained an egg, and a pair of the birds were in evidence, but brooding had not commenced. Though it was not tested thoroughly, an impression was gained that it is not possible to roll the eggs from a Brown Warbler's nest by tipping it horizon-

PLATE VIII

Habitat of the Brown Warbler.
Lilly-pilly and liana jungle at Mount Drummer.

Western Limit of the Brown Warbler.
Tributary of the Mitchell River above Glenaladale.

tally; they are evidently constructed so for safety when high winds toss them about.

Then a second torn nest was located, attached to a twig of Lilly-pilly several feet from the ground. It had a large hole ripped out below the spout, and the predator concerned had perched above it, for it had been lifted from the usual pendant position and left lying horizontally above the layer of foliage. It was empty.

Some miles to the north, excursion was made to the well-known "Den of the Nargun" at Deadcock Creek. Down in the gorge, the Brown Warbler was again in evidence though no nests were found.

The next day there was a second egg in the undamaged nest, and while in its vicinity, the pair of birds gave voice to four quite distinct calls. There was the usual "What is it?" (with variations) and the soft "cheep" noted previously; a soft, throaty "che-qua" was heard several times—somewhat like a call of the Buff-tailed Thornbill; and once the male uttered an alarm call—a harsher, comparatively loud note, rapidly repeated about a dozen times.

The two torn nests were collected later: the little pink-speckled egg measured $\frac{5}{8}$ of an inch in length and $\frac{1}{2}$ in width.

In the neighbourhood of the Warblers' nests at the Mitchell River, there were other jungle birds—many Rufous Fantails, a few Black-faced Flycatchers, Rose Robins, and several Lewin Honeyeaters, as well as a number of the more widely distributed Victorian species. Though associated thus in summer with species that migrate to Victoria from the north, it should be noted that the Brown Warbler is quite stationary.

A little over twenty years ago, New South Wales ornithologists gave *Gerygone richmondi* considerable prominence in the pages of *The Emu*. The fullest report was by A. J. Elliott of Cambewarra, under the title "Nesting Notes on the Brown Warbler" (Vol. 31, p. 237). A. J. Marshall contributed an article "A Problem in Nest Destruction" (Vol. 31, p. 237), and both H. Wolstenholme and N. Chaffer published notes on the bird (Vol. 27, p. 215, and Vol. 30, p. 58 respectively).

Marshall described cases of nests which had been torn open by some unknown predator, and both Wolstenholme and Elliott discussed similar occurrences; but none could do more than guess as to the identities of the raiders. Wolstenholme described the nest-building activities of the female bird, while the male accompanied her, singing and fluttering his wings. Chaffer and Elliott made like mention of the noisiness of the male during nest construction; in all cases, the song was the much-publicized "What is it?" Chaffer commented that the female "can be identified by her duller plumage"; and a reference by Elliott to a Brown Warbler's nest "placed at a distance of about three feet from the mossy home of a pair of Black-faced Flycatchers" could almost have been written of the association noted by the present writer at Double Creek.

Consideration of the two torn nests at the Mitchell River throws some light on questions raised by the above writers. It was thought that the Pied Currawong was a likely offender, and in this connection Elliott contended that the bird might fly to and fro past a nest in an open place and tear at it, but that it could pierce it with a small hole only if it were attached to a twig stout enough to afford a firm perch.

The first Mitchell River nest was in the open, it had the tail and spout torn right off, and it was pierced with a small hole high up, but it was suspended from a single slender liana stem. The agent was a long-beaked bird which *could* cling to the liana, though not securely enough to extract the last egg. It is possible that a Currawong could do that; they sometimes cling, flapping their wings, to a rough-barked eucalypt while pecking at something in a crack in the bark. Could a Butcher-bird or Kookaburra manage the same thing?

The second torn nest was in a deeply shaded situation, it had been *lifted* bodily from its hanging position, was torn wide open, and was left lying on top of the light foliage. Consideration of these four points suggests that a small owl was the culprit. In any case, it is quite certain that these two nests, within a few hundred yards of each other, were damaged by quite different kinds of individuals.

Early in February this year, Brown Warblers were noted in two additional localities. There was a group of four birds in the Lilly-pilly scrub on the shore of North Arm at Lakes Entrance, and birds were seen in the Kanooka and Lilly-pilly by the bridge that takes the Princes Highway over the Benm River.

So it is apparent that our little brown birds and their lovely pendant nests are quite plentiful in the far east of Victoria. They are restricted to the Lilly-pilly and liana jungles that occur in pockets from the Mitchell River gorges eastward to the border, a distance of about 140 miles. Were they in Lilly-Pilly Gully on Wilsons Promontory before the bushfires devastated the area recently; and if so, do they still survive there?

Notes: David Morgan's comment about Mathews is somewhat misleading. The latter first published the name *richmondi* for what he considered to be a northern sub-species of the Brown Warbler of central-eastern New South Wales (Gosford, etc.). Then when he transferred the name *fusca* to the western species, he established *richmondi* as the specific name of the eastern bird. Thus the north-eastern New South Wales birds became the typical *G. richmondi*, and Mathews designated the near-Sydney ones, which he said were paler in colouration, as subspecies *gouldiana*.

As regards specimens of *Gerygone richmondi* in the National Museum of Victoria, examination of material in the H. L. White collection there has brought to light five such, all from Ourimbah in New South Wales (H.L.W. Nos. 1546 to 1550 inclusive). However, these were in with specimens of the Western Warbler, for their original naming, as *G. fusca*, had not been amended to conform to the present revised classification.

A BILL FOR VICTORIAN NATIONAL PARKS

How Soon Now?

By J. Ros. Garnet

On September 27 of last year, a conference, convoked jointly by the Victorian National Parks Association and the Australian Primary Producers' Union, was held to discuss a number of matters relating to nature preservation in Australia. Those who took part in the discussion included Mr. Dewer Goode, Chairman of the State and Federal Land Usage Committees of the A.P.P.U., who acted as Chairman of the Conference, Mr. Ian McCann (A.P.P.U.), Messrs. Crosbie Morrison and Ros. Garnet (V.N.P.A.), Mr. Fred Lewis (F.N.C.V.), Messrs. Hugh Wilson and Ray Littlejohns (R.A.O.U.), Mr. S. Carpenter (R.A.C.V.), Messrs. C. E. Isaac and A. Wilkie (Natural Resources Conservation League), Mrs. Chas. Bott (Country Women's Association), Mr. Tom Kilburn (Youth Hostel Association), Messrs. R. Oldham and S. G. Skewes (M. & M.B.W.), Messrs. M. C. Downes and J. McNally (Fisheries and Game Dept.), Mr. R. G. Downes (Soil Conservation Authority), Mr. M. J. Harkins (Government Tourist Bureau) and Mr. T. Langford-Smith (Commonwealth Department of National Development).

As an outcome of the meeting, at which particular attention was given to Victorian National Parks, a deputation waited on the Premier (Mr. H. Bolte) on November 17 last to urge the early introduction of legislation for the control and development of the State's national parks and other nature preservation reserves and to seek a supplementary grant of £20,000 for the Tourists Resorts Committee to permit it to carry out immediate works on the State's pre-eminent scenic places in preparation for the expected influx of overseas and interstate visitors during the Olympic Games season.

Addresses were given by Messrs. Morrison, Rayment (who, on this occasion, was able to be present to represent the F.N.C.V.), Isaac, Mrs. Bott and Messrs. McCann, Wilson, Kilburn and Garnet. Mr. Rayment, in his brief speech, brought to the Premier's attention an aspect which is all too often neglected in discussions of this kind—the economic advantages of preserving the habitat of certain insect fauna such as the sericophorine wasps and species of native bees as a device for ensuring a beneficial biological balance in a country already overloaded with introduced pest species.

The Premier, in his reply, indicated that he was greatly impressed with the case put by the several speakers, the remarks of our Club's President being especially interesting to him. He assured those present that he was keenly interested in the welfare of the national parks and the problems of nature preservation, so much so that he would introduce a Bill to deal with the matter in the next session of Parliament which would meet in April 1956. So that he might have before him a complete picture of the requirements for such legislation he intended to seek the views of the various Government departments likely to be affected by it and he invited the organizations represented by the deputation to prepare for him a draft Bill in which could be included provisions which were considered as being essential to such a measure.

He made it clear that he was not inclined to take the Bill introduced by a previous Government in 1952 as a model. He had in mind something which would better express his Government's attitude to land utilization in this State—something which would take into account the conservation of natural assets in balance with both present and future economic development.

Referring to the request for the supplementary grant the Premier was less encouraging. However, he promised to examine the matter although the State's current financial commitments made it very doubtful whether such a sum could be allocated during the present financial year.

NATURALISTS' NOTEBOOK

(Reserved for your Notes, Observations and Queries)

NATIVE CYMBIDIUM AT MERIMBULA

Readers may be interested to know of the occurrence of the epiphytic *Cymbidium suave* some fifty road miles beyond the eastern border of Victoria. The writer first found it growing just outside the boundary of the camping park at Merimbula in early January 1939, and specimens were sent to the late W. H. Nicholls. During the last four summers, flowering plants have been observed again in the same place, in all cases growing on eucalypts. They perched at heights varying from a few to perhaps thirty feet, looking like clumps of wide-leaved rushes with fragrant, yellowish-green flowers in racemes several inches long. Unfortunately, no plants were observed within the camping reserve, and the surroundings are gradully being alienated for building purposes. It may be that the species extends into eastern Victoria.

—Ernest H. Homann.

[In January 1954, Mr. W. Hunter of Mallacoota found a plant of this orchid growing in a stump by the old Tathra Road four miles north of Merimbula; and more recently, Mr. Paul Fisch saw some a little to the north of Tathra.—Editor.]

IN THE GIPPSLAND BUSH

"Caw, caw, caw," two crows called as they saw me climb the little hill in a secluded part of the Gippsland bush. Then there was silence, broken suddenly by the raucous laugh of our friend the Kookaburra, then all was quiet again. I stopped walking, and sat down to fully appreciate the wonders about me. Towering, almost struggling to reach the pale cobalt-blue sky, the various eucalypts formed a natural fence cutting me off from human associations. Ferns, heath, tea-tree, Black Wattle and beautiful delicate terrestrial orchids, all grew together to form the homes of six-legged creatures of all shapes, sizes and colours. I looked up, just for a minute, to see several little black and yellow striped insects hovering, almost motionless, their transparent wings oscillating briskly, when, with several sudden forward movements, the native bees were gone. Several common forms of butterflies fluttered past in the now cool breeze, and I arose quietly and slowly, and walked reverently from the virgin unspoilt bush, to the old tumbling farm-house, a sign of the unhurried, peaceful and harmonious past.

—Michael B. Morgan.

WHAT, WHERE AND WHEN

F.N.C.V. Excursions:

Saturday, April 28—Botany Group excursion to Botanic Gardens. Subject: North American trees. Meet 2 p.m. at gate near Herbarium.

Sunday, May 13—Parlour coach excursion to Murrundindi and Wilhelmina Falls. Leader Mr. R. Hemmy. Coach leaves Batman Avenue 9 a.m., returns approximately 8 p.m. Fare £1. Bring two meals.

Group Meetings:

(8 p.m. at National Herbarium)

Wednesday, April 18—Microscopical Group.

Monday, April 23—Botany Group. Botany in colour. A series of Kodachrome slides to be shown by Mr. K. Atkins.

Wednesday, May 2—Geology Group. Crystallography. Speaker: Mr. Davidson.

Marie Allender, Excursions Secretary.