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*of the*

**FIELD NATURALISTS CLUB OF VICTORIA**

in which is incorporated

The Microscopical Society of Victoria

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*Hon. Editor:* N. A. Wakefield

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# The Victorian Naturalist

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MAY 10, 1956

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## PROCEEDINGS

The General Meeting, held at the National Herbarium on April 9, 1956, took the form of a combined meeting with the Anthropological Society of Victoria and the Frankston Field Naturalists Club. Mr. John Moir, donor of the Australian Natural History Medallion, was welcomed to the meeting.

Upon receipt of a letter on the subject, the Club decided to join with the Wimmera F.N.C. in protesting against the proposal to hold an open season for possums.

The President presented the 1955 Australian Natural History Medallion to Mr. S. R. Mitchell, of Frankston, and spoke of his outstanding work in the fields of ethnology and geology. Dr. Wishart supported his remarks, and Mr. Mitchell responded.

Mention was made of the passing of Mr. F. J. Bishop, and Messrs. Swaby and Woollard spoke of his service to natural history.

The President referred to the display of wildflowers to be arranged by the Bank of New South Wales during the Olympic Games, and called for suggestions from members as to what wildflowers would be available in November.

Mr. W. L. Williams spoke on the Snowy Mountains in winter, and showed a series of coloured slides of the Monaro and Kosciusko areas under snow.

Mr. Hugh Wilson spoke on the deputation to the Premier to urge legislation for National Parks. The hope was expressed that a new bill would ensure adequate of the countryside and its flora and fauna in the reserved areas.

Mr. H. Stewart referred to the destruction in Western Australia, in a four years period, of 10,711 eagles and 49,371 emus. He referred to National Parks, and urged that there should be some close reserves which would not be despoiled with the idea of making them available to people.

Mr. N. Wakefield asked members to show an interest in the Youth Movements Committee which Council had decided should be re-constituted. He requested that those who had Club copies of the *Victorian Naturalist* should return them or inform the librarian, for checking purposes; and that any back numbers of the journal, not required further by members, should be handed back to the Club.

Mr. Swaby asked the meeting to vote on the idea of holding annual Nature Shows. This was approved, though one member spoke against the idea stating that the last two shows had returned little or no monetary gain.

Mrs. H. Conway, Miss C. Bruck, Miss E. Herbstreit and Miss B. Perrott were elected as Ordinary Members, and Mr. G. Booth as a Country Member. The President welcomed them to the ranks of the Club. Two nominations for membership were received.

Mr. John Bechervaise was nominated by the Club for receipt of the 1956 Natural History Medallion.

Exhibits included some marine shells by Mr. Gabriel, aboriginal weapons by Mr. Mollison and cultivated native flowers by Mr. Hammet.

Mr. Wakefield showed two torn Brown Flycatcher nests and one of the Black-faced Flycatcher which had been commented on in the April *Naturalist*.

The meeting was adjourned at 10.30 p.m. for the usual conversation.

### EDITORIAL

This month, the first number of Volume 73 of the *Victorian Naturalist* has been printed, and this issue begins with the title page of the new volume. The index is to be incorporated at the end of the twelfth part, that of April 1956, so it will not appear as a separate unit. It is considered that this arrangement will be an improvement on that of the past thirty years, when indexes were issued a month or so after the conclusion of their respective volumes.

There is usually a preponderance of botanical material available for the journal, so contributions are invited on zoological, geological and anthropological subjects. Papers and articles should be typed or written in a clear hand, with sufficient space between the lines and at the margins for the necessary editing. Authors should note the format used in the journal, particularly as regards the method of printing dates, references, technical names, etc.

If the journal pleases you, then consider how it can be improved; if it does not, then make shift to remedy the situation; but remember that, at all times, the *Victorian Naturalist* is what YOU make it.

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### MARINE BIOLOGY AND ENTOMOLOGICAL GROUPS

At the last meeting of the F.N.C.V. Council, it was decided that some of the Club's special groups should be revived, particularly the Marine Biology Group and perhaps the Entomological Group. The matter will be brought before the forthcoming May General Meeting, and those who will not be at that meeting and who are interested in one of these subjects should communicate with Mr. J. W. H. Strong, c/o Legislative Council, Parliament House, Melbourne.

### EXCURSION TO CHELTENHAM PARK

On Saturday, March 3, about thirty people, including several members of the Cheltenham Park Planning Committee and of the Beaumaris Tree Preservation Society, were present to inspect the progress made up to date in converting the Park into a reserve for native flora. The Mayor of Moorabbin (Cr. Wishart) also attended during the afternoon.

The history of the Park Planning Committee was briefly traced, from 1951 when a public meeting was called by the Cheltenham Progress Association to consider planting the Park with native flora. One map shown to those present showed the general layout of the Park, while a second one indicated how it was divided into hundred-foot squares and how it was proposed to arrange various groupings of plants.

The strips, each a hundred feet wide, running parallel to Park Road are labelled by capital letters, while those running north and south are designated by small letters. Any particular square is then identified by using one capital and one small letter. At the corner of each square there is a white post with four letters corresponding to those for the four adjoining squares.

The first area inspected had been planted last September after the removal of two large pine trees. Some of the plants noted to be doing particularly well included *Melaleuca hypericifolia*, *Leschenaultia biloba*, *Acacia broomei* and *A. dyummandi*. The party went on to some other areas where several hanksia species are making spectacular progress, and *Boronia heterophylla*, *Correa reflexa*, *Prostanthera* species, and Kangaroo Paws were seen to be doing particularly well.

When the party walked towards the western end of the Park; there were many comments on the beauty of the two ovals. They are surrounded by thick banks of trees, including Manna Gums, Mahogany Gums, Late Black Wattles, Coast Tea-tree, Cherry Ballars, and Coolamundra Wattles. Swamp Gums and Red Gums were also seen near the Western Oval, and Sweet Bursaria is quite common there.

While making our way back along a pathway which passes to the south of the ovals, we were joined by Mrs. Temple-Watts who lives close by and visits the Park almost every day. She has found nine species of orchids which still grow in the Park, and she was able to give the excursionists much information about the many species of birds which frequent the area and those which are known to nest there.

After some further inspection of the planted area, Mr. E. Hanks moved a vote of thanks for what he described as a very enjoyable and informative excursion, and this was carried with acclamation. The great interest shown by those who attended was certainly most encouraging to the leader of the Excursion, to the Cheltenham Park Planning Committee and to the Moorabbin Council.

—A. E. BROOKS

### MICROSCOPICAL GROUP

At the March meeting of the Group, Mr. K. W. Atkins lectured on the subject of botany. He was assisted by Mr. C. Middleton who showed transverse sections, etc., greatly enlarged on the screen, by means of his excellent projector. Mr. C. Nance commented on some of his own slides and their staining, they being screened also.

The April meeting was most successful also, with Mr. W. Evans speaking on photo-micrography, both in black and white and in colour. This was demonstrated in a very practical manner.

Although not a microscopical subject, the showing of Kodachromes of Western Australian wildflowers, by Miss Jean Woollard, was a delightful feature of the meeting.

For the meeting on May 16, Mr. D. McInnes will take the subject of rock

sections in the realm of Geology. Members are requested to bring along their microscopes and some appropriate slides.

Mr. McClintock has been elected the Group's new leader, following the retirement of Dr. R. M. Wislart. The future promises well for group activities, several new members and a number of encouraging enquiries point to rising interest in this special field.

#### EARLY VICTORIAN RECORDS OF THE BROWN WARBLER

While the April issue of the *Victorian Naturalist* was in press, with the article entitled "The Brown Warbler in Eastern Victoria", it was ascertained that this bird was listed as Victorian in three places prior to the publication of A. J. Campbell's *Nests and Eggs of Australian Birds*. The references are as follows:

*Southern Science Record* 2: 61 (1882)—under "Oology of Australian Birds" (Part IV), by A. J. Campbell.

*Victorian Naturalist* 1: 66 (August 1884)—under "Victorian Fauna. Class II. Aves—Birds", by T. A. Forbes-Leith and A. J. Campbell.

*Victorian Naturalist* 6: 33 (May-June 1889)—under "Trip to Croajingolong", by Professor Baldwin Spencer and C. French, F.L.S.

Furthermore, the bird was known from the Mitchell River jungles over forty years ago. It appeared in a list appended to an article, "Bird-life on the Upper Mitchell" (i.e. Deadcock and Bull Creeks), by F. J. Thomas. Ref. *Victorian Naturalist* 28: 200 (February 1912).

It would be interesting to know who observed the Brown Warbler in Victoria prior to 1882.

An error in citation should be corrected: In line 31 of page 185 of last month's *Victorian Naturalist*, "237" should read "263", in the reference to Elliott's paper.

Also, in the article last month, near the foot of page 178, the word "presumably" was inadvertently omitted. The distribution, as given by Campbell, should read "from South Queensland to presumably Eastern Victoria".

—N. A. WARFIELD

#### VICTORIAN FLORA SEVEN MILES FROM G.P.O.

In December last, a boy of twelve, a valued worker at Sydenham, drew attention to a spot on Gardiner's Creek, near the Alamein cricket ground. The area has never been cultivated and this bend of the creek has so escaped trampling as to be almost free from introductions. High summer is not an ideal time for making a census, but 33 species are listed. It is a Red Gum plant association, one beautiful tree dominating the entrance to the ground.

Plants listed are—Common Maidenhair, 3 grasses, *Luzula*, *Lepidosperma laterale*, 8 lilies, *Hypoxis*, *Microrhis*, Sundew, Bursaria, 2 wattles, *Bassiaea*, *Pogonthera*, *Pimelea humilis*, *P. curviflora*, Red Gum (seedling), Silky Tea-tree, Swamp Paper-bark, 2 *Halaragis*, *Nertera*, Centaury, *Goodenia ovata* and *Leptorrhynchus tenuifolius*. To the writer, it appears that east has met west when maidenhair and *Goodenia ovata* occur in the same small area as *Caesia vittata* and *Pimelea curviflora*.

Fortunately the survival is in Camberwell City and was looked into as soon as attention was drawn to it. About 600 square yards have been selected for a sanctuary. The Superintendent of Parks and Gardens intends to proceed with the fencing as soon as a break in the weather makes available the man hours now being given to watering the City's young trees.

—W. WADDELL

**A NEW TRIGGER-PLANT FROM THE NORTHERN TERRITORY**

By RICA ERICKSON\* and J. H. WILLIST

**STYLIDIUM QUADRIFURCATUM** *Erickson & Willis*

species nova subgeneris *Andersonia* inserenda, ob formam corollæ *S. fissilobum* F. Muell. et *S. muscicola* F. Muell. accedit sed differt ab utroque statura parviorè atque modo auctus (scapo unico); *S. muscicola* folia pauca infra frondem rosulantia (folio quoque 1-2 cm. lato) fert, eius calyx usitate omnino glandulopilosus lobis obtusis dum petala (quanquam bifida) non late furcata sunt; *S. fissilobum* folia dispersa parva linearia bractiformia solum fert, eius flos *S. muscicola* similimus sed calyce minus glandulopiloso.

Herbaria circiter 7 cm. alta, glabra, multiflora, omento albedo-hyalino infra frondem rosulantia. Folia circ. 5, rosulata (ad basin caulis), ± sessilia, late ovata, circ. 3 mm. longa. Scapus unicis, sed multis ramis qui emergere inferne incipiunt, in partibus inferioribus pullior. Calyx linearis, ad florimentum vix 10 mm. longus sed usque ad 12 mm. producens, omnino glaber præter pilorum paucorum (glandibus) prope basin loborum; lobi perbreves, acuti, eorum duobus paucis usque ad apices connatis. Corolla circ. 6 mm. lata, pallida, petalis perinequalibus, tubus quam calyx lobis paullo longior, inter petala anteriora profundius incisus petala omnia regulariter late furcata, pari anteriore bifido erecto et tertium longitudinis petalorum alterum vix attingenti, pari posteriore bifido late expandenti circ. 5 mm. longis; faucis appendiculae prominentes, saltem duæ (quandò visibi), laterales et illi *S. schizanthi* similes, sed glandes marginales abeentes; labellum minutum angustum apicatumque, in superficie tubi corollæ infra incisuram affixum. Columna gracilis, corolla circ. æquilonga.

A small glabrous plant, about 7 cm. high, with numerous flowers and a transparent whitish caul sheathing the stock below the basal rosette of leaves.

Leaves about 5, dark green, rosulate at base of stem, more or less sessile, broadly ovate, about 3 mm. long. Scape single, with numerous branches spreading from rather low on the scape, darker in the lower parts, with minute narrow bracts subtending the branches and bases of the flowers. Calyx linear, scarcely 1 cm. at time of flowering, but lengthening later to 12 mm.; lobes very short, pointed, two of them connate almost to the apices, glabrous throughout except for a few glandular hairs near the bases of the lobes. Corolla about 6 mm. wide, pale, with very unequal petals; tube a little longer than the calyx lobes, more deeply incised between the anterior petals. Petals all regularly and widely forked; anterior pair bifid, erect, less than a third the length of the other petals; posterior pair bifid, about 5 mm. long, spreading broadly. Throat appendages prominent, at least 2 (as far as seen), broad, obtuse and similar to those of *S. schizanthum*; but no marginal glands present. Labellum situated on the outer wall of the corolla tube below the incision, minute, narrow and pointed. Column slender, about as long as the corolla.

*Epithet*: In allusion to the four broadly forked petals.

*Vernacular name*: Four-prong Trigger-plant.

*Habitat*: On low-lying wet ground near water-courses.

*Representative localities*: NORTHERN TERRITORY—Pine Creek (HOLOTYPE in MEL—J. H. Niemann, Apr. 1904, ex Herb. F. M. Reader); "South to tributaries of McKinley River" (MEL and K—R. Tate, No. 23, ?1882).

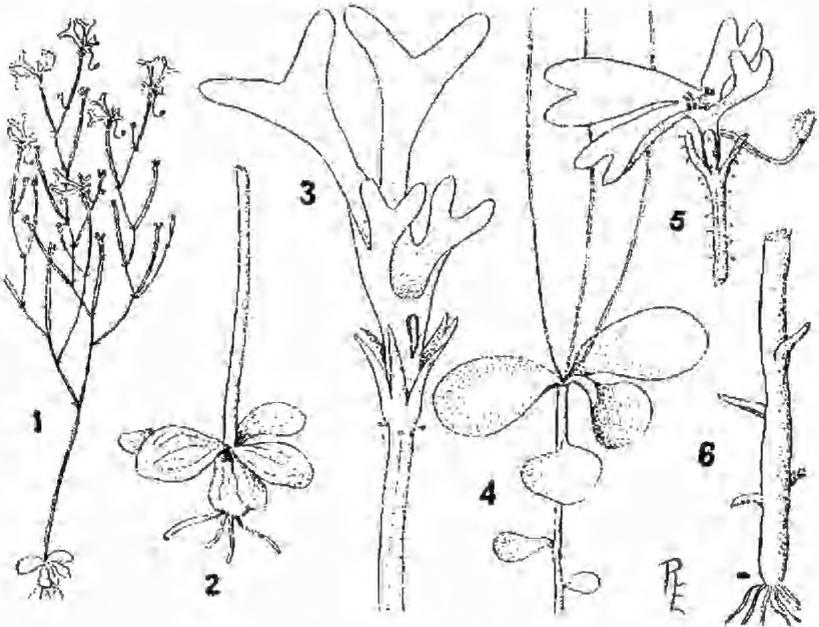
The new species is close to *S. fissilobum* F. Muell. and *S. muscicola* F. Muell. (of the tropical subgenus *Andersonia*) in the form of its corolla, but differs in habit of growth—with single, short, much-branched scape. These

\* "Fairlea", Bolgart, W. Aust.

† National Herbarium of Victoria, S. Yarra, Vic.

latter species are both taller and larger. *S. muscicola* is sparsely leafy below the rosette which is much larger (leaves 1-2 cm. wide); its petals, though bifid, are not as widely forked, while the calyx is usually entirely glandular-hairy and has blunt lobes. *S. fissilobum* bears only small, linear, bract-like leaves scattered along the stem; the flower is similar to *S. muscicola*, but with less glandular-hairy calyx.

The foregoing description is based upon dried, but well-preserved, specimens which were found among sheets of *Stylidium schizanthum* at the National Herbarium, Melbourne. Living material should be studied, whenever available, since it may yield additional data on the throat appendages—so difficult to examine satisfactorily in pressed flowers.



*Stylidium quadrifurcatum* sp. nov.

1. Habit of growth; 2. Basal rosette of leaves, and sheath; 3. Flower, including upper portion of calyx. For comparison—4. Leaves of *S. muscicola* F. Muell.; 5. Flower of *S. muscicola*; 6. Leaves of *S. fissilobum* F. Muell.

### CORRECTION TO PREVIOUS ARTICLE

In our "Critical Notes on Australian *Stylidiaceae*" [Vict. Nat. 72: 131 (Jan. 1956)], the following amendment is necessary to the paragraph discussing affinities of *Levenhookia octomanlata*:

In second last line of page, delete the two words "non-umbellate inflorescences" and after "petal" (last line) add—"while the two latter species have non-umbellate inflorescences" [The flowers of *L. leptantha* are decidedly umbellate ]

--R. E. & J.H.W.

## STUDIES ON AUSTRALIAN CHAROPIDAE

## Part 4—Convex Genera

RON C. KERSHAW

Shells which have their apical whorls convex in outline are placed in the genera discussed. There is a group with, and one without, apertural lamellae.

The choice of the term convex is probably unfortunate, for there are some forms referred to in this work as "planate" which in fact are a little convex in outline. However, study of the form reveals that some of these shells are more elevate in outline than the majority. The adjective "convex" is used here only to distinguish these elevated forms from those which are "concave" or, more or less, flattened. Members of the family *Paralaunidae* are sometimes markedly convex in outline, but the form of the *Charopidae* is subtly different and not so elevate as those shells which have developed in a, by comparison, dry habitat.

It is noticeable that the umbilicus is rather wide in the series without apertural lamellae, whereas it is narrow to minute in the series with this feature. Moreover, in the first series, the sculpture tends to be rather bold, while in the subimperfurate, dentate genus, the sculpture is very fine.

## Series I—Aperture not Dentate

*Pernagera* Iredale 1933: In his fascinating study of Western Australian land shells Iredale (1939), gave a description of this genus, for the type, *P. albannensis* Cox 1868, is a Western Australian shell. Points made were the elevation, wide umbilicus, coarse sculpture, loose coiling of the whorls with deep sutures, radially striate apex with the tip smooth. The aperture is rounded, and very uniform among the various species, the columella is generally rather straight. Many of the species are decorated with more or less defined streaks or flames of colour at intervals on the whorls. There is a whole series of species developed in Tasmania, some of them having the umbilicus narrower than the western species. In the essay preceding this, growth stages in a Tasmanian species were described. There is a Victorian species, *P. gathiffi* Gabriel which agrees with the Tasmanian, while *P. lakelandensis* Gabriel 1947 has some resemblance, though it lacks the colour markings and the straight columella.

Distribution: Western Australia, Tasmania, Victoria.

*Selomedina* Iredale 1933: These are fragile shells with smooth protoconch, adult sculpture elevated ribs with radial striae crossed by faint spirals in their interstices. Compared with *Pernagera* the ribbing is more elevate and wider spaced, while the type, *S. seticostata* Medley 1924 has slender upright bristles on the major ribs. A similar feature described as "long slender points" occurs in the only other species yet described, *S. aculeata* Hedley 1899, which is also said to have the spire level.

Distribution: Mid to northern New South Wales.

*Epinterium* Iredale 1939: These shells, like *Pernagera*, have a radially striate apex with the tip smooth. The adult sculpture consists of strong, distant radial ribs, with close radial striae in the interstices; the whorls are loosely coiled, the umbilicus wide and cavernous. There is a resemblance to *Pernagera* but the form is more depressed than in that genus. The type is *E. restifer* Iredale 1939, and there is a subspecies, *firmatum* Iredale, which has sculpture of bold ridges.

Distribution: Western Australia.

*Kannaropa* Iredale 1937: Iredale remarked a resemblance to *Dentheronia* but without the apertural tooth. There is a depression near the aperture on the last whorl, the sculpture being remarked as bold. The type is *K. subrugosa* Legrand 1871, and Brazier, who provided Legrand with the description, remarked the sculpture as of bold subrugose striae. Later Petterd referred

to the hold "projecting out of the ribs" in his monograph. Authors have sometimes used descriptive terms loosely in the past, adding to the confusion inevitable with such tiny shells. Between the ribs the interstitial sculpture is finely striate, and the umbilicus is exceptionally wide. Iredale gave the distribution as South Tasmania, but there are shells from the Blue Tier which is in the north-east of the State. Gabriel has the species from Victoria.

Distribution: Tasmania. Victoria.

*Theskelomensor* Iredale 1933: This genus was introduced for *T. lizardensis* Pfeiffer 1863, a shell which appears to have more affinity with Pacific than Australian forms. It seems a doubtful Charopid, and is very distinctive, the sculpture being of close radial ribs with a strong secondary spiral; the shell is elevate in contour and strongly keeled. Consideration of this beautiful shell may be left to the experts.

Distribution: Lizard Island, North Queensland.

### Series 2—Aperture Dentate

*Bischoffia* Iredale 1937: Iredale describes a subglobose form with spirally lirate protoconch, adult sculpture almost reticulate, minute umbilicus, and outer lip with two internal lamellae. The type is *B. bischoffensis* Petterd 1879. The fine sculpture recalls *Dypucharopa*, a Western Australian genus with a concave spire and narrow umbilicus. The protoconch sculpture of spirals combined with the adult sculpture and umbilical features suggested *Oreomora*, and to a lesser degree *Pillomora*, and these are Victorian and Tasmanian and perhaps allied.

Distribution: N.W. Tasmania (Mt. Bischoff).

*Dantherma* Iredale 1933: Shell depressed convex, elevate spire, aperture dentate; adult sculpture coarse sharp ribs, interstices with very fine radial striae, umbilicus moderately narrow and deep, the protoconch apparently radially ribbed. The aperture of this shell can only be described as sub-square. The type is *D. dispar* Brazier 1871, which species has a small internal "oblong white callus tooth" near the base of the aperture, a particularly interesting and distinctive shell.

Distribution: Tasmania (Mt. Wellington).

One has observed that where the protoconch sculpture is spiral the subsequent sculpture is generally fine, on the other hand where the protoconch has radial sculpture, stronger sculpture tends to dominate the adult. The family as a whole tends toward strong sculpture compared with related groups, although Laomid forms exhibit many similarities. Both spiral and radial sculpture appear to be ancestral at least in part, but the tendency toward strong ribbing may be a comparatively recent acquisition. Shells are seen which have some interstitial riblets or striae tending to become stronger than others. The genera displaying smooth protoconch are variously connected with the other groups, one at least has very simple strong sculpture only, other sculpture having vanished if ever present. There is a tendency for some aspects of both adult and protoconch sculpture to become obsolete, and the strong radials and perhaps smooth protoconch to triumph. Fine sculpture is perhaps a sign of degenerating sculpture, or simply a retention of ancestral sculpture.

*Cralopa* Iredale 1941: The species *C. stroudensis* Cox has already been referred to in part 2 of these studies (1955 a), when it was observed that the shell differed in form from the genus *Gyrocochlea* in which Hedley had placed it. It was anticipated that *G. stroudensis* would be separated and in fact this had already been done. This species was designated the type of the genus *Cralopa* in a work which had not been seen by the writer when previous parts of these studies were prepared. The essential points of difference are the nature of the spire which is not concave but very slightly raised in the

figure although Iredale describes it as flat. The shell is smaller than species of *Gyrorachlea*, while even more noticeable is the smaller umbilicus. Iredale (1941, p. 269) points out that the shell is more loosely coiled, has very fine sculpture, while the protoconch is smooth. He added a second species, *C. intensa* Iredale 1941, from Byron Bay.

Distribution: New South Wales.

*Letomala* Iredale 1941: *Letomala* was introduced for the species *L. contortus* Hedley first placed in the dentate genus, *Rhophodon* Hedley. However *L. contortus* differed as has already been noted by the writer, in having but few apertural lamellae, and the sculpture is much finer. In defining *Letomala*, Iredale draws attention to the large smooth protoconch; zigmoid, rather irregular sculpture; sinuate outer lip, giving a distinctive aperture, narrow above and broader below. There are three lamellae, one on the inner lip, and two basal on the outer lip.

Distribution: New South Wales.

KEY TO THE GENERA OF GROUP (c) CONVEX GENERA

- Shell with spire elevate, aperture not dentate.
  - Apex radially striate, tip smooth.
    - Interstitial sculpture fine striae.
      - Umbilicus wide, cavernous.
        - Primary adult sculpture, close coarse radial ribs . . . . . *Pernagera*
        - Primary adult sculpture, strong distant radial ribs . . . . . *Epinicium*
      - Apex smooth.
        - Adult sculpture elevated radial ribs.
          - Interstitial sculpture fine radial, faint spiral striae.
            - Umbilicus wide, ribs with bristles . . . . . *Setomedia*
          - Adult sculpture numerous fine curved riblets.
            - Interstitial sculpture absent.
              - Umbilicus narrow . . . . . *Cralopa*
    - Shell carinate.
      - Adult sculpture radial ribs with dominant secondary spiral.
        - Umbilicus moderately wide . . . . . *Theskelomensor*
    - Shell with marked groove above periphery at aperture.
      - Adult sculpture bold radial ribs, subrugose.
        - Interstitial sculpture fine striae.
          - Umbilicus very wide ( $\frac{1}{2}$  diameter) . . . . . *Kannaropa*
    - Shell with spire elevate, aperture lamellae few.
      - Adult sculpture fine radials, microscopic spirals.
        - Protoconch spirally lirate.
          - Umbilicus very small, almost absent . . . . . *Bischoffena*
        - Adult sculpture coarse sharp radial ribs.
          - Interstitial sculpture fine striae.
    - Shell with spire depressed, apertural lamellae few.
      - Adult sculpture fine close rugose striae.
        - Protoconch smooth.
          - Umbilicus wide, shallow . . . . . *Letomala*
          - Umbilicus moderately narrow, deep . . . . . *Dentherona*

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## EUCALYPTUS CAMALDULENSIS AND E. LONGIROSTRIS (ROSTRATA)

By J. B. CLELAND, C.B.E., M.D.

In 1832, Dehnhardt (Cm. *Pl. Hort. Camaldul.*, Edit. 2 40) published his description of *E. camaldulensis*. The tree was then 40 feet high and 10 years old. (See Reizo Agostini, "Cenni Storici Sulla Introduzione Degli Eucalitti in Italia" in *L'Italian Forestale e Montana*, Anno VIII, fasc. n. 3—Maggio-Giugno, 1953, 3-8). Agostini says that the Hortus Camaldulensis was situated on the hill of Vomero (Naples) in a charming position between the hills of Camaldoli and Posillipo and the Gulf of Naples, at a height of about 170 metres. It was attached to the patrician country seat of Francesco Ricciardi, Count of Camaldoli. Agostini says that the garden was short-lived and all the eucalypts in it have completely disappeared since about 30 years ago when the majestic trees of the first planting, nearly 100 years old, were cut off. (Translation by Mrs. Zimmler, University Library, Adelaide.)

In Dehnhardt's Latin description, the operculum is given as conico-acuminate and equalling the calyx. Now one of the most striking features of *E. rostrata* Schlecht., the one which gave it its specific name, is the beaked appearance of the operculum. It is true that on occasional trees, this pitched-in or beaked appearance may not be manifest. Every tree on the plains round Adelaide has probably a rostrate operculum, but trees occur in the north of South Australia with buds which are conical. The fruit is merely called globose with no mention of the valves.

The flowering period is given thus: Nov. Holl., Flor. Sep. Oct. (quoting Maiden) "*E. rostrata*" in my experience flowers only between the end of December, in January and in February.

Dehnhardt says that he received it under the name of *E. persicifolia*, but, receiving the true *E. persicifolia* later, he perceived a great difference and he could not approach it to anything else. *E. persicifolia* DC is given by Blakeley as a synonym of the Blackbutt, *E. pitularis*. This, of course, at once suggests that the seed came from New South Wales. Where could the seed of this eucalypt, planted in Italy in 1822, have come from, if it is indeed the same species as *E. rostrata* Schlecht. and *E. longirostris* F. Muell.?

In 1822, the only parts of Australia where the species grows that had been visited were Kangaroo Island (Robert Brown, Baudin—1802), the head of Spencer Gulf and Mt. Brown (Robert Brown, 1802), Port Phillip (Grimes and Flinnig, 1803) and the western plains of New South Wales (Cunningham and Fraser, Lachlan near Combolbin, 1817).

The only place on Kangaroo Island where *E. camaldulensis* grows is on the Cygnet River, even close down to its exit to the sea. Mr. H. M. Cooper, the authority on the South Australian part of the expeditions of Flinders and of Baudin, assures me that members of these did not visit the Cygnet River or its immediate neighbourhood. The buds on these trees are characteristically rostrate. Robert Brown was put ashore from "Investigator" probably a little north of Yorala Harbour and made directly for Mt. Brown, some fifteen miles away, across the plain between the Flinders Range and the sea. Various creeks emerge from the Flinders Range and cross this plain, some fading out as they do so, though the plain is only about ten or twelve miles wide at its widest. Mr. H. M. Cooper of the South Australian Museum, and Mr. A. R. R. Higginson of Port Augusta, who know this locality well and have studied the probable route taken by Robert Brown, were at first doubtful whether the latter, making a straight course for the mountain later named after him, must inevitably have crossed over one of these creeks, though he must at least have seen them not far off. However, a special search by Mr. Higginson near the foot of the range revealed a small creek emerging near Horrocks' Pass which it seemed Robert Brown

must certainly have crossed, a creek I had myself crossed some months previously, when I came to the same conclusion. Buds of Red Gums on it were typically rostrate. Mr. Higginson collected for me a number of samples of Red Gums from this area up to the Pitch-Ritchi Pass and amongst these there was one at least whose opercula were not rostrate but resembled those in Dehnhardt's specimens. Red Gums at Bareota, further south, all had rostrate buds as far as I examined them.

In 1803, some months before the arrival of Collins in "Calcutta" in October, Governor King had sent Acting Surveyor-General Grimes with a gardener James Fleming, to "walk round Port Phillip . . . to examine the soil, timber, etc.". During this peregrination they discovered the Yarra, and Fleming in his report concluded that "The most eligible place for a settlement that I have seen is on the Freshwater River", i.e. the Yarra (*A.N.Z.A.A.S. August 1932: 321*). *E. rostrata* grows on the Yarra. It is hardly likely that Fleming collected seed of it which found its way eventually to Italy.

Ida Lee, in *Early Explorers in Australia* (1925) has published Allan Cunningham's Journal. Between April 20 and May 17, 1817, he travelled from Bathurst to Farewell Hill. On April 25 they made the Lachlan River, probably somewhere near where Condobolin now stands. He writes (p. 190) "its banks are very high and clothed with lolly timber of a species of *Eucalyptus*, commonly denominated Black-buttet Gum (footnote, presumably by the Editor, *Eucalyptus pilularis*), inclining inward so as to form in some places a kind of arch, with the heads of the trees of the same species on the opposite bank. This is obviously the River Red Gum, many old trees of which have a rough dark base to the trunk. Its identification in the footnote as *E. pilularis*, a coastal species, is an editorial assumption based on the popular name given to it by Cunningham, who surely cannot have examined the fruits. Under the date 27th (April), Cunningham writes, "I visited the rocky hills on the left bank with C. Fraser of the 46th Regt., who had been sent as one of our party, in order to form a separate collection of seeds and specimens for Earl Bathurst". Now Dehnhardt says that he received the seed from which he grew *E. camaldulensis* as that of *E. persimifolia* which is a synonym for *E. pilularis*. I think therefore we can infer, with considerable confidence, that the seed came either from Allan Cunningham or from Charles Fraser, and that the mother tree grew somewhere near Condobolin on the Lachlan.

There is further evidence to suggest that Fraser collected the seed. Miss Nancy Burbidge, whilst at Kew in 1954, kindly examined Dehnhardt's Catalogue, a copy of which is in the British Museum (Natural History). She noted that in the list of plants were four Western Australian ones, *Acacia alata*, *A. nigricans*, *Didymus coarulescens* and *Banksia coccinea*. Now in 1827, Charles Fraser, now the Colonial Botanist, visited the Swan River in H.M.S. *Success* (Captain James Stirling).<sup>2</sup> The ship called in at King George Sound on the return journey. If the Western Australian seeds in the Hortus Camaldulensis came from Fraser, this would give them less than five years to grow and flower (if they had flowered when the catalogue was prepared). This seems rather short for *Banksia coccinea*. The only other Western Australian collectors would be Robert Brown and Menzies with Vancouver.

Miss Burbidge was puzzled over *E. diversifolia* Bonpl. being one of the eucalypts in the catalogue but this was grown in Europe from seed collected by Baudin's Expedition, evidently from Kangaroo Island.

If it were possible to ascertain where the seeds went to that Fraser sent to Earl Bathurst in 1817, the solution to the problem would probably be

<sup>2</sup> See "The visit of Charles Fraser . . . to the Swan River in 1827, with his Opinion on the Suitableness of the district for a settlement, together with various notes by J. G. Hay", published by J. G. Hay, 1906. Read before the West Australian Natural History Society—20th March 1906.

clear. Earl Bathurst was Secretary for War and the Colonies from about 1812 to 1827 when he became Lord President of the Council (1828-30).

To sum up this aspect, the evidence seems strong that the seed of *E. camaldulensis* came from the Lachlan near Condobolin and was collected by Charles Fraser.

Now as regards the photograph of the type given by T. G. B. Osborn in the *Proceedings of the Linnean Society of New South Wales* (Vol. 62, 1937, Pts. 1-2, Plate IV), Maiden identified the type in the Vienna Herbarium in 1902 as *E. rostrata*. Why did he not implement his identification? He seems to have had no doubt and Mr. R. H. Anderson, Chief Botanist and Curator, National Herbarium, Sydney, assures me that he has no doubt about the identification. The buds of nearly all, but not quite all, of the River Red Gums, in localities that could have been visited before 1827, are markedly rostrate even in the early stage. The buds depicted in the photograph are conico-acuminate, but not rostrate. No one intimately acquainted with the River Red Gum would at first sight recognize it from the photograph.

I have been in correspondence with Mr. Anderson and have his permission to quote from his letters, as follows:

"We have given a good deal of consideration to the question of the correct name for the River Red Gum. This has involved a review of the whole range of variation within the species and the distribution of the various forms.

The River Red Gum includes a number of more or less intergrading geographic and ecological races, but all of these are readily distinguished, when unaffected by hybridisation, from other red gum species, providing complete material is available. The fruit shape is characteristic, and it is unfortunate that the type of *E. camaldulensis* was devoid of fruits. The bud shape shows a certain variability, but in most areas the operculum is fundamentally hemispherical in outline, with a beak-like process which may vary considerably in length, being almost absent in some forms. (The shapes of both buds and fruits are very constant on any one tree). However, trees may be found in which the operculum is more elongated and these are especially common in two areas. The first of these is the marginal zone at the eastern limit of the range of the River Red Gum, and the more conical operculum here seems to be always correlated with certain features of juvenile and mature leaves, pedicels and fruit shape which appear to indicate hybridisation with *E. blakelyi*, *E. tereticornis* and occasionally *E. dealbata*. In other words, these trees are not "pure" River Red Gum. The second area includes the Barrier Range area of New South Wales, where two distinctive races of River Red Gum occur along small creeks. In one of these there is a decided tendency to a more conical operculum not associated with any indication of hybridity.

"As well as these, however, occasional trees are found in other areas (e.g. on the Lachlan River around Condobolin, N.S.W.) which are quite characteristic River Red Gums, but nevertheless have a rather conical operculum. In these cases there is no evidence of hybridisation and the trees seem to be merely individual variants.

"The specimen is an undoubted red gum (leaf-shape, venation, inflorescence, buds). It is not a River Red Gum of the most usual form (opercula are more conical). It has no fruits or juvenile leaves. It has long pedicels and is not a good match in general appearance for the usual River Red Gum. The buds are immature, but could agree quite well with some of the forms with conical opercula mentioned above, but would not agree with any other red gum species.

"There is no doubt that the trees described by Cunningham as arching over the river were River Red Gum. Many old trees along the Lachlan, as along other inland streams, do have a considerable amount of old rough

\* Other red gum hybrids.

bark at the butt. So far as we can tell the trees flower in December and January, but fairly well-developed buds have been collected at all seasons. Fruits, of course, are available over a considerable period.

"The only other species in the Condoholin district which would be likely to hybridise with River Red Gum is *E. dealbata* (and related forms). However, these are *short-pedicelled* forms and hybrids with River Red Gum would not resemble the *long-pedicelled* type specimen of *E. camaldulensis*."

Mr. Anderson also writes: "From the photograph it appears to us that the buds of the type are markedly immature. The shape of the operculum does not really seem so very different from fairly normal River Red Gum at certain immature stages."

He adds further: "I feel, however, that it (*E. camaldulensis*) is best retained as the name for the River Red Gum unless it can be shown that the type does not fall within the ambit of that species. Whether the type is representative of the most usual form is nomenclatorially irrelevant."

Nearly all the River Red Gums in regions accessible before 1822 have markedly rostrate buds. These buds, in the neighbourhood of Adelaide, for instance, take a long time to mature. Next season's rostrate buds may be seen soon after the time of flowering. What is the significance of meeting with occasional trees in which all the buds show practically no rostration, while all others in the neighbourhood are rostrate?

Professor D. G. Catcheside has kindly supplied the following paragraph: "The situation parallels in a striking way the clinal variation seen in species which have been subjected to experimental analysis (*Plantago maritima* and *Abutilon trifolium*). It is accounted for by the different gene frequencies in different populations showing a fairly regular trend in relation to geographical distribution. Unknown factors of natural selection have brought about this regularity, which might be correlated with degree of aridity."

As we proceed north in South Australia, the sucker leaves tend to become broader and more glaucous (this appears even in the northern Flinders Ranges) and the buds lose their rostrate appearance. Specimens I recently collected (1954) in the Musgrave Ranges and on the Officer are broadly but shortly conical. The same appearances are found in the MacDonnell Ranges.

Another factor of interest is that many of the River Red Gums must be very old, some probably a thousand years old. Efforts are being made to ascertain the age by taking wood from the intact centre of very large trees and seeing what is the relation of C14 to C12. If a young River Red Gum can set seed in ten years, it might give rise to ten generations in a hundred years or 100 in a thousand years. I suppose nothing unusual would happen if pollen from such a young tree, 100 generations removed from a neighbour, fertilised the latter. After all, the River Red Gum on the Yarra must have been completely separated from those round Adelaide for many thousands of years, yet no difference can be detected.

To sum up, where does this lead us? *E. camaldulensis* probably came from the Lachlan. It is unlike the common southern River Red Gum in not being rostrate. It is either a mutant or a hybrid of the River Red Gum. Can a minor mutation be sufficient to establish a variety? If so, the common southern River Red Gum might be called *E. camaldulensis* var. *longirostris*. But this perhaps would be carrying things to an extreme. It is obvious, however, that it is a pity the name was ever revived, since there is a possibility that it is a hybrid. It would be interesting to know whether any of its progeny survived and what they were like.

*Addendum*.—Professor Catcheside, F.R.S., has given me permission to include the following elaboration of the paragraph by him included in the text:

"It is common experience that when a widely, or even narrowly, ranging species is analysed genetically it is found to show very considerable genetic diversity. In particular, if the frequencies of allelic genes are determined,

it is found that the populations in different parts of the area have characteristic local gene frequencies. The blood group genes in humans provide a very good example which has been studied in great detail. The different gene frequencies are pretty certainly produced by local selection pressures, and frequently show a topographical, or sometimes ecological gradation in frequencies from one part of the area of distribution to another. Now this is likely to happen for all the different genes in the mating group that constitutes a species, and it is therefore likely that gradation in characters, sometimes with mixtures in local populations, will show as one traces a widely ranging species from one part of its range to another. This is, I think, what you have in the bud shape and in the shape and colour of leaves of sucker shoots in the River Red Gum.

The genetic nature of such clinal variations in character has been demonstrated in most detail for *Plantago maritima* (by Gregor, 1938-9, *New Phytologist* 37: 15 and 38: 293) and for *Achillea millefolium* and relatives (by Clausen, Keck and Hiesey 1948, *Carnegie Inst. of Washington, Publication No. 531*: 129). Jens Clausen has published a book entitled *The Evolution of Plant Species* (Cornell University Press 1951) which gives a summary account of this kind of experimental taxonomy."

### A TALE OF TWO BIRDS

Trapping is a common method of controlling the rabbit pest. From time to time traps are visited by wild domestic cats; however in this instance birds were the culprits. On several occasions partly devoured rabbits were found, but when the stumpy gave out the thief himself was caught and proved to be a Little Falcon. Releasing him was a problem, as he was far from friendly. At a later date partly devoured rabbits were again found and the hawk family suspected. However, the new thief also managed to trap himself, and proved to be a fine Tasmanian Masked Owl. This chap was approached rather warily, the previous experience still fresh in mind. But to my astonishment the bird lay over, partly on its side, while its leg was released and lifted from the trap, the great eyes watching every move. The leg was lacerated, but otherwise no damage appeared to have been done; however, instead of flying off the bird walked away a few feet, then turned to look back. After gazing at me for the better part of a minute, it moved a few more feet only to stop and gaze back again. The process was repeated perhaps half-a-dozen times before the bird vanished into the bush. I wondered whether it was suspicious, but hoped it was grateful.

—RON. G. KENSHAW.

### WHAT, WHERE, AND WHEN

#### F.N.C.V. Excursions:

Sunday, June 3—Botany Group excursion to Open Cut, Bacchus Marsh. Take 8.40 a.m. train to Bacchus Marsh from Spencer Street. Bring two meals, and thermos if hot drink is required as fires are not permitted.

#### Group Meetings:

(8 p.m. at National Herbarium).

Wednesday, May 16—Microscopical Group

Wednesday, June 6—Geology Group. Subject: Origin of coal. Speaker: Mr. A. A. Baker.

NOTICE For the next three months the Botany Group will meet on Saturday afternoons at the National Herbarium, at 2 p.m. The next meeting will be on Saturday, May 19. Subject: Carnivorous plants. Speaker: Mr. K. W. Atkins.

—MARIE ALLENDE: Excursion Secretary

# The Victorian Naturalist

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JUNE 7, 1956

No. 870

## PROCEEDINGS

There was a full attendance at the General Meeting of the Club at the National Herbarium on May 14. The President extended the sympathy of the Club to the Rev. H. M. R. Rupp, of Sydney, following the passing of his wife, and to the relatives of the late Mrs. E. E. Pescott.

Honorary Life Membership certificates were presented to Mr. and Mrs. Freame, who thanked the Club for the honour bestowed on them.

Mr. Tarlton Rayment delivered the presidential address on Dimorphism in Halictine Bees. Mr. Swaby thanked the President for his outstanding address and suggested that it should be published in the *Naturalist*.

Five new members were elected: Mrs. K. M. Bowden and Messrs. S. J. Wilson, E. Byrne, G. O. Francis as Ordinary Members, and Mr. W. R. Gasking as a Country Member. Four nominations for membership were received.

The Editor reported that Miss Phyllis James, of 22 Grosvenor Street, Abbotsford, was now supplying natural history material—minerals, shells, ethnological objects, scientific books, etc. Mention was made of the Club badges which are for sale at 4/- each, and particulars were given of the two wooden bookcases or cupboards to be disposed of.

Mr. Swaby reported that Messrs. Garner and Hooke and he had met the sub-committee of the Sir Colin Mackenzie Sanctuary and discussed a proposed nature trail in the area. The Club was asked to help map out the trail, supply labels for plants, assist in maintenance, and do some research into the possibility of establishing a larger trail in the Coranderrk area later. The Club agreed to this and authorized the three persons to deal with the matter.

The President reported that the Bank of New South Wales had approved of his designs for the wildflower display during the Olympic Games. Mr. Geo. Coghill invited members to visit Monometh Avenue, Canterbury, to see the autumn display of the *Quercus palustris*. Miss Wigan conveyed greetings from Sydney naturalists to the Club.

Exhibits included alpine flowers (Miss Woollard); growing plants of Rock Quillwort, *Isoetes humilior*, collected near Tumlaramba, N.S.W., in May, 1955 (Mr. Wakefield); an Emperor Gum Moth cocoon on a narrow plant (Mr. Coghill); and a remarkable array of fungi (Mr. Webb and Mr. Mollison).

The meeting adjourned at 10 p.m. for the usual conversazione.

### NOMINATIONS FOR OFFICE-BEARERS, 1956-57

At the General Meeting of the Club on April 9, 1956, the following nominations were received for Club Officers and Council for 1956-7:

President: Mr. A. J. Swaby.  
 Vice-Presidents: Messrs. F. Lewis and W. L. Williams.  
 Hon. Asst. Secretary: Mrs. F. Curtis.  
 Hon. Editor: Mr. N. A. Wakefield.  
 Hon. Assist. Editor: Mr. A. B. Court.  
 Hon. Treasurer: Mr. A. G. Hooke.  
 Hon. Asst. Treasurer: Miss M. Dutchart.  
 Hon. Librarian: Mr. A. Burke.  
 Hon. Asst. Librarian: Mr. R. D. Lee.  
 Hon. Excursions Secretary: Miss M. Allender.  
 Council: Dr. R. M. Wishart, Dr. W. Gerow, Mr. J. R. Garnet, Mr. K. Atkins.

### TALLAROOK EXCURSION—1955

On Sunday, October 30, four members attended the Botany Group excursion to the Tallarook Native Plant Sanctuary which was established some six years before. At the time, in 1949, there had been no fire through the area for many years, and now a stable natural balance has been attained.

The sanctuary is lightly wooded, it is of poor soil formed of decomposed silurian rock, and it tops a slight rise. From outside the fence the excursionists could see a wide variety of plants. Orchids were abundant and included two-foot spikes of Scented Sun-orchid, the Tiger Orchid and the multicoloured Fringed Spider-orchid.

The undergrowth was a medley of low bushes—pale yellow Wedge-peas (*Gompholobium lineyeli*), three species of Parrot-pea, two Guinea-flowers (*Hubbertia stricta* and *H. linearis*), and the delicate purplish-blue Finger Flower. Amongst the shrubs was a tangle of *Stuckhousia*, Running Postman, Yams, Goodenias and a rich orange form of Wiry Buttons. At ground level, hundreds of seedlings—mainly Parrot-peas—were struggling through a mat of Pennywort (*Hydrocotyle lariflora*), variable Stinkweed, Water-buttons, Common Cup-flower and Matted St. John's Wort. The only introduction, Shell Grass, is apparently tolerated by native flora, the latter growing vigorously in association with it.

Those who doubt the advisability of such enclosures should visit Tallarook in early or mid-spring. They would be impressed with the value of sanctuaries—on roadsides, in schoolgrounds, on private property and especially on otherwise useless land—for the preservation and display of our native flora.

K. W. ATKINS

### WILHELMINA FALLS EXCURSION

The purpose of the Club Excursion on May 13, 1956, was to inspect the impressive but little known Wilhelmina Falls. These falls lie on Falls Creek, a tributary of the Murrindindi River, which in turn is a tributary of the Yea River. They are reached from the Yarra Glen-Mount Slide-Yea Road by turning to the right off the main road about four miles from Glenburn.

Approximately 50 members and friends were in the party and appreciated the sunny day after the rain and wind of the day before. From the parlour cars, extensive views over the Yarra Valley were obtained as the road climbed the Great Dividing Range. After a brief spell at the top, Mt. Slide, the cars took the road down through the State Forest, crossing and recrossing the Yea River till the cleared country near Glenburn was reached. The branch road also proved attractive and the shrubs on the side of the road gave promise of even more beauty when flowering. Some of the hush wattles were still in bloom and there were occasional patches of heath.

Lunch was enjoyed in the sun on the banks of the Murrindindi River. The foot track which used to lead across the stream had been washed away, but thanks to the forethought of Mr. Haase and the work of Mr. McInnes, a log across the stream was converted into a temporary bridge. The track, when located on the other side, was reasonably clear and the majority of the party reached the falls. The track wound up through the timber, stringybark, peppermint and gum. Some large patches of fungi attracted attention with their various and unusual colours; one big patch of purple shades being particularly noticed.

The feature of the falls is the breadth and length of their passage over the broad faces of unbroken granite and their location on what from the bottom appears to be the top of the mountain, the upper portion of their catchment being hidden from view. These features were appreciated also by those who decided not to try the climb but strolled further up the road and saw the falls from a bend about a mile away.

Return to the city was made via Toolangi and Healesville.

—R. G. HENRY

**MICROSCOPICAL GROUP REPORT**

At a well attended meeting, Mr. D. McInnes occupied the Chair for the first night of his new term of office. After the conclusion of the business, he demonstrated his versatility by delivering a most comprehensive discourse on "Geology in Rock Sections". There were some ten microscopes on the bench and Mr. McInnes used these to illustrate his points—on cleavage, twinning, polarization, etc., by showing his own grindings and mountings.

The programme committee has arranged a syllabus for several months ahead, as set out below. Other Club members are especially asked to note the July 18 date and are cordially invited to attend.

June 20—Mr. H. Barrett: "Some Oamaru Diatoms". Illustrated with photo slides of specimens by Mr. W. Evans.

July 18—Mr. Tarlton Rayment: "Incidence of Pollen Grains of Heath on Creative Evolution". Members to provide microscopes to show the speaker's specimens for study.

August 15—Mr. E. Snell: "On Mounting Opaque Objects" Members to make the evening a showing of opaque slides.

**F.N.C.V. ACCOUNTS, 1955-56**

**FERN BOOK ACCOUNT**

Purchases—			
First instalment of books	£98	Sales .....	£145
Blocks for illustration of books .....	108	Stock at date, valued at cost	245
Advertising matter .. ..	4		
	210		
Balance of order, printed but not yet delivered, taken at printing cost .. ..	735		
Credit balance transferred to Building and Contingencies Fund .. .. .	45		
	£990		£990

FIELD NATURALISTS CLUB OF VICTORIA  
STATEMENT OF RECEIPTS AND PAYMENTS FOR 12 MONTHS ENDED APRIL 30, 1956  
(Figures adjusted to the nearest £)

GENERAL ACCOUNT

Previous Year	RECEIPTS		EXPENDITURE		Previous Year
£66	Subscriptions received—		<i>Victorian Naturalist</i> —		£592
803	Arrears . . . . .	£78	Printing . . . . .	£642	104
9	Current . . . . .	821	Illustrating . . . . .	69	76
884	Life Members . . . . .	9	Despatching . . . . .	57	15
68	Sales of <i>Victorian Naturalist</i> . . . . .	20	Index . . . . .	11	787
12	Advertisements in <i>Naturalist</i> . . . . .	24	Working Expenses—		
2	Interest received—Library Fund . . . . .	2	Postage and Telephone . . . . .	19	29
21	Donations received . . . . .	1	Printing and Stationery . . . . .	32	8
			Duplicating . . . . .	21	—
			General Expenses . . . . .	33	20
			Library . . . . .	2	9
			Donations and affiliation fees . . . . .	4	4
				111	70
			Total payments for the year . . . . .	890	857
			Surplus of Receipts over Expenditure for the year . . . . .	65	130
£987		£955		£955	£987

F.N.C.V. Accounts, 1955-56

BUILDING AND CONTINGENCIES FUND

Purchase of Orchid-books . . . . .	£1	Amount of Fund at 1/5/1955 . . . . .	£1124
Bank charges . . . . .	1	Sales of <i>Victorian Naturalist</i> . . . . .	155
Amount of Fund at 30/4/1956 . . . . .	1408	Credit balance from Fern Book a/c. . . . .	45
		Sales of other Publications and badges . . . . .	54
		Interest on investments . . . . .	32
	£1410		£1410

LIFE MEMBERSHIP ACCOUNT

June  
1956

£36		£29	Taken into subscriptions of this year ..	£9	£9
£35	Balance in Bank on 1/5/1955 .. . . .	£28	Balance in Bank on 30/4/1956 . . . . .	20	27
1	Interest on current account .. . . .	1			
				<u>£29</u>	<u>£36</u>

BALANCE SHEET AT APRIL 30, 1956

Previous Year	LIABILITIES	ASSETS	Previous Year
£1124	Building and Contingencies Fund £1408	Bank Current Accounts .. . . .	£329
50	Dudley Best Library Fund . . . . . 50 1458	Arrears of subscriptions, estimated to realize .. . . .	50
		Sundry Debtors .. . . .	58
	Subscriptions paid in advance—	Stocks on hand—	
140	Ordinary .. . . . 105	Fern Books, at cost .. . . .	108
28	Life membership .. . . . 20 125	Publications at valuation .. . . .	48
		Badges at valuation .. . . .	
74	Excursion Account .. . . . 88	Investments, at face value—	
27	Special Donations in hand .. . . . 22	Dudley Best Library Fund:	
	Brown, Prior, Anderson Ptd. Ltd., amount owing for balance of order of Fern Books .. . . . 735	Commonwealth Bonds .. . . .	50
1830	Surplus of Assets over Liabilities .. . . . 1822	Building and Contingencies Fund:	
		Commonwealth Bonds .. . . .	950
		E.S. & A. Bank .. . . .	174
		Library, Furniture, Paintings, Epidiascope, Microscopes and other equipment .. . . .	1517
<u>£3273</u>	<u>£4250</u>	<u>£4250</u>	<u>£3273</u>

F.N.C.V. Accounts, 1955-56

Audited and found correct, 18/5/1956—  
 A. S. CHALK }  
 W. P. J. EVANS } Hon. Auditors

A. G. HOOKE, Hon. Treasurer

## JERBOAS

By RON. C. KERSHAW

The unfortunate fact that so many Australian animals are commonly known under foreign names may have to be suffered for some time yet. However, when a friend recently told me of a "kangaroo-rat" he has seen (he had seen a Bettong, *Bettongia cunicoides*) I thought of the Jerboas which kept us company in Libya. In this matter of names, however, one presumes that not many people stop to consider the difference between a "rat-like kangaroo" and a "kangaroo-like rat". But it does seem desirable that naturalists should endeavour to use the most appropriate terminology, and unfortunately this has not always been done.

The female Bettong perhaps, and the Potoroo have some rat-like features, but my friend of the desert is not much like either, except that it hops after the style of the kangaroo.

The Jerboa is, of course, a true rodent, and is quite distinct from the marsupials. One is not inclined to regard rodents with favour, particularly the common rat and the rabbit. However the Jerboa initiated a certain nostalgia in weary soldiers, as well as a fellow feeling when the German opened fire with his artillery. However, the little fellows provided a sane note in a crazy world when they reappeared after the noise had died away.

The animals appeared at sunset, from their holes in the ground. Their nocturnal habit is probably essential in the heat of the summer. The colony of which I saw most, lived on a rocky ridge which had a very little covering of sandy soil. The vegetation was sparse, consisting of small shrubs, among which the animals hopped, apparently fearless, but really rather shy. From a distance they blended very well into the drab background. Their only companions were an occasional snake or lizard, insects, and a bird which we called a plover. I did not collect any snails, but some were collected not far away in Egypt by another soldier and sent to Mr. Iredale at the Australian Museum. The Jerboas appeared to include insects and seeds in the diet, and presumably also eggs of the ground-nesting birds.

True rodents are characterized by having only one pair of incisors in the upper jaw. There are several genera of rodents having a general relationship and/or similarity to Jerboas. The Kangaroo-Rat is a native of America and an ally of the Pocket Gopher, names which mean little to Australians. There are also Jumping Mice which are found in America, Asia, and Africa, representing various groups. The so-called Jerboa Rat of Australia has little resemblance except perhaps superficial, but the Australian Hopping Mice do seem to resemble the Jerboa more closely.

However, the Jerboas form a distinctive group of which an important characteristic is the fusion of the metatarsal bones of the hind foot into a single bone with only three toes, although there are allied forms with four or five toes. The Australian rodents have not developed this feature which is like yet distinct from the kangaroo foot. The Jerboa is rather like a rat in body form with a head which recalls that of a rabbit. Our friends of the desert near Tobruk in Libya were presumably the Egyptian Jerboa, or at least a race of that form, which is widespread.

### REFERENCE

TEACHTON, F. L. G., 1943—*Furred Animals of Australia*, 2nd Ed., Sydney.

### CUPBOARDS FOR SALE

The Club wishes to dispose of two large cupboards admirably suitable for use as bookcases. The timber of each cupboard is in excellent condition but the exteriors of both are slightly soiled. Both are fitted with wooden doors and adjustable shelving. Sizes: Both are 6 ft. high and 2 ft. deep; one is 4 ft. 6 in. wide and the other 5 ft. wide. Price: £5 each. Anyone interested should contact Mr. N. A. Wakefield.

## ABORIGINAL PAINTINGS AT THE FLAT ROCK SHELTER

By A. MASSOLA\*

During a recent visit to the painted rock shelters in the Grampians the writer was fortunate, under the able guidance of Mr. I. R. McCann, of Stawell, a keen naturalist and a tireless walker, to visit the recently discovered Flat Rock shelter, on the northern flank of Flat Rock, the hill just south of Mt. Zero. As this site is as yet undescribed, it is my purpose in this paper to give a preliminary description of this latest addition to the number of known "Art Galleries" in this State.

It is situated in a cave-like shelter formed by the erosion of the sandstone scarp which is such a prominent feature of this particular hill and of the Grampians generally. The shelter itself is roughly seventy feet long and about ten feet wide, and it follows the contour of the hill. Because of its elevated position it is half way up the hill—it commands a beautiful northerly view over mile upon mile of country dotted with lakes (the Green Lakes). It is possible that from its aborigines of long ago witnessed the progress of Major Mitchell's party coming from the north-east, and closely observed all the great explorer's movements on July 20, 1836, when he ascended nearby Mount Zero.

Along the wall and ceiling of the shelter are seen several groups of drawings done in red ochre. They are beautifully preserved and some are quite fresh looking, possibly because of the relatively dark position they are in. Certainly neither sun nor rain can reach them, and as yet they are free from those disfiguring proofs of visits by unthinking people. There are no names scribbled over them.

The designs include Emu or bird tracks, several parallel strokes (as in the Red Rock at Glen Isla), three designs of unknown significance which with a little imagination could be mistaken for the letters H, E and O. One figure approaches in shape the Langi Ghiran "snake", and there are several human hands. These hands are not stencilled, as in the Cave of Hands at Glen Isla, but they look as if the maker had immersed his hand in the red ochre and stamped it on the wall. In each there is a little unpainted region in the centre of the palm, which, of course, is just what would happen if the hand were pressed against a flat surface.

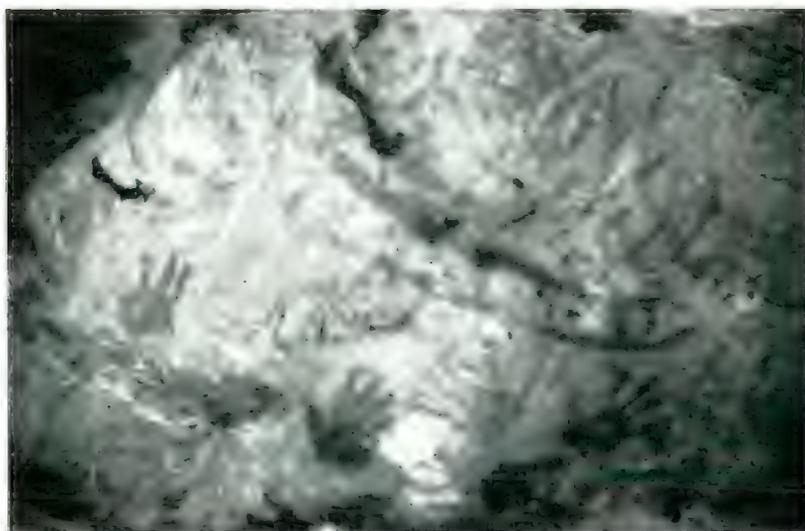
As stated, the designs form small groups some distance away from each other. On entering the shelter from the left side and walking to the right, or north, one sees first a few parallel strokes on the ceiling. About three feet away, on the wall, comes a group of Emu tracks. A foot away is a "snake" about thirty inches long, with several human hands below and a group of strokes above it. Another three feet away, on the ceiling, is a large bird track, and

\* Department of Anthropology, National Museum of Victoria.

PLATE I



Location of Flat Rock Shelter—the entrance is in the centre of the picture.



Hands, strokes and "snake" at Flat Rock Shelter.

five feet further are the "letters". For the next seventeen feet there is only an occasional bird track on wall or ceiling, then comes the group of hands. Because of the length of wall over which the paintings are spread it is hard to describe their relative position in a preliminary review. The writer hopes to be able, in the near future, to make a thorough report.

In the meantime steps are being taken to protect this shelter by enclosing it in a wire cage, as has been done at Glen Isla and Langi Ghiran. This is a pity but also a necessity to prevent vandalism.

With this new gallery, the known painted rock shelters in Victoria are now eight in number. They are set out below. In this list the term "Cave" is used because the localities have long been called such. In reality they are rock shelters, not caves in the sense of the word as used for the European examples.

At Glen Isla: The Cave of Hands.

The Red Rock.

The small shelter in the vicinity of the last.

The Cave of Fishes. (Or are they Lizards?)

In the Northern Grampians: The Cave of Ghosts.

Flat Rock Shelter.

At Mt. Langi Ghiran: The Cave of the Serpent.

In North-east Victoria: The Koctong Valley Shelter

Doubtless many more await discovery. Members of the F.N.C.V. and of walking clubs are asked to report any such discoveries to the National Museum of Victoria.

## BIRDS GALORE

By R. M. WISHART

During the years 1945-53 a friend of mine owned and cultivated a ten-acre block about two and a half miles from Monbulk. He was a bachelor and during the greater part of that period did not have even a dog to keep him company. On two sides of his house was a wide verandah and surrounding this a wild tangle of old-fashioned garden containing a few large trees—cedar, cypress, flowering gum and holly, besides innumerable shrubs—azaleas, rhododendrons, brooms, abelias, weigelas, lilacs, etc.

Being observant he soon noted that at times a few species of native birds haunted this area. To encourage them to become regular callers he erected amongst the shrubbery just off the verandah and within easy reach small wooden stands on which were placed shallow oval tins containing sweetened mixtures—either jam, honey or golden syrup and water—the honeyeaters he saw being his first objective. "Sugar-ants" were a decided menace until adequate steps were taken to deal with them.

His efforts soon paid dividends for within a comparatively short

time he had a varied and interesting visiting list. Eastern Spinehills, Crescent, White-checked and Singing Honeyeaters were among the first to sign the visitors' book. The fact that food dishes were so placed that birds could perch on the branch of a shrub and yet drink easily from them undoubtedly helped in the initial stages. To vary the menu slightly a thick slice of bread liberally sprinkled with sugar then moistened under the tap was speared on a nail driven into the centre of one wooden platform. All the honeyeaters were partial to this as an article of diet.

But others besides the sweet-tooths quickly demanded attention. Blue Wrens, Scrub Wrens, Yellow Robins and Grey Thrushes were furnished with enticing meals of cheese. Just inside the back door on a bench was placed a hard stale hunk of this commodity which, when scraped with a knife, provided appropriate food for the insect-eaters. Cake and fruit when available were also on the free list.

Birds did not live entirely in the garden though some actually nested within its boundaries, for example, Blue Wrens, Scrub Wrens, Brown-headed Honeyeaters and Grey Thrushes. They appeared to alternate their time between the not so distant scrublands and the extra food supplies. Was it a question of their seeking essential vitamins contained only in natural food resources? I wonder!

The honeyeaters while under observation varied tremendously in their behaviour. Some were pugnacious, others shy and retiring, but the majority soon became fearless and friendly. One particular White-eared, a really handsome fellow, lorded it over the rest. He could be seen occupying a food tin in solitary regal splendour, no other bird dared eat at the same table. The White-naped and the Brown-headed were the least timid of them all, especially the little short-billed "Brown-caps". These appeared to nest just round the corner somewhere, and raised several families in a season. As soon as the infants could leave the nest they were introduced to the free hand-out by their parents. It was not uncommon to see very young birds with down still adorning their heads and with immature beaks being fed by brothers and sisters of an earlier brood. They became so tame that they would perch on one's hand or head, on a tin of food being carried from the kitchen, or on a slab of bread before it could be placed in position. What daring, dainty little sprites they were!

Sometimes the immediate vicinity of the house would be entirely devoid of feathered folk. Then like bolts from the blue Brown-headed Honeyeaters would literally cascade down through the foliage. It was incredible how many of them tried to obtain a foothold on the rim of one tin dish at one time. They would stoke up with a fresh supply of calories before going hush once more in a hurry. After a few long nips of honey and water, with usually some moist bread and sugar for a chaser, they vanished. This species always did things at the gallop.

It was an unusual treat for any nature lover to sit quietly on the verandah and be entertained by Mine Host and his adopted family. Busily scraping away at a piece of stale cheese, he invariably called softly "Come on Jenny". Obediently the Blue Wren family popped out from between the slats of the verandah railing to pick up crumbs—almost off the toes of his boots. Yellow Robins in their usual deliberate manner sat and eyed the proceedings solemnly before breaking their fast while the more sombre coloured Grey Thrushes literally ate out of his hands, and back-stage was a galaxy of delicately tinted honeyeaters busily sipping their watery rations or pecking away at bread and sugar to their hearts' content.



The Scrub-Wren's Nest in the Werkroom

To return home together late in the day after having been absent since early morning was something to remember. Food provided first thing had not been replenished, tins were empty and the baker had forgotten to call. What a grand welcome we received! Every bird was doing its best to emulate Little Tommy Tucker. But they did not sing, they simply yelled for their supper. While food was being prepared a cloud of feathered youngsters clung to the wire-door, and no collection of babies in a nursery at feeding-time could possibly have created more noise—weight for weight.

All this to me was an object lesson in what love of nature mixed with kindness plus a wee bit of patience could do to overcome the natural timidity of our native birds.

During early autumn when berries were no longer available hungry hordes of Silvereyes descended upon the hitherto peaceful community. They commenced mopping-up operations at once, practically monopolizing the food supplies made available for the regulars. To counteract this invasion, kind but stern measures were adopted, to wit—enticing the interlopers into special wire-netted boxes in which they were speedily transported by car to fresh fields and pastures new, where they were released.

One day while seated in the kitchen we were alarmed by a distinctly audible commotion among a family of Blue Wrens. Blaming a marauding cat we went into urgent action. What a relief it was to find that Dad and Mum were merely doing their utmost to shepherd three youngsters from their nesting place in a clump of blackberries a short distance away to a more secure haven near the house! We were amused to see what hard work they made of it and to hear the incessant stream of abuse hurled at the tiny offspring. No sergeant-major could have bettered the performance. I may mention at this stage that no stray feline enjoyed more than one life, and that a very brief one, within cooee of this home-made sanctuary.

On one occasion a Scrub-Wren built her nest in the folds of an old chaff-bag hung over a rail in the workshop under the house. She constructed it of fine grass and wood shavings which she picked up from the floor and it was within a few feet of a carpenter's bench which was used almost every day of the week. Young were successfully reared and were paraded for inspection by the old ones on numerous occasions. I regret that in those days I did not possess a good 35 mm. camera to make a permanent record of such scenes.

To my sorrow my cobbler no longer lives out along the dusty tree-lined road. The house and the garden are as of yore but bird-watching there is a thing of the past. I presume birds still return to their old haunts but there is no longer a free counter-lunch provided for them.

#### F. J. BISHOP — AN APPRECIATION

Frederick James Bishop, who died in March, was for years a member of our Club. His friends remember him as a quiet courteous man, with a boy's delight in every wildflower he saw and an expert's power to record it through his camera. Though he was almost seventy and had had a good deal of ill-health of late years, his enthusiasm was not dimmed nor the perfection of his work abated. I doubt whether anyone thought of him as old.

For thirty years he illustrated articles on wildflowers for me. I had only to send him an article and he sent back exactly the photographs that were needed, but always far too many, with a note "all duplicates and any extras for your own collection". That generosity was characteristic of him. As one result of it I have his photographs of over 300 species of Australian native plants, and often several pictures of one species, perhaps showing fruit, habit and habitat, as well as colour-variations (for he coloured many pictures with careful art).

Often when I have been uncertain of some detail of structure and have not had a fresh specimen, it has been possible to examine his photograph with a pocket-glass, as one would a living flower. He was the photographer of the little flowers, the buttercups and daisies, the Early Nancies and bluebells. He pictured Yellow Stars and sundews with as much pleasure as waratah or Quasap bell.

Keenly as he enjoyed his occasional visits to distant parts of Victoria his greatest pleasure was in quiet rambles with his friend, the late W. H. Nicholls. Sydenham, Sunshine, and St. Albans, were their happy hunting-grounds, as innumerable pictures show. They show also how many flowers have gone from those places today. His home was near Reckett Park and Maranoa Gardens, and these too provided countless subjects and endless pleasure.

Although we worked together we rarely met, but I have vivid memories of the few times I visited his home, of the garden that was a pleasure to all his family, of the warm welcome, and of the wildflower photographs in beautifully bound volumes (for he was a bookbinder and an expert craftsman). I remember how amazed I was when he showed me his "studio", a laundry in which, with photographic equipment in place, there was hardly room to stand; but most of all I remember his enthusiasm for the work of a younger photographer. "Have you seen Bert Reeves' pictures?" he asked. "They are magnificent! You must see them." There was real delight in his voice.

His own pictures were less spectacular than those he admired, but in his own sphere he was unsurpassed. He revealed the little flowers to us. *Cynopogon sturtii* often passes unnoticed, apart from its scent, but his pictures show what a lovely thing it is. Tiny fans of *Scoropoli hookeri*, greenish flowers of saltbush, the small clusters of lignum in bloom, are all revealed in their perfection, not larger than life, but lifelike, brought close to our eyes by one who loved them.

"One who loved them!" That was his secret. Next to his happy family life he found his greatest happiness in photographing the flowers, taking infinite pains in the smallest and least, and sharing that happiness with friends.

We are poorer because a quiet flower-lover no longer goes out to picture the wayside flowers and find endless pleasure in the Maranoa plantings, but we are richer for what he has done. His photographs will no doubt be preserved for other generations to study and enjoy. If we could preserve with them the spirit of single-minded and affectionate craftsmanship in which they were taken we should be rich indeed.

- JEAN GALBRAITH

#### EDWARD JESSE GREGSON—1882-1955

Edward Jesse Gregson was born at Newcastle, in New South Wales, where his father was manager of the Australian Agricultural Company. He graduated in Arts at the Sydney University and studied further at Cornell University in U.S.A., specializing in engineering. He joined the Canadian Military Forces in World War I and returned to Australia in 1919.

His father, Jesse Gregson, had been one of the pioneers at Mount Wilson and there had developed an interest in the local eucalypts. Edward Gregson resumed farming activities on the family property and, except when serving with the 2nd A.I.F., he lived there until his death.

After his retirement in 1945, he continued the researches his father had begun into the eucalypts, in particular those of the Blue Mountains. A person of great energy, Edward Gregson became a familiar figure in that area, either alone or with friends of similar interests. Soon his knowledge of the puzzling forms of the genus in those mountains became second only to that of his friend and companion of many rambles, the Reverend Colin Burgess.

Gregson amassed a large collection of dried specimens of eucalypt species, which, on his death, were bequeathed to the University of New England at Armidale. Readers may recall his contribution to this journal, in February 1952 (Vol. 68, pp. 165-171), entitled "Eucalypts of Mt Wilson and Mt Irvine, N.S.W."

My acquaintance with Edward Gregson did not begin until 1952, but thereafter many happy hours were spent in his company. A man of kind and generous disposition, his passing will be mourned by a wide circle of friends. Death came quietly on the morning of November 25, 1955, when he was in his 74th year.

—GEO. W. ALTHOFER, Dripstone, N.S.W.

## NATURALISTS' NOTEBOOK

(Reserved for your Notes, Observations and Queries)

### AN EASTERN SPINEBILL IN AN UNUSUAL SETTING

A busy suburban shopping centre is probably the last place in which one would expect to see an Eastern Spinebill (*Acanthorhynchus tenuirostris* La.). However, on Saturday morning, December 3, 1955, dozens of people in Church Street, Middle Brighton, had a near view of this interesting honey-eater. It was a cold, dull morning, strong southerly winds being accompanied by intermittent heavy showers, and it is possible that these weather conditions may have been responsible for the bird's presence in its unusual surroundings.

For some weeks previously, the hardware store in this particular locality, in line with the latest advertising technique, had been staging demonstrations of one of the modern "wonder" paints. Animated advertisements such as these usually attract a crowd. Consequently, on the morning in question, on approaching this store, I was not surprised to find a crowd gathered. However, I was puzzled by the absence of the usual announcements from a loud speaker, and by the people peering overhead rather than at the display window. An Eastern Spinebill, not a modern "wonder" paint, was the object of the crowd's attention.

The store has an old-style veranda, the sheets of roofing iron, and consequently the veranda, being steeply curved. Glass fanlights admit light for the display windows and, to protect the people beneath from falling glass in the event of breakage, wire netting is fixed beneath the fanlights. There, fluttering between netting and glass, was the Spinebill, behaving like a moth at a lighted window-pane on a summer evening.

While some onlookers, in typical human fashion, were sympathizing with the bird, others took the opportunity to note its salient features and answer the questions that were posed by the junior members of the audience. Along one edge, the netting had become detached from its fastenings and, by hit or miss methods during its instinctive flutterings, the bird found this cleavage and escaped from its imprisonment. But its freedom was short-lived. To the bird, the fanlight was open space and freedom and, almost instantaneously, it was hack again through the mesh of the netting, only to be a captive once more.

This performance was re-enacted several times during the ten to fifteen minutes I was present. Finally, during a brighter interval between showers, and again by chance rather than by design, the bird, in escaping from its prison, flew low enough from under the veranda to find the open space and freedom of Church Street.

Apart from proving that there are things apart from modern advertising methods to draw a crowd, and apart from illustrating the hazards which the inventions of man create for nature's creatures, this was a perfect demonstration of the blind instinctive behaviour typical of and predominant in bird life.

—F. G. ELFORD.

### BLACKBIRDS' TROUBLES

Seeing some grey birds fly into a garden tree I went out to see what they were; there was a great deal of fighting and fluttering about in the tree and as usual the Bell Miners were objecting to strangers. I watched the dispute, and a neighbour, who is interested in birds, joined me. I walked back with her and was away for about ten minutes. When I returned, a magpie was on the lawn near the tree and was pecking savagely at something struggling. I ran over and drove the magpie off. The "something" was a nearly fully-feathered young blackbird. I tried to revive it, kept it warm, etc., but it died shortly after. What seemed to me unusual was for a magpie to attack and kill a young bird. Is this usual? There was a further incident. The only other young bird in the nest, which we have had under observation for both this brood and a former one, struggled out of the nest and fell or fluttered to the ground. Fortunately, my little grandson and I saw this happen and restored the bird to the nest. The mother bird returned at 7 p.m. and all seemed well, but both mother and baby were gone next morning. I suppose that nestlings, when frightened (as by the light in the tree), sometimes climb out of the nest. I have sometimes found dead nestlings in the garden. But I did not know that magpies killed other birds. And where and how did the mother blackbird remove the nestling?

—FRANCIS ESTERSON, VERMONT.

### OUTSTANDING NATIVE GARDEN PLANTS

As everyone has his own special favourites, it is not likely that the twenty native plants for the garden, which are listed below, will meet with everyone's approval. If you agree that ten of the plants should have been included, then perhaps the list can be regarded as a good one; if you consider that fifteen of them should be in the list, then you must have a garden in the same area with the same climatic conditions as the writer, and you must have similar tastes, too.

Before going any further, perhaps we can agree that a really outstanding garden plant must have spectacular flowers borne during a long flowering season, foliage and shapeliness which give a pleasing appearance throughout the year, and yet it can be propagated readily, grows fairly quickly, and is hardy enough to stand up to conditions in the garden without any special attention! Needless to say there are not many such plants, so we must select those that come nearest to this ideal.

The difficulties associated with making a list of outstanding garden plants may be illustrated by referring to the boronias. No plant has more delightful perfume than the Scented Boronia (*B. megastigma*), but many conditions do not suit it: the N.S.W. species "Native Rose" (*B. serrulata*), Sydney Boronia (*B. laedifolia*) and Pale Boronia (*B. floribunda*) are all beautiful; while Pink Boronia (*B. muelleri*), Pinnate Boronia (*B. pinnata*) and Hairy Boronia (*B. pilosa*) are good Victorian species.

Nor can the Tall Boronia (*B. elatior*) or *B. denticulata*, both from W.A., be overlooked, but my preference is for a third western species Kalgan Boronia (*B. heterophylla*), because it is not difficult to propagate or cultivate, it is shapely, and has beautiful blossom during a fairly long flowering period.

Here is the list: Common Bottle-brush (*Callistemon speciosus*), Pink Hybrid Thryptomene (aff. *T. saricoides*), Long-leaf Wax-flower (*Eriostemon myoporoides*), Kalgan Boronia (*B. heterophylla*), Gungahra (*Eurolychnis caesia*), Common Correa (*C. reflexa*), Scarlet Honey-myrtle (*Melaleuca fulgens*), Pink Grevillea (*Grevillea sericea*), Mudgee Wattle (*Acacia spectabilis*), Grass-leaf Hakea (*H. multicaulis*), Heath-leaved Banksia (*B. ericifolia*), Gravel Bottle-brush (*Beaufortia sparsa*), Swan River Myrtle (*Hypocalymma robustum*), Grooved Dampiera (*D. laeocoluta*), Common

Heath (*Epacris impressa*), Woolly Net-bush (*Calothamnus villosus*), *Kimberley* (*Esperance*) Wax-flower (*Chamaeternstroemia cuneata*), Oval-leaf Mint-bush (*Prostanthera ovalifolia*), and Round-leaf Tea-tree (*Leptospermum rotundifolium*).

—A. E. BROOKS.

### GROUPINGS OF NATIVE PLANTS

Although our native plants are becoming more popular as garden subjects, not a great deal has been done in the way of grouping them. Most of us are content to grow as many natives as possible, placing them with due regard to such features as size, compactness, season and colour of flowers, and their suitability for a sunny or shady position, a moist or dry one, or an exposed or sheltered one.

At Frankston, quite large areas of Bushy Heath-myrtle (*Thyrsanotus calycina*) have been successfully grown, and Mr. J. Swanson has effectively grouped a number of plants of such species as Swan River Myrtle (*Hypocalymma robustum*), Kalgan Boronia (*B. heterophylla*), and Broad-leaf Wax-flower (*Eriostemon lanceolatus*).

At the Botanic Gardens, Kangaroo Paws have been effectively grouped in one large bed and a number of species of *Correa* and *Boronia* in another; at Maranoa Gardens some grouping has been done, and Mr. G. Hatley has certainly lost no opportunities to group eucalypts on his property near Stawell, where he has about four hundred species growing.

These examples provide the exceptions and not the usual procedure, but at Cheltenham Park, following on the original planning of Mr. A. J. Swaby, it is proposed to put considerable emphasis on groupings of native plants.

If you can supply any information about successful groupings of Australian plants, which you have seen or have experimented with, the writer would appreciate your comments.

—A. E. BROOKS, Tulip Street, Cheltenham.

### WHAT, WHERE AND WHEN

#### F.N.C.V. Excursions:

- Saturday, June 9—Geology Group excursion to Open Cut, Bacchus Marsh. Take 8.40 a.m. train from Spencer Street to Bacchus Marsh. Bring two meals, and thermos if hot drink is required as fires are not permitted.
- Sunday, June 17—Warrandyte. Leader: Mr. Haase. Take 8.55 a.m. Ferntree Gully train, alight at Ringwood, then Warrandyte bus to Fiveways. Bring one meal.
- Sunday, July 8—Lyrebird excursion to Sherbrooke Forest. Leader: Miss I. Watson. Take 8.55 a.m. train to Upper Ferntree Gully, then bus to Kallista. Bring one meal and a stack.

#### Group Meetings:

(At National Herbarium)

- Wednesday, June 20 (8 p.m.)—Microscopical Group.
- Saturday, June 30 (2 p.m.)—Botany Group. Speaker: Mr. K. Atkins. Subject: Trees in winter.
- Wednesday, July 4 (8 p.m.)—Geology Group. Subject: Origin of Coral Islands. Speaker: Miss B. Neilson.

#### Preliminary Notice:

- Saturday, July 14—Mid-winter Mystery Trip, by parlor coach, approximately 156 miles, mostly along highways, no walking. *Objects*: Historical and Physiographical. Coach leaves Batman Avenue 8.30 a.m. Bring two meals—morning tea available at roadside cafe en route. Bookings, 18/- each, with Leader: Mr. H. Stewart, 14 Bayview Terrace, Ascot Vale (Telephone FL 1096).

—MARIE ALLENDEE, Excursion Secretary

# The Victorian Naturalist

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No. 871

## PROCEEDINGS

About fifty members were present at the Annual General Meeting of the Club, held at the National Herbarium on June 11 last. The retiring President, Mr. Tarlton Rayment, was in the Chair; he welcomed to the meeting Miss Sutherland, a visitor from Vancouver in Canada.

Mr. Swaby reported that several visits had been paid to the Sir Colin Mackenzie Sanctuary, Healesville, by the committee appointed to assist in the making of a Nature Trail, and that the first working bee would be held on July 7, when as many members as possible should attend. Mr. Garnet gave a resume of the National Parks Bill to be debated in parliament in August, and he agreed to bring before Council several proposed amendments.

The 76th Annual Report of the Club was read by the Secretary, and the Treasurer outlined the financial statements. These are in this issue of the *Naturalist* and in last month's issue respectively. The Auditors signified that no report was necessary from them.

Mr. Rayment reported that he had received a letter from Mr. Sarovich advocating a rearrangement of the Building and Contingencies fund, but, because of its length, he would not deal with it but would take it as signifying the writer's intention to move a motion at a future meeting.

The election followed of Office-Bearers and Council for 1956-57. As nominations did not exceed requirements, the following were declared elected: Mr. A. J. Swaby, President; Messrs. F. Lewis and W. L. Williams, Vice-Presidents; Mrs. F. Curtis, Assistant Secretary; Mr. A. G. Hooke, Treasurer; Miss M. Butchart, Assistant Treasurer; Mr. N. A. Wakefield, Editor; Mr. A. B. Court, Assistant Editor; Mr. A. Burke, Librarian; Mr. R. D. Lee, Assistant Librarian; Miss M. Allender, Excursions Secretary; and Dr. R. M. Wishart, Dr. W. Geroe, and Messrs. J. R. Garnet and K. Arkins, Council Members.

Mr. Rayment vacated the Chair in favour of the new President. Mr. Swaby asked that Messrs. Eustace Coghill and F. Curtis be invited to attend the forthcoming meeting of Council, as they had agreed to accept office as Secretary and Council Member respectively; thus there would be a full team to manage Club affairs. The new President said that major points of policy for the year would be the stimulation of the scientific side of Club activities.

and the securing and maintaining of closer contact with kindred societies and with country and interstate members.

Messrs. Chalk and Evans were again appointed as Auditors. Mr. F. G. Davidson and Mr. Paul Genery were elected as Metropolitan Members of the Club, Mrs. F. G. Davidson and Mrs. F. Curtis as Joint Members and Master John Walsh as a Junior Member. These new members were welcomed to the F.N.C.V. and wished well in their association with the Club.

Mr. Woollard suggested that more prominence be given in the *Naturalist* to the activities of the various Club Groups; the Editor commented that such would be very welcome material for the journal, as Club activities, including excursion reports, were always given priority over other material.

There were a number of nature notes and comments on exhibits, the latter in particular being very diverse and interesting. The meeting closed at about 10 p.m. for the usual conversation and perusal of exhibits.

### SEVENTY-SIXTH ANNUAL REPORT, 1956-57

The 76th Annual Report chronicles a year of satisfactory progress and activity for your Club. Membership for the year was 546, the same as the figure for last year, new members making up for resignations and other losses. The membership comprised 347 Metropolitan, 154 Country, 20 Honorary, 5 Life and 20 Junior. In addition there are 37 subscribers to the *Victorian Naturalist*.

Unusually severe losses occurred in the Club during the past year through the deaths of Mrs. T. Sarovich, Mrs. K. Woodburn, Miss M. Wise, Sir Russell Grimwade, Major H. W. Wilson, Mr. P. Bibby, Mr. J. Bishop, Mr. A. Burston, Mr. E. Dakin, Mr. A. Jenkins, and Mr. H. Smith, all of whom did fine work for the Club in the past.

During the year, your Council, through its Finance Sub-Committee, kept a close watch on the factors of income and expenditure involved, mindful of the heavy commitment represented by the publication of the Fern Book. Consideration was again given to publishing the *Victorian Naturalist* as a quarterly, but it was generally agreed that this should be resolved to only in the event of acute Club difficulty. Last year's newly exploited source of revenue was tapped even more profitably by the Editor, who pushed sales of back numbers of the *Victorian Naturalist* so vigorously that an extra £175 was added to the Club funds. As the financial report in last month's *Naturalist* showed there was a surplus of £65 on the General Working Account for the past year, which has led to a satisfactory increase in the Bank balance.

A major event of the Club year was the publication in December of the re-written and enlarged edition of the Fern Book. Sales progressed reasonably well, 473 copies being disposed of to

April 30, as noted in the balance sheet. The book reflects credit as a solid achievement for the Club and its Editor, Mr. N. A. Wakefield.

Credit and thanks are due to those who lectured to the Club during the past year. The President's address, on Dimorphism in Halictine Bees, was particularly memorable, as a lucid account, well delivered, of a highly technical subject. Innovation of 10-minute lecturettes at the General Meetings proved a popular move. However, they did not always continue along the lines originally intended, which was to relate actual experiences or research rather than information at second-hand. An attempt was also made during the year to augment the exhibits for the General Meetings.

The chief meeting of the Club was held on April 9, 1956, in conjunction with the Anthropological Society of Victoria and the Frankston Field Naturalists Club, for the presentation of the Australian Natural History Medallion to one of our members, Mr. Stanley R. Mitchell. It was an historic occasion, for it was the first time that the Medallion had been presented by another medallionist, the Club President, Mr. Tarlton Rayment. A coincidence was that the dossiers for both these recipients had been prepared by Miss Lynette Young of this Club.

During the year, the Club lent its support to a number of worthy projects. The International Boy Scout Jamboree at Wonga Park was furnished assistance by Club members who lectured and exhibited. A proposed Olympic Games Wildflower Display by the Bank of New South Wales is receiving Club support, both artistic and technical. The Club has been asked (and currently has a sub-committee working) to assist in staging a small-scale Nature Trail within the Sir Colin Mackenzie Sanctuary, in time for the Olympic Games. The Club has continued its never-ending battle toward reasonable conservation by protesting against wholesale destruction proposed for kangaroos in Western Australia, and a proposed open season for possums in Victoria. We were represented too at the Australian Primary Producers' Union Conference on conservation problems and in a deputation to the Premier of Victoria on proposed National Parks legislation.

Field Naturalists Clubs were formed in two other areas of Victoria during the year. We were happy to welcome the Wimmera and the Colac Clubs into the ranks of those dedicated to the study of Natural History and to the protection of native fauna and flora. There are now eight National History bodies affiliated with the Senior Club.

Work among the Study Groups progressed. The Botany Group was sorely hit by the untimely death in July of its chairman, Mr. E. Dakin. The Group is now engaged in an ambitious project, an Ecological Census of Sherbrooke Forest, under the guidance of its Secretary, Mr. K. Atkins. The Microscopical Group has had an

active year under Dr. Wishart's chairmanship. They organized an interesting evening of colour slides and talks for the General Meeting in November. The Geology Group, under Mr. A. A. Baker, enjoyed a year of considerable interest. Lapsed during the year were the Wildflower Garden Section and the Marine Biology Group. A latent interest in the latter has been aroused however, and efforts are now being made to combine it with an Entomological Group. The younger generation continued to be served by willing workers from the Club Membership. The Hawthorn and Prahran Junior Clubs flourished throughout the year.

Attendance at some 34 Club and Group excursions was gratifyingly up as compared with last year's figures. The Christmas holiday trip to Mount Buller was the highlight of such activities, and it was conducted most successfully.

With the completion of the move of the Club's Library to the National Herbarium, our last link with the old quarters at the Royal Society's Hall was severed. Re-organization of this valuable Club asset is now under way, and it is hoped that Club members will be enabled to make more frequent and better use of it.

In conclusion, sincere thanks are due to Mr. A. W. Jessep of the National Herbarium for the use of their fine facilities for our Club and Group meetings.

On behalf of the Council,

D. C. McDONALD, Honorary Secretary.

#### MICROSCOPICAL GROUP REPORT

The Group continues to increase membership and to interest those who attend meetings. Upwards of twenty enthusiasts met on June 20 last, and the Chairman, Mr. D. McInnes, extended a welcome to Mr. and Mrs. A. J. Swaby and other visitors.

After the routine preliminary business, Mr. H. Barrett addressed the meeting on "Some Oamaru Diatoms". The speaker has made a lifelong study of the group, and still collects material as well as receiving parcels of specimens, both fossil and recent, from overseas. There were eighteen microscopes on the tables, and Mr. Barrett followed the precedent established by Mr. McInnes last month, using all these to illustrate his talk, showing many rare and beautiful forms.

Mr. W. Evans had previously photographed some fifteen or so of Mr. Barrett's drawings of other species, and these were screened through Mr. Woodard's projector and commented on by the speaker. Mr. Barrett concluded by answering a number of queries, and he was heartily thanked by the Group Leader, on behalf of those present. (A summary of the talk will appear in a future issue of the *Naturalist*).

Members are asked to again bring their instruments for use by Mr. Rayment in conjunction with his talk on July 18; and an invitation is cordially extended to E.N.C.V. members to be present.

## VICTORIA'S CATHERINE RIVER

By JOHN GATTINS\*

The parliamentary exploration party surveying the route of the proposed new road along the Wonnangatta River linking the North East with Gippsland aroused much interest in Victoria's Catherine River. The route covered the Buffalo River valley, crossing the Barry Mountains to the Wonnangatta River on the south side of the Range. The Catherine has its headwaters in the Barry Mountains and joins the Buffalo River, itself a tributary of the Ovens, at Catherine Station.

During Easter, 1955, Donald Spriggins, Steve Berrigan and the writer planned to negotiate the Catherine River from both ends. Steven was to make the approach from Mansfield by walking along the Howqua River, over Mount Howitt, along the Crosscut Saw to Mount Speculation and thence on to Mount Despair where Don and I were to meet him on Easter Saturday. We two left Wangaratta on our motor cycles on Good Friday and proceeded to Catherine Station through Dandongdale and Abbeyard. After Dandongdale the road narrows to barely the width of a single car and winds in and out of the hillside making progress extremely difficult.

We left our bikes at Catherine Station, having covered the sixty-five miles from Wangaratta in just under three hours. We then proceeded up the Catherine valley which for the first three miles had been cleared of undergrowth. After this the undergrowth along the river flats became very dense and we had frequently to wade across the river. There is supposed to be a track all the way up the river but it was difficult to follow and, when we did strike it, we could not follow it for long.

As evening drew near we made our camp on a grassy spot. The valley floor had widened considerably (it is about half a mile across at its widest point) and at this particular spot, it would be over 300 yards and stretched for some four miles, making the area suitable for cattle grazing, and more than once, while moving through the undergrowth, we came suddenly upon startled animals who seemed resentful of our intrusion into their grazing land. At nightfall the call of the Boobook Owl heralded the rising moon over the eastern ridge and from the nearby hills the eerie howl of a dingo could be heard.

On Easter Saturday we continued up the river, intending to meet Steve at Mount Despair. However we took a wrong branch of the river and headed up a tributary. Fortunately it was not long before we discovered our mistake and we decided to cross the ridge between us and the main stream. This was a great error in

\* Student at School of Forestry, Creswick.

judgement because when we reached the top of the ridge, we found we were at a height of about 3,500 feet!

There we had a magnificent view of the Razor approximately a mile away. This is a rocky outcrop of 5,000 feet elevation and about a mile long, with cliffs about 300 feet high falling away on both sides to timbered ridges. At the southern end of the Razor and behind several steep ridges was what we thought at first to be Mount Despair (4,500 feet). Between it and us were about three miles of numerous ridges which we realized afterwards, from Steve's description, could not have been our *rendezvous*. In actual

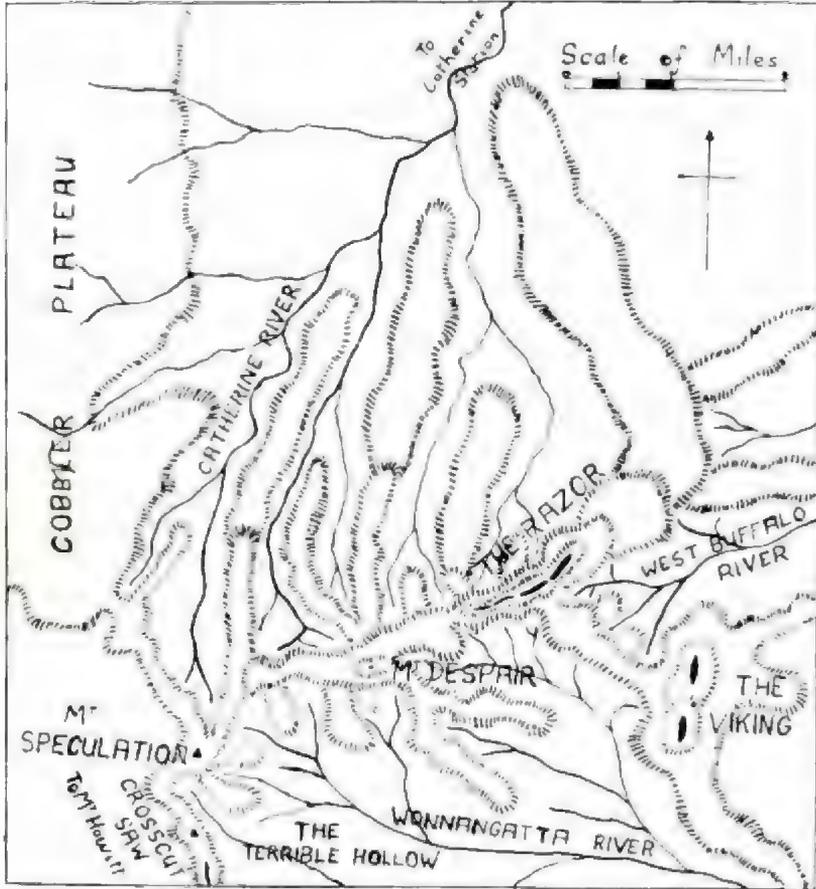


The Highest Peak of the Razor.

fact Mount Despair was still farther back and was out of sight from where we were. Towards the south we could see the hump on top of Mount Speculation rising to 5,650 feet—the highest peak in the Barry Mountains. As it was 11 a.m. and our appointment with Steve was at noon, we decided to eat our lunch while we reviewed the situation.

From Mount Despair, Steve looked on an even more striking sight. He had an end-on view of the Razor whose top had the appearance of a narrow track with steep cliffs dropping away on either side. South-east of the Razor he could see the Viking, our view of which was obstructed by the Razor. The Viking is similar in shape and size to the Razor, but on one side it has high over-

hanging cliffs and on the other there is a slope only slightly less formidable. It is said that the Viking is Victoria's most inaccessible mountain and this is no exaggeration for, besides having rugged peaks on three sides, behind it lies the Terrible Hollow through which runs the Wonnangatta River in its early stages. The Terrible Hollow is really a huge valley in the form of an amphitheatre whose



Sketch-map of Catherine River area.

walls consist of cliffs which fall 3,000 feet before reaching the floor of the valley.

On failing to find us on Mount Despair Steve headed down the Catherine River. It was to be a full day before he came upon us fishing not far from the camp. Incidentally, we were able to supple-

ment our diet over the four days with a dozen delicious rainbow trout, most of which were about one pound in weight.

The vegetation in the gullies in the area forming the headwaters of the Catherine River is of the luxuriant rainforest type which is common in the mountainous country south of the Great Dividing Range. On the lower slopes of Mount Despair there is a magnificent stand of virgin Alpine Ash (*Eucalyptus delegatensis*) which looks not unlike parts of the Fitzroy Gardens in Melbourne, having no undergrowth other than grass. The fern gullies contain the usual rainforest birds, and in them may be heard the varied mimicry of



Mount Buffalo from Dandongalale Station.

the Lyrebird accompanied by the resounding crack of the Eastern Whipbird and the calls of various others such as the Golden Whistler, the Pilot Bird and the ever friendly Yellow Robin. Lower down the river the treeferns give place to trees—acacias and correas—any many bushes. The predominant eucalypt in the valley is the Manna Gum (*E. viminalis*) some specimens of which attain a height of nearly 250 feet, although in the large swamps lying on the extensive river flats the Swamp Gum (*E. ovata*) holds its own.

Most of the ridges in the area are extremely dry and rocky, the dry condition being probably due to the fact that most of the rain falls on the southern slopes of the Great Divide and comparatively little reaches this region. An interesting feature on the ridges was that wild flowers such as Parrot-Pea (*Dillwynia glaberrima*) and Pink-Eye (*Tetratheca pilosa*) were in bloom whereas in other districts such as Creswick, they are amongst the earliest to flower in spring. Another point worthy of note was the presence of the dancing mounds of lyrebirds on top of the ridges. These mounds, which were fairly exposed and filled with stones were very different from those often found in other districts where they are usually sheltered under tree ferns and made up of moist earth mixed with rotting leaves and sticks.

The ridges were covered mainly with very stunted and poorly-formed peppermints (*E. dives*) which were riddled almost through-out by termites. The owner of Catherine Station told us that he has great difficulty in obtaining timber even for fence posts because of the extent of the damage done by these pests. The sides of some of the ridges with southerly or easterly aspects, which the sun reaches only between 11 o'clock in the morning and 3 o'clock in the afternoon, were almost completely covered with Common Maidenhair (*Adiantum uethiopicum*). This is a most beautiful sight, especially when the first rays of sunlight make the dew drops glisten on their fronds.

The bird life around the camp was dominated by the presence of a small colony of what we thought at the time to be Helmeted Honeyeaters. Since then, however, we have consulted Mr. N. A. Wakefield on the subject, and it was decided that, in view of the locality, the birds were most likely Yellow-tufted Honeyeaters. Another bird which we also observed for the first time was the Yellow-tailed Black Cockatoo, a pair of which visited our camp for a short period one morning.

On the last day of camp a dense fog blanketed the valley giving promise of another glorious day. One of our last close-up views of the mountains was a very beautiful one of Mount Buffalo from Dandongadaie. The splendour of this sight was heightened by a pair of Wedgetailed Eagles circling over the mount. How we envied them their freedom and wished that we, too, could have shared their glorious view of that formidable range, the Barry Mountains.

#### BIRTH OF A LIZARD

About Christmas 1954, a friend was fishing at Coloma and picked up a lizard's egg on the bank of the creek. He put it in a match box which, when he returned home on January 6, 1955, he put on a shelf in his garage. This he forgot until May 22, when he opened it to find a lizard about 1½ inches long, alive and quite active.

—A. LATHAM

## FERN FLORA OF THE PORTLAND DISTRICT

By CLIFF BEADGEMORE AND NOEL LEARMONTH

In this journal, in April 1944 (*Vic. Nat.* 60: 193-195) one of us (C.B.) dealt with the 22 fern species known from within 20 miles of the Portland post-office. Since then we have co-operated closely, and most likely places have been investigated. Assistance is acknowledged from Messrs. C. Stanford of Tyrendarra, P. Finck and son Eugene of Heathmont, A. Millard of Bessiebellie, T. Power of Byaduk and L. Aitken of Heywood. Their interest and guidance have contributed considerably to our knowledge.

It has been considered advisable to extend the sphere of operations to the South Australian border, across to Dartmoor, following the Crawford River, thence to Mount Eccles and thence down the Eumeralla River. We now include too all groups of the Pteridophyta. The total is now 48 species, which is remarkable, for South Australia has less in the entire State even though it has a dozen which we do not. All our species occur within 26 miles of the Portland post-office.

The order followed is that of *Ferns of Victoria and Tasmania*. The bracketed numbers are those of the species which appeared in the April 1944 list; the asterisk indicates that a species is abundant throughout our area. Our thanks are due to the Director and Staff of the National Herbarium and to Mr. N. A. Wakefield for checking specimens and for notes of old records.

1. (2.) *HYMENOPHYLLUM CUPRESSIFORME*.—Allitt's record has been re-established, presumably at the same spot, over some square feet in deep split basalt barrier at the junction of Darlots Creek and Fitzroy River, Tyrendarra. (See *Vic. Nat.* 66: 129—November 1949.)

[Note: *Mecodium australe* has been located on a dead *Dicksonia* trunk in a basalt cave at Byaduk, so it may turn up in our area, further south.]

2. *POLYPILEBIUM VENOSUM*.—In great curtains on damp walls of large volcanic cave at Mount Eccles (and in two similar caves at Byaduk).

3. (5.) *DICKSONIA ANTARCTICA*.—Widespread: numerous along upper tributaries of Moleside Creek (Little Moleside, Learmonth Creeks, etc.); at intervals along Crawford River, with one notable pocket on a branch four miles west of Hotspur and at Tin Kettle Creek near Digby. A plant grew formerly at the "Nine-mile water reserve", Heathmere, and juvenile plants still abound in a narrow shaft at the chalk mine nearby.

4. *TODEA BARBARA*.—Plentiful along upper reaches of Moleside Creek (Gallows and Little Moleside Creeks), sometimes with tufts three feet thick.

5. (4.) *CYATHEA AUSTRALIS*.—The species' western range is extended: about twenty fine specimens, two of which are twenty feet high, occur along Learmonth Creek; plants to sixteen feet high grow on an off-branch of Crawford River (East Greenwald); and there are juveniles in the chalk mine mentioned earlier.

6. (13.)\* *ADIANTUM AETHIOPICUM*.

7. (15.) *PELLIAEA FALCATA*.—Widespread on the basalt strip from Tyrendarra to Mount Eccles, but only twice on limestone: the isolated Cave Hill outcrop near Heywood and at the Rock Ravine property at Drik Drik.

8. *ANOGRAMMA LEPTOPHYLLA*.—Plentiful on moist shaded ledges in barriers or caves of the basalt from Tyrendarra to Mount Eccles, sometimes dozens of sporting plants at a time.

9 (14.) *CHEILANTHES TENUIFOLIA*—Three additional records; eastern bank, Keegans Bend, Glenelg River; Deep Creek, Mt. Clay; and cliff above Blacknose Point, on the coast.

10. *CYCLOSORUS PENNIGERUS*.—On moist limestones at intervals along the Lower Glenelg as far up as Dartmoor. As well as Moleside Creek, it occurs along Spring and Little Spring Creeks farther south; and below old Lake Condah Mission Station, on a limestone face of Darlots Creek, there is an isolated plant.

11. *PHYMATODES DIVERSIFOLIUM*.—Trailing over basalt in a barrier near the junction of Darlots Creek and Fitzroy River, Tyrendarra (also in caves at Byaduk).

12. (6.) *CULCITA DUBIA*—Additional records: Deep Creek (W. slope) and Boyer's Gully (S.E. slope), both at Mount Clay. [In about 1891 Eckert collected it somewhere along the Lower Glenelg, but we have not located it there.]

13. (8.) *HYPOLEPIS RUCOSULA*—Additional. Another drain (3 miles S.W. of other) at Gorae West; in swamps at Gorae and along Surrey River. In the *Dicksonia* pocket west of Hotspur, and at Tin Kettle Creek near Digby, it grows with *H. punctata*.

14. *HYPOLEPIS MUELLERII*—Wakefield identified as such, barren material from where the Surrey River widens at Gorae.

15. (7.) *HYPOLEPIS PUNCTATA*—At Little Moleside and Learmonth Creeks, an extension of its western range.

16. (19.)\* *LINDSAEA LINEARIS*.

17. *ATHYRIUM AUSTRALE*—One record only, from basalt caves about midway between Mount Eccles and Lake Condah.

18. (19.) *ASPLENIUM FLABELLIFOLIUM*—Common throughout the basalt formation from Tyrendarra to Mount Eccles; rare at Swan Lake Falls, at a cave near mid-Moleside Creek (both on limestone), at Learmonth Creek and Deep Creek, Mount Clay.

19. (21.) *ASPLENIUM ADIANTOIDES*—Allitt's was the sole State record until August 1949 when we re-discovered it along large split open basalt barriers near the junction of Darlots Creek and Fitzroy River, Tyrendarra, almost certainly Allitt's original locality (See *Vict. Nat.* 66: 129, November 1949). Later it was found ten miles farther north, on the eastern bank of Darlots Creek below old Condah Mission Station (See *Vict. Nat.* 67: 224, March 1951). More recently the species was located at Byaduk caves, outside our Portland area.

20. (20.) *ASPLENIUM OBTUSATUM*.

21. *ASPLENIUM BULBIFERUM*—In craters at Mount Eccles. We still wonder where Allitt found it at "Glenelg Mouth". (It occurs in fair abundance in Byaduk caves.)

22. *ASPLENIUM TRICHOMANES*—Several widely scattered records, all on limestone: high cliff, Keegans Bend, Glenelg River; Dartmoor; cave near mid-Moleside Creek; Rockingham Creek, Lower Bridgewater; and a cave on Stanford's property at Tyrendarra.

23. *PLEUROSORUS RUTIFOLIUS*—Uncommon on basalt from Tyrendarra to Mount Eccles; on limestone at Rockingham Creek and Keegans Bend.

24. (17.)\* *BLECHNUM MINUS*.

25. (16.)\* *BLECHNUM NUDUM*—The bipinnate form occurs at several places: Gallows and Learmonth Creeks, Fitzroy River, etc.

26. (18.)\* *BLECHNUM PROCERUM*.

27. *BLECHNUM LANCEFOLATUM*—Mid-Moleside Creek and a nearby cave provide our only records.

28. *DOODIA MEDIA*—At Boyer's Gully and another watercourse, both on the S.E. slope of Mount Clay.

29. (10.)\* *PTERIDIUM ESCULENTUM*.

30. (12.)\* *PTERIS TREMULA*—It has accustomed itself to diverse conditions of soil, rock, exposure, etc.

31. (11.) *HISTIOPTERIS INCISA*—Additional: a depression near Johnstone's Creek, Kentbruck. Eckert collected it from Lower Glenelg in 1891. (It is also at Byaduk caves.)

32. *CTENITIS SHEPHERDII*—In basalt caves at junction of Darlots Creek and Fitzroy River; cave near mid-Moleside Creek; narrow shaft at chalk mine near Heathmere. (Most abundant at Byaduk.)

33. (22.) *POLYSTICHUM PROLIFERUM*—Additional: Little Mo'eside and Learmonth Creeks; gully on S.E. slope of Mount Clay; off-branches of Crawford River.

34. (2.)\* *GLEICHENIA MICROPHYLLA*.

35. *GLEICHENIA CIRCINNATA*—One patch only, near old "Pipeclay" mill site, S.W. of Mount Deception.

36. (1.) *SCHIZAEA FISTULOSA*.

37. *SCHIZAEA BIFIDA*—One specimen, unbranched, under *Xanthorrhoea*, near Coolgardie Swamp, Mount Clay.

38. *SCHIZAEA ASPERULA*—Numerous in heathy country near head of Deep Creek, Mount Clay.

39. \* *OPHIOGLOSSUM CORIACEUM*—Occurring on many types of soil.

40. *MARSILIA HIRSUTA*—Only record, in swamps along Darlots Creek, Tyrendarra, fortunately in a sanctuary.

41. *PILULARIA NOVAE-HOLLANDIAE*—On flat, drying swamp in Darlots Creek sanctuary.

42. *AZOLLA FILICULOIDES*—Abundant along Darlots Creek and nearby swamps, often associated with duckweeds and the floating hepatic *Ricciocarpus natans*. (Also at a spring at Rock Ravine, Drik Drik.)

43. *LYCOPODIUM LATERALE*—Near foot of Little Mount Kincaid, and in a swamp on the W. slope of Mount Clay.

44. *PHYLLOGLOSSUM DRUMMONDII*—Long Heath, Gorae; Emu Hill area, between Gorae West and Mount Richmond; Bats' Ridges; and Eckert has a record, "Entrance of the Glenelg, 1891".

45. *SELAGINELLA ULIGINOSA*—W. slopes of Mount Clay; near rifle range, South Portland; Upper Surrey River, at Wrights Swamp and near foot of Little Mount Kincaid.

46. \* *SELAGINELLA PREISSIANA*—In moist places.

47. *ISOETES DRUMMONDII*—On flat, drying swamp, Darlots Creek sanctuary.

48. *TMESITERIS BILLARDIERI*—Mainly on trunks of *Dicksonia*, but also on *Todea* along Little Moleside Creek.

**SUNDRY NOTES ON AUSTRALIAN STYLIDIA**  
(including a new name for a tropical trigger-plant)

By J. H. WILLIS,

National Herbarium of Victoria

1. *STYLIDIUM ERICKSONAE* J. H. Willis, nomen novum.

[*S. androsaceum* O. Schwarz in *Report. Spec. Nov. Regn. Veg.* 21: 105 (1927), non Lindl. in *Edwards's Bot. Reg.* 23, Appendix . . . Veg. Swan River: xxix (1 Dec. 1839), nec DC. *Prodr. Syst. Nat.* 72: 785 (Dec. serus 1839).]

As a later homonym, Otto Schwarz's name *Stylidium androsaceum* must lapse. For the necessary new epithet, I have the greatest pleasure in bestowing the surname of Mrs. Rica Erickson (Bogart, W. A.)—my friend and col- laborator during so many researches in the fascinating Trigger-plant family. Mrs. Erickson's patience, genius for minute detail and great artistic skill have gone a very long way toward solving the taxonomic problems connected with this difficult group; she has travelled extensively to study species in the field over much of Australia (including the tropics), and everywhere has made careful colour sketches of the living plants—working toward a compre- hensive monograph of all Australian "Triggers", which is now nearing completion.

*S. ericksonae* is a delightful and very characteristic perennial. It has dense and exceedingly hirsute, verticillate rosettes ( $\frac{1}{2}$ "-1" wide) from the upper- most of which arise up to 20 (but usually less) erect one flowered, hair-like peduncles to 6" long; the calyx tube is elongated, the corolla rosy pink inside and bright yellow externally. As far as we know at present, the species occurs only within a short distance of Port Darwin. Apparently the first specimens were found by M. Holzke along the Adelaide River in 1890 (un-named collection in Melbourne Herbarium). F. A. K. Bleeser collected it at Koolpinyah, 30 miles east of Darwin ("on wet sandy flats"), during the 1920's; his material became the type of *S. androsaceum* O. Schwarz. Mrs. Erickson herself obtained good flowering examples on white sand flats along the Stuart Highway, 20 miles from Darwin (July 12, 1955) and also several miles nearer the town.

I suggest "Androsace Trigger-plant" as an appropriate vernacular name.

2. *STYLIDIUM REDUPLICATUM* R. Br. *Prodr. Flor. Nov. Holl.* 563 (1810).

= *S. pilosum* Labill. *Nov. Holl. Plant. Specim.* 2: 63, T. 213 (1806).

In the *Prodrum* Robert Brown recognizes both *S. pilosum* and *S. redupli- catum*, the latter presumed to differ in its reduplicate leaves and shorter scape with non-glandular hairs. J. Mildbraed in his monograph on *Stylidiaceae* [*Das Pflanzenreich* IV, 278, Heft 35: 80 (1908)] has a footnote to the description of *S. reduplicatum*, viz.:

*St. pilosum* Labill. . . non vili; species ex iconibus et descriptione non facile cognoscenda est. . . a *St. plantaginea* Sondl., quo eam a et, Bentli conjuncta est, certe distincta.

C. A. Gardner omits *S. pilosum* from his *Enumeratio* (1930).

Throughout the sand plain country around Esperance Bay, extending easterly to beyond the Cape Le Grand Reserve and also occurring on some islands of the Recherche Archipelago, is a large Trigger-plant which varies a good deal in width of leaves, rolling of margins, flower colour and degree of development of glandular hairs (flower part of scape usually non-glandular). This I am convinced is the *S. pilosum* of Labillardiere, from which *S. redupli- catum* R. Br. can not be separated specifically. I sent material from Sandy Hock Island (Recherche Archipelago) to Dr. R. Pichi-Sermolli for com- parison with Labillardiere's type at Florence, and he replied (29/9/1952):

"Your specimens agree well with the type of *S. pilosum* in all characteristics, in the appendages at the throat of the corolla too."

3. *STYLIDIUM ADPRESSUM* Benth. *Flora Aust.* 4: 22 (1869).

The epithet has, without justification, been spellt "appressum" by J. Mildbraed (1908) and C. A. Gardner (1930). Mrs. Erickson examined material in the Sydney Herbarium labelled *S. cynnorum* W. V. Fitzg. [*Journ. & Proc. Mueller Bot. Soc.* 19: 16-17 (June 1902)], and found that the specimens are inseparable from our *S. adpressum*, var. *patens* [see *Muelleria* 11: 16 (Feb. 1956)]. They differ from Fitzgerald's description of *S. cynnorum* in having much shorter leaves (seldom 1 cm., in contrast with his 1½ inches), pink not yellow flowers and without the 5 throat appendages. The exact nature of Fitzgerald's species is still uncertain, but it could represent an extraordinary form of *S. adpressum*.

4. *STYLIDIUM MERRALLII* (F. Muell.) Pritzl., ut obs., in *Engler Bot. Jahrb.* 35: 596 (1904).

F. Mueller published the species under *Candollea* (not *Stylidium*) in *Vict. Nat.* 5: 76 (1888), so it is incorrect to write "*S. merrallii* F. Muell." as Mildbraed and Gardner have done. The first writer to use the combination *S. merrallii* would seem to be E. Pritzl, in a footnote under his original description of *S. dictyanum*; he also attributed the binomial to F. Mueller.

5. *STYLIDIUM DESPECTUM* R. Br. & *S. BRACHYPHYLLUM* Sand. in Lehm.

These species are almost co-extensive, very similar, and have been completely confused in eastern Australia. However, they may be distinguished quite readily as follows:

*S. despectum* lacks a basal rosette and has the two posterior petals larger than the anterior, longitudinally arranged and almost touching throughout their length; whereas *S. brachyphyllum* has an obvious rosette of radical leaves, the two posterior petals smaller than the anterior and widely separated, almost forming lateral pairs with each anterior petal.

L. Rodway in *Tas. Flora* (1903) does not mention *S. brachyphyllum*, neither does A. J. Ewart in *Flora Vict.* (1930); J. M. Black synonymizes it under *S. despectum* in his *Flora S. Aust.* (1929), yet the species occurs in each of these three States. Dr. Winifred M. Curtis recently (Dec. 1955) found both trigger-plants growing near Low Head at the mouth of the Tamar River, Tas., which is Brown's type locality for *S. despectum*.

6. ~~*STYLIDIUM LEPTOPHYLLUM* DC. Prodr. Syst. Nat. 7: 783 (1838), var. *MUCRONIFOLIUM* Benth. *Flora Aust.* 4: 30 (1869)~~

= *S. dichotomum* DC. i.e., forma.

Mildbraed (1908) emphasizes the difficulty of separating certain forms of *S. leptophyllum* from *S. dichotomum*; and Mrs. Erickson has found that the two can appear almost identical, the only reliable criterion then being the manner in which the anthers are arranged on the column—transversely fixed in the former, and parallel to column axis in the latter species. In Benthani's variety *mucronifolium* the anthers are placed as for *S. dichotomum*, not *S. leptophyllum*. To make a new combination "*S. dichotomum*, var. *mucronifolium*", however, would be superfluous because *dichotomum* sometimes has decidedly mucronulate foliage; Benthani himself synonymized *S. mucronifolium* of Hooker (*Bot. Mag.* 4538) under *S. dichotomum*.

7. *STYLIDIUM ROSEO-ALATUM* R. Erickson & J. H. Willis in *Vict. Nat.* 72: 133 (Dec. 1955).

The date given, under the original description, for collection of the HOLOTYPE (in MEL.) is incorrect; it should be Oct. 26, 1952, not Oct. 17, 1948.

**A NEW SPECIES OF TAENIOPHYLLUM (ORCHIDACEAE)**

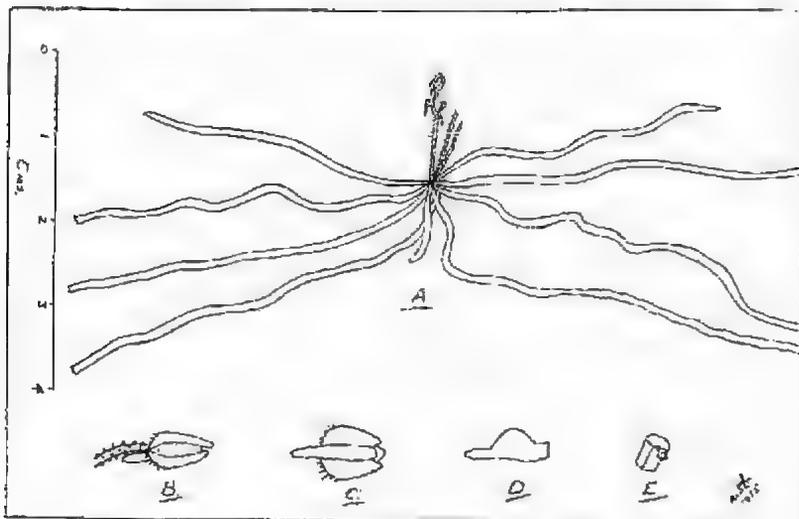
By A. W. DICKRILL, George's Hall, N.S.W.

**TAENIOPHYLLUM LOBATUM** sp. nov.

Planta efoliata. Radices cinereo-virides, fere planae, saltem 12 cm. longae, usque ad 1 mm. latae. Pedunculus circa 9 mm longus, sparsim et perscepranter hispidus. Pedicelli circa 2 mm. longi, hispidi. Bractae pedicellos sustententia variabiles, sed fere semper magnae, ad basia latae, acuminatae, acute decurvatae. Flores plerumque 2, subflavi, vix aperientes. Segmenta adjuncta sed non adhaerentia; supra ad partem lateralem curvata, infra plana. Sepala circa 2 mm. longa et 1 mm. lata, cymbiformia, basia versus setas paucas gerentia. Petala similia, paulo breviora, labellum circa 2.5 mm. longum (calcarem includens), cymbiformae, dente in summa fronte praeditum; lobi laterales magni, fere semiorientales, incurvati; calcar subcylindricum, tenue, circa 1 mm. longum. Anthera rostro obtuso, sarsum curvato, instructa.

North Queensland: Mount Spec (W. W. Abell, Nov. 1955—TYPE).

Plant leafless. Roots pale-grey-green, almost flat, up to at least 12 cm. long and 1 mm. or less broad. Peduncle up to 9 mm. long, rather sparsely beset



*Taeniophyllum lobatum* sp. nov.

A: Complete plant (about natural size), see scale. B: Flower from side; C: Flower from below. D: Labellum from side (lateral lobe raised). E: Column. (B, C, D and E are shown twice natural size.)

with short coarse bristles (which are persistent on old peduncles). Pedicels about 2 mm. long, beset with bristles similar to, but smaller than, those of the peduncle. Bracts subtending the pedicels variable in dimensions but large, broad at the base, acuminate, sharply decurved about one-third the distance from the base. Flowers 2 as far as is known, pale yellow, rounded laterally on top, flattish below and horseshoe-shaped in outline (apart from the spur), segments closely appressed but not joined and not widely expanding at their apices. Sepals about 2 mm. long and 1 mm. broad (when flattened), cymbiform, a few bristles towards the base. Petals similar to the sepals but a little smaller and without bristles. Labellum about 2.5 mm. long, including the spur, cymbiform, with a tooth in front on top; lateral lobes large, almost

seniororbicular, incurved so that they meet in front of the anther but are not column-embracing; spur subcylindrical, rather slender, about 1 mm long. Anther with an up-curved obtuse rostrum.

*Taeniophyllum lobatum* is not closely related to any of the other three Australian species of the genus, *T. Muelleri* Lindl., *T. cymbiforme* Hunt and *T. Wilkmanum* Hunt (but it has close affinities with some extra-Australian species), and it is readily distinguished from them (i.e. the three Australians) by its hispid peduncle, etc., this feature being absent in those three, and by its relatively much larger bracts and lateral lobes of the labellum.

The specific epithet refers to the large lateral lobes of the labellum.

The collector deserves the fullest praise for finding yet another new species of orchid.

### A FEAST OF NECTAR

Despite the inclemency of the weather elsewhere in the State, May 28 last was a pleasant, sunny day in the valley of the upper (Victorian) Snowy River. A stop was made for lunch at the old pine-log hut at the eastern end of McKillop's Bridge under the craggy Mount Deddick. The forest there is mainly of Murray Pine and White Box (*Eucalyptus albens*), and the latter was flowering profusely. Notice was taken of the nectar-eating birds in the immediate vicinity of the hut, and there were no fewer than twelve species present at the time—ten honeyeaters and two lorikeets. They comprised the Red Wattle-bird, Eastern Spinebill, the White-naped, Yellow-tufted, Fuscous, Yellow-winged, Yellow-faced, White-eared, Crescent and Regent Honeyeaters, and the Musk and Little Lorikeets. Has any reader noticed such a concentration anywhere of these brush-tongued nectar-feeders?

—N. A. WAKEFIELD.

### WHAT, WHERE AND WHEN

#### F.N.C.V. Meetings:

Monday, August 13—"Central Australia", by Mr. F. Pinchen.

Monday, September 10—"Native Plants", by Miss C. Carberry.

#### F.N.C.V. Excursions:

Saturday, July 14—Midwinter Mystery Trip, by parlor coach, approximately 156 miles, mostly along highways, no walking. Objects—Historical and Physiographical. Coach leaves Batman Avenue 8.30 a.m. Bring two meals—morning tea available at cafe en route. Bookings 18/- each, with leader. Mr. H. Stewart, 14 Bayview Terrace, Ascot Vale (Telephone FU 1096).

Saturday, July 28—Botany Group Meeting. Meet 2.15 p.m. at National Herbarium. Subject: Plant Ecology. Speaker: Mr. K. Atkins.

Saturday, August 4—Geology Group excursion. Collecting day for National Museum. Details at group meeting.

Saturday, August 11—Inspection of C.S.L.R.O. Native Plant Garden, Graham Road, Highbury, and visit to Highbury Nursery, 22 Middleton Street, Highbury. Leaders: Messrs. E. Swarbrick and G. A. Echberg. Take 1.50 p.m. Mordialloc train to Highbury or meet 2.20 p.m. at Highbury station.

#### Group Meetings:

(8 p.m. at National Herbarium.)

Wednesday, July 18—Microscopical Group.

Wednesday, August 1—Geology Group. Subject: Sulphide Minerals. Speaker: Mr. Cobbett.

#### Preliminary Notice:

Sunday, August 19—Parlor coach excursion to Blackwood. Leader: Mr. Williams. Coach leaves Batman Avenue 9 a.m. Fare 18/-. Bring two meals.

—MARIE ALLENDEE, Excursion Secretary.

# The Victorian Naturalist

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No. 872

## PROCEEDINGS

The hall at the National Herbarium was filled to capacity for the General Meeting on July 9 last. Before proceeding with business, the President welcomed visitors, and also the new officers—Mr. E. Coghill, Hon. Secretary, and Mr. F. Curtis, Council Member. It was learned that Mr. George Coghill and Mr. F. Lewis were ill, and it was decided that letters of sympathy should be sent to them.

A letter was received from Dr. M. Chattaway stating that she was willing to act as one of the Club's representatives at the forthcoming A.N.Z.A.A.S. conference at Dunedin. Miss Jean Woollard had been appointed Exhibit Steward, Mr. Webb had signified his willingness to act on a Youth Movements Committee, and Mr. Seaton had agreed to take an interest in the Hawthorn Junior Club. Mr. Rayment had accepted the special office of liaison between Club members and the National Museum officers.

Mr. Garnet placed before the meeting several suggested amendments to the proposed National Parks legislation, and the Club agreed to support them.

The meeting was then handed over to Mr. John Béchervaise, who delivered a most memorable address on Antarctic animal life—the Emperor Penguin, Adelic Penguin, Snow Petrel and the Weddell Seal. This was followed by an outstanding series of Kodachrome slides of the scenery, fauna and flora of the Antarctic.

It was announced that the nurserymen of the Dandenongs, with the *Argus* and *Your Garden* magazine, were to hold a show at Kalorama during Melbourne Show week; and the Beaumaris Tree Preservation Society is to organize a function during the first weekend in October.

The President reported that an F.N.C.V. party and a number of members of the B.O.C. had attended the Sir Colin Mackenzie Sanctuary at Healesville on the previous Saturday, and that a very satisfactory amount of work had been done in connection with the Nature Trail and in the planting of ornamental native trees. It was arranged that working parties should continue operations on the first Saturday of each month.

The meeting closed at about 10.15 p.m. for the usual conversation and perusal of exhibits.

### MICROSCOPICAL GROUP

About thirty members and friends attended the meeting of July 18. Mr. Tarlton Rayment was the speaker for the evening, his subject being "The Incidence of Pollen Grains of Heath on Creative Evolution". A number of micro-slides of pollen grains and of transverse sections of immature flower-buds of heaths were used to illustrate the lecture. These were presented in various ways, some were arranged under microscopes and others projected by Mr. Middleton's micro-projector. Miss Woollard projected Kodachrome slides of various heaths. Mr. Rayment produced evidence, after studying some 200 species, that at present all heaths are self-pollenating, but that they were evolving single-grained pollen cells and would in time require insect agents.

Members are advised that the slide cabinets are now accessible in the Club Library room, with a catalogue to indicate what is available. Mr. H. Barrett is the custodian. Mr. W. Evans is to act as Group Treasurer for the collection of annual subscriptions from those who are unable to attend the Club's General Meetings. Members are requested to bring their favourite opaque or dark ground slides, and some means of illuminating them, to the Group Meeting on August 15, to assist Mr. Snell in his demonstration of the technique of preparing and mounting such specimens.

### THE NATIVE WATER WELLS AT MARYBOROUGH, VICTORIA

By A. MASSOLA\*

The ability of the Aborigine to avail himself of all that Nature produces is well known. Thus he is able to survive and prosper under conditions which would mean certain death to the European. Foremost amongst his needs is water, and the many ways he makes Nature supply it are almost beyond belief, trees and their roots, frogs and dew, all serving his purpose. Less known is the Aborigine's ability, under certain conditions, to actually build storage tanks for the conservation of rain water.

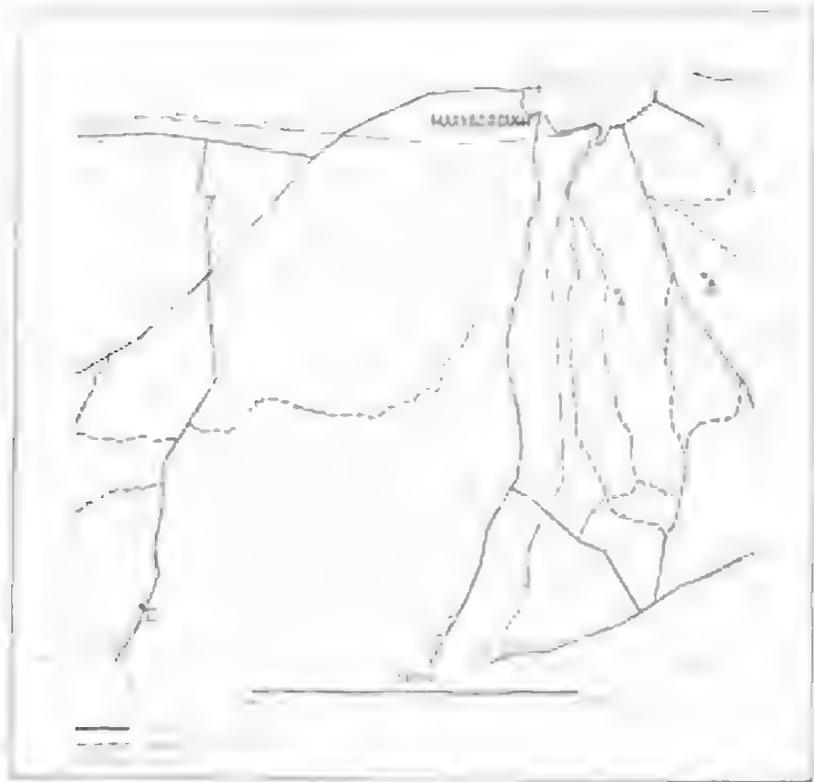
In the Maryborough district of Victoria three such rock wells are known, one being much larger than the others and apparently of some age. This last one has been known for a long time, but, although the matter was never in doubt amongst local enthusiasts and members of the Maryborough Field Naturalists Club, it has not had official recognition as a well. For instance, in the *Melbourne Herald* of January 22, 1919, there was a note about the "Sacrificial Altar, or Mysterious Rock". Apparently the victims were sacrificed on the rock, and the blood would collect in the wells! Later, in 1920, A. S. Kenyon wrote about the "Aboriginal Pigment Quarry" and stated that an ochre of a rich yellow color was obtained from the sides and bottom of the pit.

The present writer first saw this rock in July 1955, having been guided there by Mr. I. Courtney of Maryborough. At the time I expressed some doubts of it having been done by aborigines, as it seemed altogether too elaborate in design and construction, but

\* Department of Anthropology, National Museum of Victoria.

having again visited this site, as well as the other newly discovered ones, under the guidance of Mrs. B. Herring, also of Maryborough, I have now no doubt that they are water-wells.

The three wells are excavated in outcrops of micaceous sandstone and run in a general north-easterly direction through country which is particularly dry. The distance between the two farthest apart is



Location of Native Water Wells at Maryborough.

(For details, see text.)

5 $\frac{3}{4}$  miles as the crow flies, with the middle one, which happens to be the first discovered, 5 miles from its south-west partner and  $\frac{3}{4}$  mile from its north-east one. It is possible that they were on a track running through the bush and used by the aborigines during their seasonal movements between Bet-bet and Deep or Tullaroop Creeks, and forming part of a network of trade routes.

The oldest known, and largest, is situated at the head of a shallow gully, Bull Gully (marked A on map), ten chains on the left or

east side of MacCallum's Creek Road. As the photograph shows, it is a series of four holes or pits excavated in the rock on the ledge at the base of a large outcrop. Three of these holes unite under the surface, and form, as it were, one large tank with three openings. The excavation was not carried straight down, but on an inclined plane, and at one end the tank is 51 inches deep on the incline and nearly four feet vertically below the surface.

The choice of this ledge at the foot of the rock is of the greatest importance, because it forms a natural catchment for the rain falling on the rock. The narrowness of the mouths of the holes, only six to eight inches, is ideal for protection against pollution by animals and wind, as they can easily be covered with a slab of stone, and the inclination of the excavations would naturally tend to prevent loss of water by evaporation. The local people assure me that this rock well has never been known to dry up.

The other two wells, situated one on the right or west side of the road to Amherst (C on map), just before the road crosses the Opossum Gully, and the other in a shallow gully at Mosquito Flat on the left or east side of the Craigie Road (B on map), are quite small in comparison with the first (A), the former having but two shallow holes and the latter three. It is noteworthy, however, that in each case the holes were being excavated diagonally into the rock, below the surface, and that the holes are on a ledge at the foot of the rock. Clearly, these two were in process of manufacture.

Although such wells are known from other states, these, to the writer's knowledge, are the only *artificial* rock wells reported from Victoria. But as the people formerly inhabiting Tuaggara (Maryborough) were the Jajaurung, one of the many tribes forming the Kulin Nation, which collectively occupied the country from Colac to the Baw Baws, and from Wangaratta and Murchison on the north to Port Phillip and Western Port to the south, it is possible that this idea may have spread and that more will come to light.



Photo: Chas. Will.  
Maryborough Water Wells.  
(Marked "A" on map.)

VICTORIAN FLUVIATILE AND LACUSTRINE MOLLUSCA—PART I  
THE PELECYPODA

By RON C. KERSTIAN\*

The freshwater mollusca have always presented the student with exceptional difficulties. In Victoria, the first semblance of order for this fauna of the State was achieved by C. J. Gabriel, but his results have not necessarily been in agreement with those of other workers. As the first of a proposed series of papers relating to Victorian mollusca, it was hoped that a bringing together of the work of the various authors would enable a more up-to-date picture to be presented. Since this work was completed, Dr. McMichael of the Australian Museum has reported on some revolutionary discoveries in relation to freshwater mussels, which enables a completely new approach to be made.

It is not proposed to debate the arguments put forward by McMichael (*Nautilus* 69 (1) 1955); the writer wishes to accept them as the only satisfactory course. Tredale had revised the mussels in 1934, and again in 1945 and had introduced various new groups in the first paper. Gabriel did not find these acceptable in 1939, and preferred to adhere to the findings of Cotton and Gabriel in 1931. (See references in list below.) For the controversial *Uma australis* he had retained *Hyridella*, and in this he was correct, but, as McMichael has shown, the name has been in use for the wrong shell. In the following list the name *Hyridella australis* is applied to the shell formerly known as *Propehyridella nepmanensis* (Conrad), and this is undoubtedly the correct usage.

Of interest is the physiological work of Dr. I. Hiscock, who has shown that there are three phases in shell movements of the common Murray mussel (*Aust. J. Mar. Freshwater Res.* 1 (2): 259, 1950). The shells may be closed, completely open (and feeding), or partly open at a stationary intermediate position. He has described the expulsion of the glochidium larvae, and in a later work (*Trans. Roy. Soc. S. Aust.* 74 (2): 146, 1951) discusses the host fish, the callop emerging as the likely principal host.

An interesting point remarked by Hiscock was the former belief that the glochidium was a parasite of the gills of fish; it is in fact parasitic on the fins. During or before the expulsion of the glochidia they may be present in the branchiae in numbers. This led very early observers to regard them as parasites of the mussels themselves, a certain Prof. Jacobsen of Copenhagen being convinced of this. A little more than one hundred years ago in *Charlesworth's Magazine of Natural History* (Vol. 3, p. 441) they were described as distending the branchiae "in a remarkable manner". Dr. Pfeiffer, however, observed the presence of minute mussel ambones, and concluded he was seeing the young; this conclusion was later accepted as having been correct. Joyce Allan (*Brit. Nat.* 51: 166, 1934) records the discovery of a pearl found in a mussel by Mrs. Freaine, and discusses this type of occurrence.

Mussels are found in many places in Victoria; a large number of these are recorded by Mr. Gabriel. They may be found in a main stream, or in a billabong, lagoon, or lake habitat. It is very desirable that more be learnt concerning the various types of habitat, and certain species seem to have some preferences. The best opportunity for collecting is at a time when river levels are low, and I have found them even among rocks on the river bed. The shells vary according to environmental conditions, which may affect growth of the shell in various ways. Dr. Hiscock found that a young animal left accidentally in an aquarium jar without water, withstood desiccation at 22 degrees Centigrade for at least three months. There are in Victoria several species of minute bivalves listed by Mr. Gabriel in the genera *Sphaerium*, *Psidium*, and *Corbicula*. Tredale has preferred Dr. Dall's *Corbiculum* instead

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of *Corbicula*, and has himself introduced new groups to replace the first two, on the grounds that Australian species are not regarded as referable to these genera by extralimital workers. In general appearance the shells themselves are similar to the English Orb and Pea shells, but in any case they are so small that close study is needed to recognize the species at all. Hence they tend not to be popular; however they may be found in streams, lakes and marshy places, often buried in the mud. I have found them in the banks of streams, amongst the roots of reeds in the wet mud. They are said to climb reeds growing in the water.

Iredale has renamed Gabriel's *Sphaerium tasmanicum* and records two species from Tasmania. If the Victorian shell is not distinct from the Tasmanian, then it is at the moment, a moot point as to whether it be equivalent to *S. tasmanicum* or Iredale's *S. lacusedes*. However, as both these shells are from South Tasmanian river systems (the latter species is from Great Lake in the Derwent watershed, and incidentally occurs not in the Lake but in the outflow) and one is not yet convinced that they are separable, and which, if either, is found in the north of Tasmania, it seems much more satisfactory to accept Iredale's *S. victoriana*, despite the brief diagnosis, until it can be conclusively demonstrated that there are specific differences, or conversely, that there are no specific differences, present. It is hoped at a later date to make comparisons between shells from various localities in an effort to determine the relationships in Tasmania. Collecting to this end has been done in several places.

Class: PELECYPODA

Superfamily: NAIADACEA

Family: HYRIDELLINAE

Subfamily: VELESUNIONAE

VELESUNIO, Iredale *Aust. Zool.* 8 (1): 59 (May 9, 1934).

(Type: *Unio ambiguus* Philippi = *U. bulanensis* Conrad.)

1. *VELESUNIO DANELLII* (Villa)

1871. *danellii*, *Unio* Villa, *Journ. de Conch.* 19 (3 ser. xi): 328.

1934. id. *Velesunio* Iredale, *l.c.*: 60, Pl. 3, fig. 4, & Pl. 4, fig. 4.

1934. id. *Velesunio* Allan, *Vict. Nat.* 51 (7): 166 (Nov.), with text fig.

River Yarra. Mrs. Freame's specimen figured by Joyce Allan came from Everton, from a lagoon "off the River Murray".

2. *VELESUNIO TESTATUS* Iredale

1943. *testatus*, *Velesunio* Iredale, *Aust. Nat.*, 11 (4): 88 (Nov.).

1934. *exans*, *Velesunio* Iredale, *l.c.*: 62, Pl. 3, fig. 7, & Pl. 4, fig. 7.

Type. Benthaggi, N.S.W. (non *V. exans*) Pl. 3, fig. 6, & Pl. 4, fig. 6).

1939. *australis*, *Hyridella* Gabriel, *Mém. Nat. Mus. Vict.* 11: 129, Pl. 4, fig. 38.

The species hitherto regarded as *H. australis* has been shown to have been confused with a species of *Velesunio*. We are here concerned with the identity of the shell figured by Gabriel, and I have preferred *V. testatus* for the time being. The species is stated by Iredale to be common in Victoria and South Australia. Gabriel gave distinguishing points of *U. ambigua* Philippi from his

*H. australis*, however his conception of these forms is identical with that of Cotton and Gabriel (*Proc. Roy. Soc. Vict.*, 44 (2) n.s.: 156 & 157, 1932). Iredale cites their shell from Reedy Lake as being identical with his *V. cyanus*. The *Vetresunia baloneusis* (Conrad) is now known to be *V. ambiguus* (Philippi); Cotton and Gabriel's *Hyridella* is discarded (McMichael, *Nautilus* 69 (1): 11). Gabriel, thus, includes true *V. ambiguus* as a synonym of his *H. australis* and if this is not *V. testatus* as used here, then it should be *V. ambiguus*, in which case I would regard *V. testatus* as a junior synonym. Unfortunately, on the basis of the usage of the name, Gabriel has included Iredale's "*H. australis*" and his "*H. orion*", but this is incorrect.

ALATHYRIA, Iredale, *l.c.*: 63 (1934). (Type, *A. jacksoni* Iredale.)

### 3. ALATHYRIA JACKSONI Iredale

1934. *jacksoni*, *Alathyria* Iredale, *l.c.*: 64, Pl. 3, fig. 11 & Pl. 4, fig. 11

1939. *angasi*, *Hyridella* Gabriel, *l.c.*: 130, Pl. 4, fig. 39.

River Murray. This shell is not *H. angasi* and approaches nearest to *A. jacksoni*, while Iredale remarks that Cotton & Gabriel regarded "this group" (*Alathyria*) as *Hyridella angasi* (Reeve), citing Crampton. Gabriel had not altered his views.

### Subfamily: HYRIDELLINAE

HYRIDELLA Swainson, *Treatise Malac.*: 285 (1840). (Type, *Unio australis* Lamarck = *Unio nepeanensis* Conrad, emended.)

### 4. HYRIDELLA AUSTRALIS (Lamarck)

1819. *australis*, *Unio* Lamarck, *Anim. s. Vert. (Ed. 1)* 6: 80.

1850. *nepeanensis* (sic), *Unio* Conrad, *Proc. Acad. Nat. Sci. Philad.* 5 (1): 10.

1932. *id.* *Propoehyridella* Cotton & Gabriel, *Proc. Roy. Soc. Vict.* 44 (2): 158.

1934. *id.* *Propoehyridella* Iredale, *l.c.*: 73.

1939. *id.* *Propoehyridella* Gabriel, *l.c.*: 131, Pl. 4, fig. 40.

1955. *australis*, *Hyridella* McMichael, *Nautilus* 69 (7): 12 (July).

Mitchell River, etc., Gippsland.

### 5. HYRIDELLA (DRAPETA) ORION (Iredale)

1934. (*australis*) *orion*, *Hyridunio* Iredale, *l.c.*: 69

Iredale's *H. drapeta* replaces his *H. australis*, accordingly *H. orion* becomes a subspecies of *H. drapeta*; it is said to come from Lilydale. I do not propose to discuss the status of this form. Iredale states "a fully adult specimen is a little smaller, less winged, the pseudocardinals less erect and more rugose, the anterior muscle scars smaller, the anterior retractor-pedis pit notably so." One may appeal to authors not to use comparisons in original definitions; they may be supplementary. The practice was heartily condemned a few years ago by an authority dealing with crustaceans, when faced with a particularly unfortunate example.

### 6. HYRIDELLA RENUATUS (Iredale)

1934. *renatus*, *Hyridunio* Iredale, *l.c.*: 69, Pl. 5, fig. 3, & Pl. 6, fig. 4.

Lalrobe River; Tarra Creek, Tarraville. Gabriel included several species under *P. culteliformis*, however Iredale examined a shell from Tarra Creek which is probably the basis of Gabriel's record from that locality.

7. *HYRIDELLA NARRACANENSIS* (Cotton & Gabriel)

1932. *narracanensis*, *Propelhyridella* Cotton & Gabriel, *l.c.*: 159, Pl. 16, fig. 8.  
1934. *neapeanensis narracanensis*, *Propelhyridella* Tredale, *l.c.*: 74, Pl. 5, fig. 13,  
& Pl. 6, fig. 13.

1939. *narracanensis*, *Propelhyridella* Gabriel, *l.c.*: 133, Pl. 4, fig. 43.

Narracon River, Thorpdale. One has some doubt as to the shell Tredale examined. He may have mixed his localities, or for that matter, the collectors. He may, hence, have had the shell, listed as *H. australis* above, collected by J. A. Kershaw from the Mitchell River (and this differs somewhat from Tredale's illustration of *P. neapeanensis*) in which case his "subspecies" would immediately become a synonym, and had actually at first been placed as such in this work. In addition the possibility of a juvenile entering into the picture has not made for clarity, and I was led to conclude that Tredale had seen more than one form. Dr. Hiscock remarks (personal communication) that the paratypes of *P. narracanensis* are a mixed series.

8. *HYRIDELLA VICINALIS* (Tredale)

1934. (*depressa*) *vicinalis*, *Rugoshyria* Tredale, *l.c.*: 72.

1939. *cultelliformis*, *Propelhyridella* Gabriel, *l.c.*: 132, Pl. 4, fig. 41.

Mitchell River. Tredale based his subspecies on shells from the Mitchell River which Gabriel has continued to regard as *P. cultelliformis*. Inasmuch as this name is apparently not applicable, *H. vicinalis* may be used, but the status may be questionable, and I do not regard it as confirmed, as the *R. depressa* series seems to need further study. I understand from Dr. Hiscock that he and Dr. McMichael regard *Rugoshyria* as a synonym. From a systematic point of view one may prefer to retain it in view of the elongate shape and differences of the hinge teeth in the series, which may give it subgeneric value. Such a course has value when large series are involved, in preventing a genus from becoming unwieldily; whether that argument is here applicable depends on the validity of the "species" involved.

PROTOHYRIDEI. A Cotton & Gabriel, *Proc. Roy. Soc. Vict.*, 44 (2) n.s.: 159 (1932)

(Type: *Unio glenelgensis* Dennant)

9. *PROTOHYRIDEI GLENELGENSIS* (Dennant)

1898. *glenelgensis*, *Unio* Dennant *Proc. Roy. Soc. Vict.* 10 n.s.: 112, fig. 9.

1932. *id.* *Protohyridella* Cotton & Gabriel, *l.c.*: 160, Pl. 16, fig. 9.

1934. *id.* Tredale, *l.c.*: 74, Pl. 5, fig. 14, & Pl. 6, fig. 14.

1939. *id.* Gabriel, *l.c.*: 133, Pl. 4, fig. 43.

Glenelg River. The authors regard the genus as primitive, and it may well be that they are correct as the physiographic history of the Glenelg seems to lend weight to the necessary prolonged isolation which is probably unique in Victorian streams. This aspect will not be dealt with here as it is intended to deal with it in sections dealing with the gastropods. The authors' remark that corrugated mussels are typical of quick-flowing streams and "scarcely warranted in present day slow-flowing Australian rivers", is very interesting. The Glenelg is certainly a sluggish and mature stream, and one must assume that our mussels have changed their habits (by adaption in the Glenelg), for *Velesunio* is plentiful in the often very swift South Esk River in Tasmania. However Gippsland streams harbouring *Hyridella* now tend to be sluggish, whereas they have without doubt known periods of greater turbulence in the past. A generalized view shows *Hyridella* in Eastern Victoria and the high mountains (*R. depressa monticola* on Kosciusko), *Velesunio* in the Murray-

Darling, Goulburn, Yarra, and Tasmania, and *Protohyridella* in the Glenelg. But there is overlapping in the Central systems and in Tasmania.

Suborder: DIOGENODONTA

Superfamily: SPHAERIACEA

Family: CORBICULIDAE

CORBICULINA Dall, *Trans. Wagner Free Inst. Sci., Philad.* 3: 1449 (1903)

(Type: *Corbicula angasi* Prime)

10. *CORBICULINA ANGASI* (Prime)

1864. *angasi*, *Corbicula* Prime, *Journ. de Conch.* 12: 151 Pl. 7, fig. 6.

1938. id. *Corbiculina* Cotton & Godfrey, *Moll. of S. Aust., Pt. 1, Pelecypoda*: 176, fig. 179.

1939. id. *Corbicula*, Gabriel, *Mem. Nat. Mus. Vict.* 11: 126, Pl. 4, fig. 34.

1943. id. *Corbiculina* Iredale, *Aust. Zool.* 10 (2): 193.

Murray River. South-central to Western Victoria.

Family: SPHAERIIDAE

SPHAERINOVA Iredale, *l.c.*: 195 (1943). (Type: *Sphaerium macgillivrayi* Smith.)

11. *SPHAERINOVA VICTORIANA* Iredale

1939. *tasmanicum*, *Sphaerium* Gabriel, *l.c.*: 127, Pl. 4, fig. 35.

1943. *victoriana*, *Sphaerinova* Iredale, *l.c.*: 195.

Southern Victoria.

12. *SPHAERINOVA PROBLEMATICA* (Gabriel)

1939. *problematicum*, *Sphaerium* Gabriel, *l.c.*: 128, Pl. 4, fig. 36.

1943. id. *Sphaerinova* Iredale, *l.c.*: 196.

Murray River, near Merbein.

AUSTRALPERA Iredale, *l.c.*: 196 (1943) (Type: *Pisidium etheridgii* Smith.)

13. *AUSTRALPERA ETHERIDGII* (Smith)

1882. *etheridgii*, *Pisidium* Smith, *Journ. Linn. Soc. (Lond.) Zool.* 16: 306, Pl. 7, fig. 35.

1938. id. Cotton & Godfrey, *l.c.*: 179, fig. 182.

1939. id. Gabriel, *l.c.*: 129, Pl. 4, fig. 37.

1943. id. *Australpera* Iredale, *l.c.*: 196.

1947. id. *Pisidium* Gabriel & Macpherson, *Mem. Nat. Mus. Vict.* 15: 167.

Yan Yean Reservoir; Southern and Eastern Victoria.

References to the work of E. A. Smith and others not quoted above may be found by reference to the work of Iredale or Gabriel.

I am indebted to Dr. Ian Hiscock for some very useful notes on Australian mussels, and to Dr. Donald McMichael for a copy of his paper from the *Nautilus*.

#### COMMENTS ON DIATOMS

(Summary of talk given by Mr. H. Barrett at the meeting of the Microscopical Group of the E.N.C.V. on June 20, 1956)

These are a form of microscopic algae of the family *Diatomaceae*. The structure is not unlike a pill box, consisting of an upper and a lower valve and a connecting zone or girdle; the complete cell is called a frustule. This has an internal and also an external coating of gelatinous matter; it

also has a nucleus and a plate or granules of endochrome, either green or yellowish-brown in colour.

What appeal to the microscopists most however are the silicious skeletons which all the valves possess. These skeletons are covered with various markings which differ according to the species. The sculpturing on some is very elaborate, while on others it consists of punctate lines, some comparatively coarse, while others such as *Amphipleura pellicida*, or *Nitzschia singalense*, have 92,000 to 114,000 lines per inch. As each line has an average of 30 punctae, it is rather difficult to realize how minute these markings are.

The valves, although exceedingly thin, are not solid but are in two layers, usually with a supporting framework between them; the interior plate often has fine secondary markings.

They reproduce themselves by various modes of conjugation and also by division, the latter method causing ribbon-like growths or chain-like series in which the diatoms are attached by one corner only.

Their methods of growths vary considerably; some are attached to weeds or rocks by stalks, others grow on weeds in clusters, others are attached to weed directly by the lower valve. One of the most peculiar ways is that of the genera *Schizoneura* and *Encyonema* which grow in the interior of the fronds of a small plant about 1½ in. high (named Brittleworts because they break in pieces at the slightest touch).

The group as a whole is divided into two subfamilies, the *Centricae*, with centrally built valves or arranged in relation to a central point, and the *Pennatae*, with markings arranged in relation to a median line. This line is called the raphe, or pseudo-raphe, and the raphe proper is in many species a cleft communicating with the interior of the valve.

Perhaps the most curious phenomenon connected with the *Diatomaceae* is their power of movement. This occurs only with diatoms possessing a raphe, and it is considered that the movement is due to a current set up in the raphe, from one terminal nodule to the centre nodule and from this again to the other terminal; this going on continually in both valves of the frustule, and with the probable help of a tongue of the interior protoplasm, forces the frustule in the opposite direction to the current, which incidentally can be reversed when necessary.

The greater number of the species are to be found only in fossil deposits in various parts of the world. On the Pacific coast of North America there are numerous marine fossil beds, at Monterey, St. Monica, St. Barbara, Moreno and many other places. In the eastern United States there are extensive deposits also in Maryland, and in Virginia where the city of Richmond is built over a deposit of unknown extent and averaging 20 feet in thickness. Others are located at Archangel and Simbirk in Russia and there are several in Hungary, and all have their peculiar forms, found only in their particular deposits. One of the best of these marine deposits is located at Oamaru, New Zealand. It belongs to the Oligocene period and it surpasses all others I think in the beauty and variety of the species found in it.

## TWO PUZZLING ALPINE HEATHS

*Leucopogon hookeri* Sond., and *Lissanthe montana* R.Br.  
which is now transferred to the former genus)

By J. H. WILLIS, National Herbarium of Victoria

*LEUCOPOGON MONTANUS* (R.Br.) J. H. Willis, *comb. nov.* [*Lissanthe montana* R.Br. *Præd. Flor. Nov. Holl.*: 540 (1810)].

The types of *Lissanthe montana* and *Leucopogon hookeri* Sonder [*Linnæa* 26: 248 (1853)] came from southern Tasmania; but comparable populations of both entities extend also to the mainland alps in Victoria and S.E. New South Wales. J. D. Hooker recognized both species in *Flora*

Tasmania (1857) and remarked after his description of the former plant [Vol. 1, p. 247], "So similar to *Leucopogon hookeri* that it is difficult to distinguish them." Fruit of the *Lissanthe* was described as "large, white", while immature drupes of the *Leucopogon* are illustrated (T 75) as yellowish.

F. Mueller [*Fragm. Phyt. Aust.* 6: 45 (Sept. 1867)] synonymized *L. hookeri* under his *Styphelia montana* without comment, attributing to it an abundant occurrence ("copiosissime") throughout the alps of Australia and Tasmania, with a reappearance in the high mountains of New England, N.S.W. (Ben Lomond and the sources of Hastings River); he described the drupes as light red. However, against a subsequent collection (Sept. 1886, in Herb. MEL), from the summit of Mt. Macculloch, he has written "*Styphelia montana*, var. *hookeri*."

G. Bentham [*Flora Aust.* 4: 176 (1869)] reinstated both species under the separate genera used by Hooker, and again emphasized their great similarity. He refers to an observation by R. C. Gunn, the distinguished Tasmanian botanist, that, whereas *Lissanthe montana* has drupes with "clear translucent pulp" those of *Leucopogon hookeri* are "thick and opaque."

J. H. Maiden and E. Betche [*Proc. Linn. Soc. N.S.W.* 23: 13 (June 1898)] point out once more the floral differences that serve to distinguish these two species—corolla about 2 mm. long, with beardless lobes in *L. montana*, half as long again and with bearded lobes in *L. hookeri*. I. Rodway (1903) and A. I. Ewart (1930) also uphold both species in their respective State Floras of Tasmania and Victoria, describing the drupes of *L. montana* as white or red, those of *L. hookeri* as white. I have not examined mature fruits of the former plant, but in undoubted *L. hookeri* from various alpine and subalpine stations in Victoria I have always found the drupes to be coral red and opaque.

In view of the remarkable similarity between these two heaths, and the fact that at one period von Mueller even regarded them as conspecific, the question naturally arises, "why should they be assigned to separate genera?" In defining *Lissanthe*, Bentham [*Flora Aust.* 4: 175 (1869)] states that it differs from *Leucopogon* "solely in the want of the hairs or beards of the lobes of the corolla so universal in that genus." This does not seem a very satisfactory criterion for segregating genera, especially when the degree of hairiness of the petals varies considerably throughout the large genus *Leucopogon* itself. The type material of Brown's *Lissanthe montana* from Mt. Wellington, Tas. (duplicate specimens in Melbourne Herbarium), shows crowded papillae on the corolla lobes, and this feature is matched exactly on specimens from Mt. Nelson Bogong High Plains, Vic. (6,200 ft. alt.). By contrast, *Lissanthe strigosa* (Sm.) R.Br. has very minutely papillose, but not papillate, lobes. It would be difficult to decide whether a floral organ bore long papillae or short hairs, both having originated in the same way!

Fortunately, pollen-grain and genetical investigations have come to the rescue during recent years, and S. Smith-White has shown conclusively [*Aust. Journ. Bot.* 31: 61-2 (May 1955)] that the haploid chromosome number in true *Lissanthe* spp. [i.e. *L. supido* R.Br. and *L. strigosa* (Sm.) R.Br.] is 7, while in *L. montana* and *Leucopogon hookeri* it is 14. Smith-White compares these two alpine plants closely, and he finds not only the same chromosome number but very similar tetrads of pollen and similar gynodioecytic polymorphism among individuals. He concludes with the remark, "it is probable that they constitute reproductively isolated populations", and it is obvious that he is disposed to regard them as congenetic species. Tarlton Rayment's independent (and as yet unpublished) work in Melbourne on pollination and pollen-grain phyletic, throughout the epacridaceous genera, lends weight to this opinion.

I am convinced that "*Lissanthe*" *montana* is indeed a *Leucopogon*, in which the corolla beard has either failed to develop in the usual way or is reduced to microscopic proportions, and I have made the necessary nomenclatural

change accordingly. The view of Smith-White (and others)—that *Leucopogon hookeri* and *L. montanus* (comb. nov.) should be treated as separate species—is endorsed. The former has conspicuously bearded corolla lobes 1.2-1.5 mm. long, and a tube slightly exceeding the calyx; in the alps it flowers November-December (as early as September at altitudes of about 3,000 ft. in Victoria), and the fruit ripens quickly, falling before winter. The latter species has shorter (about 1 mm.) and virtually glabrous corolla lobes (papillate under the microscope), with tube not exceeding the calyx; it flowers January-February and the young fruit overwinters, ripening the following summer. Smith-White tabulates a leaf difference also [*Aust. Journ. Bot.* 3<sup>1</sup>: 62 (1955)]—margins almost plane in *L. hookeri*, but manifestly recurved in *L. montanus*. This distinction does not always hold, however, for lower-altitude examples of *hookeri* often display quite revolute leaves.

*Leucopogon hookeri* is much the more variable plant—small-leaved in the high alps where often dwarfed to a few inches, but attaining heights up to 6 ft. in lower mountain valleys (e.g. *Eucalyptus delegatensis* forest along the upper King River, and at Coblingra, Vic.) where its leaves may be so large as to be mistaken for those of *L. lanceolatus*. It ranges from Lake Mountain eastward to the N.S.W. border, with occurrences on Mts. Buller and Buffalo and an isolated appearance on Mt. Macedon (*Eucalyptus delegatensis* occurs there also). *L. montanus* is restricted in Victoria to the highest alps above tree-line (e.g. summits of Mts. Bogong, Nelson, Feathertop and Loch), and it is always quite small; I have not seen it growing in close proximity to the other commoner species. A. B. Costin [*A Study of the Ecosystems of the Monaro Region of N.S.W.*, 277 (1954)] lists the two species as forming separate associations in his "*Oxylobium ellipticum*—*Podocarpus alpinus* Alliance".

Melbourne Herbarium possesses an interesting early collection of C. Stuart's from Tasmania, labelled "Western Mts. near Cummins Head"; it has the beardless corolla of *L. montanus* and comes nearest to that species, but the lobes are as long as in *L. hookeri* and the corolla tube almost intermediate. Dr. R. Melville (Royal Botanic Gardens at Kew) has inspected this material and suggests (23/3/1955) that it may be a hybrid between the two, nevertheless, it remains yet to be demonstrated whether natural hybridism can occur at all among any of our Australian *Epacridaceae*. Some Mt. Bogong collections of *L. hookeri*, on the other hand, show an approach to *L. montanus* in their small stature, smaller flowers and shorter beards than are usual in the former plant.

## FLORA OF VICTORIA: NEW SPECIES AND OTHER ADDITIONS—8

By M. A. WAKEFIELD, Noble Park

### Genus LEUCOPOGON: Some Hitherto Unrecognized Species

*LEUCOPOGON FILIFERUS* sp. nov. distinctissima: ramuli numerosissimi filiformes, folia lineari-oblonga eorum margines pilis longis tenuibus sericeis graeditis, spicae pauciflorae inter folia terminales, bractee bracteolae et calycis lobi acuti subtiliter fimbriati, corollae tubus perbrevis (circiter 0.5 mm.) lobis longioribus (circ. 1 mm.), ovarium triloculare.

HOLOTYPE: Bogong High Plains, Victoria; Head of Wild Horse Creek, near Kelly's Hut, leg. J. H. Willis, 19/1/1947 (MEL<sup>2</sup>).

A low, spreading intricately branched plant. The twigs filiform; leaves crowded, oblong, acute, up to 4 mm. long and about 1 mm. wide, the margins a little recurved and bearing *long fine silky hairs*; spikes about 5 mm. long, few-flowered, terminal amongst the leaves; bracts and bracteoles acute.

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

ciliate-fringed, the latter about half as long as the calyx, sepals about 1 mm. long, acuminate, minutely fringed; corolla tube about 0.5 mm. long, the lobes twice as long; ovary 3-locular.

Distribution: Alpine regions of Victoria (Hotham-Bogong area).

As well as the type collection, another was made by Wilks from the same general area (Buckety Plain east of Mount Cope, 18/1/1947). Otherwise the species is known from an early collection made by F. Mueller, presumably in December 1854; duplicates of this were labelled "Sources of the Mitta Mitta" and "Snowy Plains on the Colongra" (sic), and were annotated in various ways as forms or varieties of *Leucopogon collinus*, under which species Bentham included this material in *Flora Australiensis* 4, 191.

*L. collinus* is an erect, strongly branched shrub with leaf margins spinulose-denticulate, with larger inflorescences and flowers, and with the ovary 2-locular.

**LEUCOPOGON RIPARIUS** sp. nov., obinflorescentiam *L. ericoides* R. Br. valde affinis sed foliis majoribus (usque ad 18 mm longis) praecipue oblanceolatis acutis glabris tenuibus nitidis marginibus vix recurvatis distinguitur.

**HOLOTYPE**: Bete Bolong Creek (Snowy River), Victoria; N. A. Wakefield No. 4336; 21/9/1947; riparian in granite rock crevices; (MEL., duplicates to be sent to K and NSW\*).

Erect shrub, to 1 metre high, trunk to 2.5 cm diameter; branches erect, reddish, slightly pubescent; leaves up to 18 mm long, 1.5-2.5 mm wide, linear-lanceolate or oblanceolate, crowded and erect on sterile branches, acute and acicular at the apex, margins entire and a little or not recurved, shiny, quite glabrous except when very young; spikes axillary, 2- to 4-flowered, shorter than the leaves, the axis minutely pubescent; bracts broad, blunt, sepals about 1.5 mm. long, obtuse, minutely ciliate fringed; corolla tube exceeding the calyx, the lobes about 1.5 mm long; ovary ovoid, pubescent, imperfectly 3-locular; style about 1.5 mm. long; stigma globular.

Distribution: Snowy River, eastern Victoria.

Besides the type material, an earlier collection (in fruit) was made at Bete Bolong Creek (N.A.W. No. 3135; about December 1946), and further material (not flowering) was collected in porphyry formation on the Snowy River, east of Butchers Ridge (N.A.W. No. 4773; about 22/1/1953).

The new species has the inflorescence of *L. ericoides* R. Br., but it differs considerably from it in foliage. The typical *L. ericoides* has spreading, densely pubescent branches; the leaves oblong, broad at the base and with blunt, mucronate apices, the surface pubescent and the margins strongly recurved. In Victoria it is usually more pubescent than in New South Wales, and in eastern Victoria it grows abundantly on sandy heathlands near the coast, including some areas near the Snowy River. It is evident that *L. riparius* is genetically distinct from the widespread species.

**LEUCOPOGON GELIDUS** (Benth.) comb. nov. Syn. *L. lanceolatus* var. *gelidus* Benth. *Fl. Austr.* 1: 186.

**LECTOTYPE**: Specimen in MEL. (seen by Bentham) bearing the original data "*Leucopogon gelidus* Ferd. Mueller, Barkly Range". There are several duplicates of this, with various other annotations; these, and other material cited by Bentham (Cobbaras Mountains, 5,000 ft.; Feb 1854; and summit of Mount Baw Baw, sources of the Yarra, Albert Range, Dec. 1860; both collected by Mueller) become Paratypes.

An erect or spreading shrub; leaves 12-18 mm. long, oblanceolate or obovate, somewhat thick, spikes usually about 12 mm. long, 4- to 8-flowered,

pendant, sepals 2.5-3 mm. long; corolla-tube 3-4 mm. long, the lobes about 1 mm. long; style 1.5-2 mm. long; ovary 2-locular.

Distribution: Abundant in the Australian Alps of Victoria and New South Wales.

*LEUCOPOGON NEUROPHYLLUS* F. Muell. *Frag. Phyl. Aust.* 1: 37.

Syn. *L. lanceolatus* var? *alpestris* F. Muell. ex Benth. *Fl. Aust.* 4: 185.

Leaves rigid, lanceolate, acuminate (pungent), flat, glabrous, upper surfaces striated with 3-7 longitudinal (*transverse* and alternately long and short) nerves, mostly about 2 cm. long and 5 mm. wide, spikes in upper axils and one terminal, up to 1 cm. long, with few (up to 8) flowers; sepals 2-3 mm. long, corolla-tube shorter than the calyx, the lobes long and spreading (ovary said by Benthani, *l.c.*, to have 2, rarely 3, loculi).

Distribution: Known only from the type locality "On the top of Mount William" in the Victorian Grampians, presumably collected by Mueller.

There is only one record of the species for the present century. It was made by Mr. F. Robbins of Bendigo, but there is no specific data with the specimen.

[*Leucopogon lanceolatus* R. Br. has narrow-lanceolate leaves, usually 3-5 cm. long and about 3-6 mm. wide, thin in texture and with obscure venation; the spikes are in a terminal cluster, usually not recurved, 1.5-4 cm. long, very slender, with numerous (usually 8-20) small flowers; the corolla-tube is very short, about the length of the calyx (about 1.5 mm.), with the lobes about 1 mm. long and recurved. It extends from New South Wales to the lowlands of East Gippsland (Orbost, Cann River, etc.), and what is probably a variation of the species (with somewhat crowded flowers and spreading corolla-lobes) occurs at Wilsons Promontory and in the Portland district.]

I wish to make grateful acknowledgement to the Director of the National Herbarium of Victoria for facilities afforded in connection with material examined in that institution, and to Mr. J. H. Willis for the preparation of the Latin diagnoses embodied in this paper.

## CLEANING MICROSCOPE LENSES

By BONNET SNELL\*

It has so often been the experience of the writer, when he has examined both eye-pieces and objectives for cleanliness, that dust which has accumulated on the surfaces of the glass is the microscopist's worst enemy. It must be removed periodically. The lenses may seem to perform well enough even when very dirty, but that is no reason for them to remain dirty. It is most satisfying, after cleaning, to note the brilliance of the surfaces, not to mention what it must do to the clarity of the image.

A good method of cleaning is to take two freshly laundered soft cotton handkerchiefs (one to be used for damping and the other for drying) and a good quality, clean, rather small camel-hair watercolour brush. The last should be kept wrapped up when not in use. Place one ounce of 50 per cent alcohol, to which has been added one drop of glacial acetic acid, in a small tumbler. Screw the eye lens out of an eye-piece, taking care to keep the fingers off the glass. (Hands should be washed beforehand to get rid of excess oil from the pores of the skin.) Take the brush and tickle the dust from the glass surfaces, paying particular attention to where the edges join the mount. Then dip a corner of one of the handkerchiefs in the solution and just dampen it. The solution dries very quickly, so repeated dippings are

\* Secretary of the Microscopical Group.

required. Gently, with the least pressure required, proceed to clean the surface of dust and dirt. This may have to be repeated two or three times before a satisfactory surface appears. Gently rub dry with the lens cradled in the other clean handkerchief. Screw it back in place and take out the field lens. Put the cleaned eye-piece under cover, away from floating dust in the air. Clean the field lens in the same way as the eye lens, then put it under cover with the other, but do not re-assemble at this stage.

When cleaning the objectives it will be found that most low-power ones will screw apart into two pieces to allow the cleaning of the surfaces of the components—the front lens and the back lens. Work the camel-hair brush well into the mountings of the objectives, especially round the edges of the glasses. When cleaning, screw the corner of the handkerchief into the shank of a pencil, dampen in the alcohol, poke down into the mount and rotate gently over the glass. Persevere until they are quite clean, then dry in the same manner. Screw the components loosely together again until the next process. It is not advisable to attempt to take apart any of the higher powers, and it is unlikely that dust will get in between the front and back lenses of these. The best that can be done, apart from sending them to an instrument maker, is to clean the outer surfaces.

One's experience is that, even when the pieces are re-assembled, there are still dust specks present, they are most persistent. The next step is with the vacuum cleaner. Take each eye-piece with the eye lens in position and hold it carefully with its open end in the air stream just within the tube. Tickle the dust with the camel-hair brush if it still persists, and allow the cleaner to suck again. Screw the field lens in again, take out the eye lens, and repeat the process. Disassemble the objectives which were screwed together temporarily, and hold each component in the air stream also, then assemble firmly again. Examination, by holding up to the light, will show how clean the lenses are. Care must be exercised when cleaning with air, that the components do not go down into the dust bag.

While the cleaner is handy, it pays to go over the microscope also, as there are a number of places where it is difficult to reach with the cleaning rag, and the case too may be treated.

### OBITUARY

It is with regret that we must record the untimely death of Mr. Allan Roderick Henderson, B.L.M., a member of our Club for some years.

Of wide culture, with many community interests, the late Mr. Henderson did not participate fully in Club activities. He occasionally attended General Meetings however, and, in his leanings towards natural history, evinced a passion for birds. On a memorable Club excursion to Anglesea a few years ago he acted as host and guide at his delightfully situated cottage on the foreshore. Some of us were fortunate enough to obtain a glimpse of a Bristle-bird near his side verandah, and, later, as we were preparing to leave on the homeward journey, we plainly heard and identified the calls of the Geelong Ground-wren (*Hylacola pyrrhopygia helchersi*) in thick undergrowth at the rear of the cottage. The vicinity is the type locality of the sub-species. Earlier, our guide had introduced us to several nests, whilst in a walk along the ocean beach we obtained evidence of Mr. Henderson's intimate knowledge of sea-birds.

Mr. Henderson maintained a lively concern for National Parks in Victoria, and was part author of a publication on the subject. Once, upon learning of the seclusion and primitive nature of the Lakes National Park at Spermwhale Head, he expressed a wish to see this area, and confirm for himself the statement that it embraced at least a thousand acres of the indigenous Heath-myrtle (*Thyptomene muhleniana*), the conservation of which prompted our

Club to obtain its declaration as a National Park. The visit was planned but, because of floods in Gippsland at the time, it had to be abandoned. The reservation of certain areas of native flora at Anglesea also received practical aid from him.

Mr. Henderson was joint author of *Early Melbourne Architecture*, a coastally illustrated book issued recently. He was prominently associated with the Australian Institute for International Affairs, Victorian Branch; Vice-Chairman of the Melbourne National Gallery Trust; and President of the Victorian Eye and Ear Hospital. He was a partner in the legal firm of Messrs. a'Beckett, Chomley and Henderson.

He was an omnivorous reader and he travelled extensively. Several months ago he went on a visit abroad. Returning, he embarked on the *Orousay* in Italy, and as the vessel had left Adelaide on the last stage of the journey his death occurred, very suddenly, on June 18. His remains were buried at sea.

His business associates and many friends mourn the loss of a gracious personality.

—H. C. E. STREWART

### WHAT, WHERE AND WHEN

#### F.N.C.V. Meetings:

Monday, September 10—Native Plants, both Wild and in Cultivation: by Miss C. Carberry.

Monday, October 8—Satin Bower-bird, by N. A. Wakefield; and Discussion of Club Projects.

#### F.N.C.V. Excursions:

Sunday, August 19—Blackwood. Combined excursion with members of the Bendigo, Ballarat and Creswick Clubs. Leader: Mr. Williams. Parlour coach leaves Batman Avenue 9 a.m. Fare 18/-. Bring two meals.

Saturday, August 25—Botany Group meeting. Subject: Domesticated Plants. Speaker: Mr. K. Atkins. Meet 2.15 p.m. at National Herbarium.

Saturday, September 1—Botany Group Excursion to Langwarrin in conjunction with Frankston Field Naturalists. Take 9.10 a.m. Stony Point train, alight at Langwarrin. Bring one meal.

#### Group Meetings:

(8 p.m. at National Herbarium)

Wednesday, August 15—Microscopical Group. Mr. E. Snell: "On Mounting Opaque Objects". Members to make the evening a showing of opaque slides.

Wednesday, September 5—Geology Group. Speaker: Dr. Wishart. Subject: Rocks used by the Aborigines.

#### Preliminary Notices:

Sunday, September 30—Parlour coach excursion to Cape Patterson. Leader: Mr. K. Atkins. Coach leaves Batman Avenue 9 a.m. sharp. Fare 25/-. Bring two meals.

October 27-28—Weekend at Bendigo. Itinerary: Saturday Afternoon—Excursion Evening—Illustrated talk with Kodachromes. Sunday—Full day in Whipstick. Subjects for both excursions: Birds and Botany. Transport by car or train. Camping facilities at White Hills gardens. Hotel reservations to be made with Mr. K. Atkins, Botanic Gardens, South Yarra. S.E.I. Phone MU 3755, after 6 p.m.

—MARIE ALLENDER, Excursion Secretary.

# The Victorian Naturalist

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No. 873

## PROCEEDINGS

There was a full attendance at the National Herbarium for the General Meeting of the Club on August 13. Before proceeding with the business of the evening the President extended a welcome to a number of visitors. Mr. George Coghill congratulated Mr. Swaby on his election as President and thanked the Club for the letter sent to him during his recent illness.

The President referred to the recent passing of Mr. A. R. Henderson and Mr. F. Codmore, both valued members of the Club, and to the great loss the F.N.C.V. has sustained by the death of Mr. Fred Lewis, Vice-President, who was Honorary Secretary for many years.

It was reported that, in recognition of his long and valued service to the Club as Auditor and Treasurer, Mr. A. G. Hooke had been nominated for Honorary Life Membership by Mr. E. Coghill and Mr. C. Gabriel. This was approved by the General Meeting.

Mr. Frank Pitchen showed an outstanding series of coloured slides illustrating the geology and botany of Central Australia, particularly in the Ayers Rock and Mount Olga areas. A vote of thanks, moved by Mr. E. S. Hanks and seconded by Mr. Webb, was carried by acclamation.

Miss Ina Watson then gave a 10-minute lecturette on the subject of feathers.

Mr. Trevor Pescott and Mr. N. R. Harvey were elected as Country and Interstate Members, Mrs. R. Davidson as Joint Metropolitan Member, and Master Nicholas Edquist as Junior Member.

A letter from Mr. T. Sarovich was read, giving notice of his intention to move that the Building and Contingencies Fund be kept separate from extraneous receipts and expenditure. This business was held over for discussion at the October General Meeting.

It was announced that the Education Department had accepted the Club's tender for the supply of Fern and Fungi Books. After considerable discussion it was agreed that Council's action in submitting this tender be confirmed, and that, as Council recommended, the reprinting of 2,500 copies of the Fungus Book be proceeded with.

Messrs. Woollard and Sarovich offered to help in arranging locally grown wildflowers for the show being staged by the Western

Australian Naturalists Club; several members signified their willingness to help with this Club's exhibit at the Kalorama show; and Mr. Wilson agreed to represent the F.N.C.V. at the Kiata show. Mr. Swaby reported that a very successful working bee had been held on August 4 at the Sir Colin MacKenzie Sanctuary at Healesville and that another was arranged for September 2.

A letter of thanks was sent to Mr. Middleton for his work in repairing the Club's microphone, free of charge, and Mr. H. Dickens was thanked for his gift to the Club library of his books on Orchids and Australian Wildflowers.

The meeting adjourned at 10.45 p.m.

### EXHIBITS AT F.N.C.V. MEETINGS

#### July:

Marine shells of the genus *Neotrigonia*—*N. margaritacea*<sup>d</sup> of Victoria and Tasmania; *N. gemma*, *N. lamarki* and *N. straugi*, of New South Wales, and *N. uniophora* of Western Australia (C. J. Gabriel).

Rhinoceros hide walking stick (T. H. Sarovitch).

Popple Nuts from Grafton, New South Wales (Miss L. Young)

#### August:

South Australian plants—*Koehia georgei* and *Swainsona stipularis* from Flinders Range, and *Eucalyptus kruseana* and *E. landsdowniana* from Port Augusta (A. R. R. Higginson of Port Augusta, per A. J. Swaby). These are rarely seen in Victoria, and the *Swainsona*, with its many shades of colour, should make a good garden plant.

Marine shells—*Ancilla velosiana* from off Tweed Heads, New South Wales; *Thatcheria mirabilis* from Japan (C. J. Gabriel).

### MICROSCOPICAL GROUP

At the meeting of August 15, Mr. E. Snell spoke on the subject of "Plain Opaque Mounting of Dry Objects". He then invited Dr. R. M. Wishart to contribute some remarks on the same topic. At the conclusion of this, the speakers replied to several questions put to them by those present, and the Group Leader, Mr. D. McInnes, thanked them for their efforts.

Exhibits included Foraminifera from Ricketts Point and from the Great Barrier Reef (shown by Messrs. W. Black and H. Barrett respectively); and Dr. Wishart showed the head and pedipalps of a jumping spider and a number of other specimens specially mounted for the occasion. Mr. McInnes had several exhibits; these included scales from wings of butterflies, grams of chalk and scales from a Diamond Beetle. Mr. W. Evans exhibited the freshwater diatom *Melosira*; Master John Walsh showed eggs of the housefly; and Mr. Snell showed the head of a small centipede, polyzoa on seaweed, and pollen of *Hibiscus* in situ.

On September 19, Mr. A. Busby will speak on "Amateur Microscopy Today".

### STORAGE SPACE NEEDED

The F.N.C.V. urgently needs some additional storage space for show equipment and for its stocks of the *Victorian Naturalist*, the aggregate of which would occupy most of a garage or small room. Would any member who knows of any such space which may be available, either free or for hire, please communicate with the Editor (P.O. Box 21, Noble Park, Phone UJ 2440)

## MORE PAINTINGS ON FLAT ROCK

By A. MASSOLA\*

A second rock shelter bearing aboriginal paintings has been reported from Flat Rock. Mr. A. Hemley of Stawell accidentally discovered this new shelter while out looking for the recently described one in the same locality. (See *Vict. Nat.* 72: 21, June 1956). So the writer once again had the pleasure of visiting the area. This time the party consisted of several members of the Stawell Field Naturalists Club, including the Secretary, Mrs. W. A. Collins, and Mr. I. R. McCann. The latter served as a botanical encyclopedia, identifying the wonderful profusion of wild flowers for which the Grampians are famed.

The new shelter, Flat Rock No. 2, is possibly not as interesting pictorially as the earlier, or No. 1 shelter, inasmuch as the design consists solely of a few strokes done in red ochre. But it is precisely this dearth of pictography which renders this particular shelter of major importance. For it presents a problem to solve. Like No. 1 it is situated half way up the hill, and from it, again as in No. 1, a beautiful view of the country to the north-west is obtained. The shelter is cave-like in appearance, about 12 feet wide at the entrance and only 9 feet deep at its deepest point. The outside edge of the ceiling presents a flat, smooth beam-like surface 12 feet long and 14 inches wide. It is upon this surface that the aboriginal artist painted his strokes in red ochre. Beginning from the left, there is a small group of only three strokes, covering a mere 3 inches by 2 inches of surface; six inches away to the right are four more strokes, covering 3 inches by 3½ inches; three feet away are two more strokes, 4 inches by 1½ inches; a further eighteen inches brings us to two more strokes, 3 inches by 1½ inches. That is all!

But this is the problem. The strokes obviously were made for a purpose. The four little groups give the idea that they were purposely kept apart. Each stroke in each group is of the same size and length as the others. Were they records of time or distance, of visits by outlying groups, or memory aids?

The people who inhabited the locality were apparently a group or sub-tribe of the *Mukjarawaint*. Robinson, the Chief Protector of Aborigines, called them *Poit-Bulluc*, and stated that they inhabited the country near Mt. Zero (*Wolcor*). The *Mukjarawaint* were said to be but a section of the *Wotjobaluk*, a large Nation which seemed to own all the country from the Grampians to the South Australia border and north to within twenty miles of the Murray River. No doubt the Northern Grampians, with its plentiful supply of food and water, must have been a rallying point for all these desert groups.

\* Curator of Anthropology, National Museum of Victoria.

PLATE II



Flat Rock Shelter No. 2

Top: View from shelter towards the Green Lakes  
Bottom: The shelter; the paintings are on the diagonal face on the immediate left of the figure

It has been said that the messengers sent to distant groups were in the habit of painting strokes on their arms with red ochre. Each stroke represented a day, and each day one of the strokes would be rubbed off. The messenger was thus able to tell in exactly how many days' time this particular group was expected at a certain locality. Would the strokes painted on the ledge of this shelter serve a similar purpose? Again, the headman of each section would know, or be expected to know, where each group comprising his section could be found. The natives knew just how many days' march any particular waterhole or food gathering place was from a given spot. Four strokes could mean a four days' journey, which again would have meant a certain locality four days away. Could they have been a very primitive system of writing a message, of informing a possible messenger just where they were to be found?

Only the discovery of more such painted shelters, enabling comparisons to be made, will perhaps solve the riddle. Once again I appeal to members of the Field Naturalists Clubs to report to the National Museum any such discoveries, no matter how trivial they may seem.

## AN ABORIGINAL BURIAL MOUND

By A. A. BRUNTON

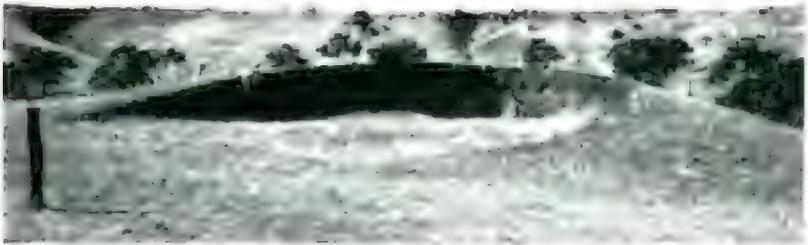
About two miles north of Sunbury, in the valley of Jackson's Creek, there are the remains of a large aboriginal burial mound. This is situated on the property known as Emu Bottom, the original selection of George Evans, who came over from Tasmania in the first voyage of Fawkner's ship. Incidentally, he built the first building in Melbourne—a sod hut to keep the stores dry. In 1836 he settled on Jackson's Creek and built a homestead, now the oldest inhabited house in Victoria. In 1920 the property passed into the possession of Mr. Webb, the present owner. He has maintained as far as possible everything that Evans had built.

Some years after moving in, Mr. Webb had occasion to repair the private road. Between this road and Jackson's Creek there is a big alluvial flat composed chiefly of waterworn gravel and soil, and on this and overlooking the creek is the circular mound, ninety feet in diameter and five feet six inches in average height. Knowing that much of it was suitable for road making Mr. Webb instructed his men to cart the same to the road. This they did, but when working into the centre of the mound they encountered many old and decomposed human bones and ashes, unfit for road repairs.

On being informed, Mr. Webb hurried across the flat and saw a strange sight. Evidently many bodies had been partially burnt and then heaped together on the original surface. Over these a layer of well puddled wet clay, four to five inches thick, had been

plastered. Then soil and waterworn stones from the surrounding flat had been piled over and around the burial. The depressions caused by their excavations can still be traced close by. The appearance of the mound from a distance is extremely like the prehistoric ones upon the Dorset Downs in England.

Mr. Webb stopped further carting and then took photos of the scene. One of these, a close-up of the clay layer, shows that the original dome must have been about eight feet in diameter, but in the passage of time this had collapsed in places and had assumed a shape remarkably like the coast line of northern Australia. This can be seen in the photo. Many years have elapsed since the discovery, and weather and stock have worn down the excavation and merged it with the remainder of the mound.



The Excavated Burial Mound

The question arises: What was the purpose of the aborigines in covering the remains with a layer of clay? Fortunately we have the evidence of an early settler who observed an identical burial by a lower-Murray tribe. After the bodies had been covered with a layer of plastic clay the old men of the tribe sat around them in a circle. Some distance further back the remaining men of the tribe formed another circle, and beyond them again were all the women and children. Under the hot sun the wet clay began to dry, and, after numerous inspections, the old men detected a crack. Sighting along this crack they pointed in the direction indicated and announced to the tribe that the evil magic which had caused the deaths came from there. A war party was sent off in that direction and the first strange aborigine encountered was killed and his kidney fat extracted. The party then returned with revenge and honour satisfied. In the meantime the remainder of the tribe had completed the burial mound.

The Club will be pleased to know that Mr. Webb has prevented any further destruction of this most interesting relic of the blacks.

## ADDITIONS TO THE VICTORIAN SEDGE FLORA (CYPERACEÆ)

By J. H. WILLIS, National Herbarium of Victoria

In his *Flora of Victoria* (1930), A. J. Ewart recognizes 115 species of *Cyperaceae*. Since that date, many name changes have been adopted and 25 additional species published for the State—largely the outcome of revisional studies undertaken in the difficult genera *Cyperus* and *Scirpus* by S. T. Blake† (Brisbane) and in *Carex* by E. Nelmes\* (London). There still remain eleven indigenous species and five naturalized aliens of the family which do not seem ever to have been recorded for Victoria. These bring the total number of sedges in the State to 150 species, and the following arrangement of new records conforms to the generic sequence in Ewart's *Flora*. All collections now cited have been lodged in the National Herbarium of Victoria, and recent discoveries which extend the known range of a few localized sedges are also recorded as a matter of interest.

### 1. \**CYPERUS CONGESTUS* Vahl, 1806.

Brighton—abundant in gutters along Durrant Street (J. H. Willis, 14/3/1952).

The collection was determined by S. T. Blake, 17/3/52. Introduced from South Africa, this pestiferous species is already naturalized in Western Australia, South Australia and New South Wales, and has been noted in Victoria at places as widely separated as Dimboola and Lakes Entrance. It closely resembles *C. rotundus*, but lacks the root tubers and has a much denser inflorescence of numerous very narrow spikelets.

### 2. *CYPERUS NERVIFLOSUS* (Kükenthal) S. T. Blake, 1940.

Lake Hattah, Kulkyn National Forest—growing amongst *C. gymnocaulus* (Mrs. E. Ramsay, 1/2/1953).

This delicate little annual (to 4 in. high) was previously known only from tropical Australia. S. T. Blake identified the collection, 10/4/53.

[*C. pygmaeus* Retth., 1773, has been known from Victoria only by a fragment which F. Mueller had collected accidentally with a clump of *C. (Kyllinga) brevifolius* on the Ovens River (22/2/1853). W. J. Zimmer re-discovered the species at Mildura on 7/5/1935, and more recently (17/5/1953) Mrs. E. Ramsay has found it at Colignan—on the Murray River east of Nawingi. This little annual, of quillwort-like aspect, has a wide distribution throughout inland Australia, and extends to many parts of the Old World (Asia, Africa and Europe).]

*C. glaberrimus* All. 1789, had been included on the Victorian plant list solely on the basis of two old collections—"springs on the Lower Hume River, with *C. Anzax*" and "in company with two other species on the Upper Hume River"—both made by F. Mueller in January 1874. The honour of re-establishing this species for Victoria goes to Raleigh A. Black who found it "in marshy places" at Yackandandah, 16/4/1941.

*C. unioloides* R.Br., 1810, remains as a single record for the State, viz. "springs on the Upper Hume River, 3-4000", where it was collected by F. Mueller in January 1874; it is probable that this material actually came from the Kosciuszko (N.S.W.) side of the Upper Murray. The broad, very flat, shining spikelets with close-set bistre-coloured glumes are unmistakable.]

† See "Notes on Australian *Cyperaceae*" (17) in *Proc. Roy. Soc. Qd.*, 98, No. 11 (1937); 49, No. 15 (1938); 51, No. 5 (1940); 51, No. 11 (1940); 53, No. 7 (1941); 54, No. 8 (1943); and 58, No. 2 (1947). Also "A Monograph of the Genus *Eleocharis* in Australia and New Zealand", *l.c.* 50, No. 13: 88-132 (1959).

\* See "A Key to the Australian Species of *Carex* (Cyperaceae)" in *Proc. Linn. Soc. Lond.*, Session 155, 1943-4: 277-285 (1944).

3. \*SCIRPUS HAMULOSUS (*M. Bieb.*) *Steud.*, 1814

Murray River S.E. of Red Cliffs—on a billabong in Karadoc Parish (Mrs E. Ramsay, 25/4/1951)

Determined by S. T. Blake, 18/3/52, and most distinctive from its narrow crowded uncinuate glumes. The species is also naturalized in Central Australia and the far north of South Australia, where it is presumed to have been introduced with camels from Afghanistan.

4. SCIRPUS DISSACHANTHUS *S. T. Blake*, 1946.

Merwyn Swamp, Lawloit Parish, 8½ miles E. of Kaniva (*A. J. Hicks*, Mar. 1952 *et seq.*).

Determined by S. T. Blake, 4/5/1952, and previously known from northern Australia, Queensland (where widespread) and South Australia on the Murray. In his original description [*Vict. Nat.*, 53: 116-120 (Sept. 1946)] Mr. Blake anticipated the occurrence of the species in Victoria. *S. dissachanthus* may attain 1 ft. in height and is comparatively robust for an annual member of the subgenus *Isolepis*; its most interesting feature concerns the disposition of flowers—normal hermaphrodite ones in the terminal inflorescence of 1-3 large spikelets, and solitary female flowers hidden within the leaf sheaths at the base of the culms.

5. SCIRPUS FORSYTHII *Kühenth.*, 1913.

Genoa River gorge, ca. 3 miles above Genoa township—among granite rocks near water's edge (*J. H. Willis*, 25/1/1947, *N. A. Wakefield* Nos. 2284 and 3556, 25/1/1947 and 5/3/1949 respectively).

The type was from Nepean River, N.S.W. (*W. Forsyth*, Mar. 1809), and was allied with *S. smithii* A. Gray of eastern U.S.A.—a tufted annual and much larger plant. I am convinced that the Genoa gorge plant is conspecific with the original material of *S. forsythii* (duplicate type in Melbourne Herbarium); it has the same comparatively thick, sulcate culms of resinous appearance (with lines of very minute whitish pustules) and the same broad shining, bluish, membranous glumes to the rather large, solitary, lateral spikelets. S. T. Blake, who examined my collection, remarked (2/7/1947):

Probably *S. forsythii*, as you suggest, but unfortunately the specimen is too immature for accurate comparison. It appears to be otherwise known only from the type collection, and there is a doubt in my mind as to whether it is really an Australian native . . . it is rather distinctly different from any other Australian species.

[*Eleocharis atricha* R.Br., 1810, was recently recorded for Victoria by E. J. McBaron in *Contrib. N.S.W. Nat. Herb.* 22: 136 (1955). His collection (No. 4671) was from a roadside seepage in Beechworth township (25/6/1950) and is located at Sydney Herbarium. *E. atricha* is close to *E. pusilla* R.Br., differing in the presence of tubers on the stolons, longer glumes (3 mm. or more) and a large conspicuous style base.]

6. \*CAREX DISTICHA *Huds.*, 1762.

Marlo at mouth of Snowy River—on damp flats amongst luxuriant grass (*W. Hunter*, Nov. 1943).

This Eurasian species does not seem to have been recorded for Australia before: S. T. Blake identified the collection, 21/3/1944.

7. \*CAREX DIVISA *Huds.*, 1762

Creswick—in a Ruglan Street drain (*R. V. Smith*, Sept. 1943 and Mar. 1944).

Determined by S. T. Blake, 21/3/1944. This species, also Eurasian, has been noted already as an introduction to New Zealand and in *Kew Bulletin*: 309 (1939) E. Velmes recorded a form of it from Bellecive, Tasmania.

8. *CAREX DIVULSA* Gooden, 1794.

Bacchus Marsh (J. Wills, 8/12/1937—det. S. T. Blake, 4/9/1944; Yackandandah (per *Coppeland & Northern Pty. Ltd.*, 4/10/1940—det. E. Nelmes, 28/8/1946); Melbourne Botanic Gardens—western extremity of main lake, opposite Long Island point [7Kc. grid] (J. H. Willis, 17/1/1952).

Another Eurasian species, distinguished by the small, pair sessile spikes borne intermittently along a slender culm.

[*C. watrigii* Nelmes, 1939, was for ten years known only by the type collection—*Eucalyptus stellulata* forest along the Omeo-Mt. Horham Road, near Cobungra at about 4,000 ft. (*R. A. Black*, No. 1150.000-7, 30/1/1938). Then, almost simultaneously, it was found again by the original collector at The Steppes (2900 ft.), Western Tiers of central Tasmania (28/1/1944)—new for that State, and by the present writer at Bidwell, Victoria (18/1/1949), bordering sphagnum bogs near the Delegate River bridge on the Bonang to Bendoc Road (about 3,000 ft.). The very slender nature of leaves and culms is distinctive.

*C. hypandra* F. Muell. ex Benth., 1878, was attributed by Bentham to "Victoria—Munyang Mountains . . . 6,000-7,000 ft. F. Mueller" [Jan. 1879]. At the time when Nelmes revised our Australian *Carexes* (1944), only the single type collection was known, and he repeats its origin as "Victoria". However, the type location ("Munyang Mts.") is definitely not in that State, but on the Kosciusko plateau, N.S.W.; so the species should be deleted from Victorian lists—as was done in Ewart's *Flora of Victoria* (1930). Among the late Dr C. S. Sutton's collections (recently acquired by Melbourne Herbarium) is an undoubted specimen of *C. hypandra* from Cradle Mountain, Tasmania (Feb. 1919)—a new record for the Island State. This high alpine, and apparently quite rare, little sedge may be recognized at once by its thick, very congested and dark-coloured inflorescence, with minute glumes and utricles.

*C. canescens* L., 1753 (non Auctt. Aust.), was collected by F. Mueller in December 1854 on "Snowy Plains between the Cabongra [= Cobungra River] and Bogong Range", Victoria. It is one of those boreal species which are shared with Australia where they occur only as rarities on our alps—the ferns *Botrychium lunaria* and *Cystopteris fragilis* belong also to this category. *C. canescens* does not seem to have been found again in Victoria since 1854. It appears under the synonymous name *C. burbaoui* Wahlenb. in Ewart's *Flora*, while his "*C. canescens*" is referable to *C. curta* Gooden—a widespread species throughout our higher alpine bogs.]

9. *CAREX BICHENOVIANA* Boott ex Hook. f., 1858.

Wimmera (*M. Guerin*, 1829); Dimboola (*St. E. D'Alton*, 1889); Goulburn River at Murchison (*R. A. Black*, 4/11/1942); Broken River, S. of Dookie (*J. G. Standley*, 6/10/1931).

The first two of these collections were examined and determined by Kükenthal—as variety *bichenoviana* of *Carex pumila* Thunb., but he does not mention a Victorian occurrence in his *Carex* monography (*Pflanzenreich*) of 1909. However, J. R. Tovey recorded *C. pumila*, var. *bichenoviana* (Boott ex Hook. f.) Kükenth. for Victoria in *Proc. Roy. Soc. Vict.* n. ser. 34: 46 (1921). Ewart ignored this record in *Flora of Victoria* (1930), so have J. M. Black (1943) and Nelmes (1944). It is thus considered appropriate to repeat the reference. The species is abundant on sandy ground near water-courses in the Wimmera, Murray Valley and Goulburn Valley districts and it is sometimes a nuisance in gardens. Closely related to *C. pumila* (the sand sedge), *C. bichenoviana* may be distinguished by its taller growth, rather narrower leaves which are never circinnate at the apices, culms projecting well beyond the leaf-sheaths, male spikes usually several (more than 4).

female glumes (and often utricles) with purplish pigmentation, and the utricles much smaller (4.5 mm. long, c.f. 6-7 mm. in *C. humilis*).

#### 10. *CAREX JACKIANA* Boott, 1845.

Head of Middle Creek near Rover Scout Hut, Pogong High Plains—hill-side soaks and morasses at about 5,000 ft. (*J. H. Willis*, 2/2/1949; *Coryd. Shermes*, early Jan. 1953); Baw Baw plateau swampy flats between Mts. Baw Baw and St. Phillip, ca. 4900 ft. (*J. H. Willis*, 20/3/1951); Mt. Rutter at "The Springs", ca. 5600 ft. also Mt. Stirling (*J. H. Willis*, 8/3/1953).

The collection first cited was determined by E. Nelmes, 22/12/1949, and its recording constitutes a remarkable extension in range of a species previously considered endemic in the Indo-Malesian region (India, Ceylon, Malaya and Java). It will almost certainly be found in New Guinea, and perhaps also in other parts of the Australian alps. Although similar in habit and size to *C. bromiculans* R.Br., *C. jackiana* differs manifestly in its blue-green colour, even shorter inflorescences which are quite hidden among the bases of the leaves, and in its long, narrowly conical utricles (to 7 mm.) which are many-veined, but not ribbed (as in *C. bromiculans*). Indian and Malayan specimens of *C. jackiana* have rather longer culms and less congested spikes than the Victorian.

#### 11. *CAREX TASMANICA* Kükenthal, 1904.

Heywood township—in shallow drain beside Forest Office (*J. H. Willis*, 1/11/1948).

I have no doubt that the Heywood collection is identical with this uncommon species, previously considered endemic in Tasmania. Tips of the leaves and bracts become characteristically withered and circinnate, the spikes are short and very dense (as in *Plantago lanceolata*), the glumes are short and obtuse with long-excurrent midribs, while the small pale flattened utricles (to 3 mm.) have thickened margins and widely spreading teeth.

#### 12. *CAREX IYX* E. Nelmes, 1944.

Gorae West, near Portland—on lightly timbered flat of heavy black loam (A. Cliff *Braughole*, No. 3146 16/1/1954), Ballarat (*F. Mueller*, Jan. 1853): etc.

Both collections were determined by E. Nelmes, 23/3/1955 and 1943. *C. iyx* differs from *C. longibrachiata* Boeckl. [syn. *C. longifolia* R.Br., non Thuill.] in its denser-flowered, thicker (5-8 mm. wide) spikes, the female glumes more than 2.5 mm. broad and with wide hyaline margins. A review of all Victorian collections hitherto referred to *C. longifolia* R.Br. [i.e. *C. longibrachiata*] in Melbourne Herbarium shows that only two (Tambo River and Glenelg River near Dartmoor) conform to Robert Brown's type material from Port Jackson—slender, narrow, loose-flowered spikes, with glumes less than 2.5 mm. broad. The remainder (Gorae West, Heywood, Lake Corangamite, Ballarat, Ballan, Colongra, The Cobboias, etc.) are all referable to Nelmes's *C. iyx*—a widespread plant in Victoria. The difference upon which *C. iyx* was erected seems to me rather trifling, and I would prefer to regard it as a variety of *C. longibrachiata*.

[*C. atrophila* F. Muell., 1874, and *C. conspicua* Boott. ex C. B. Clarke, 1902, are both retained as Victorian species in Nelmes's key of 1944. The former was based upon five syntypes—Watts River, Mt. Juliett, Mt. Arnold, Baw Baws and "Tarwan" [= Tarrago] River. The last two of these collections became the types of Boott's *C. conspicua*, presumed to differ from *C. atrophila* in having the terminal spikelet wholly male. A review of all the type material, together with several recent collections, discloses that *C. conspicua* is based upon quite inconstant details, which are no more than intraspecific variations in the disposition of male flowers and lengths of

glumes (from 4 mm. to 6 mm.): the terminal spike may be wholly male, wholly female, female at the top, or male with occasional female flowers here and there—occasionally the four uppermost spikes are entirely male. Such variations are not correlated with any other differences in gross morphology, and I have no hesitation in merging *C. emaphiticus* with *C. alopathia*!

### 13. *SCHÖENUS FLUITANS* Hook f., 1858.

Barwon River near Geelong (*J. Bracebridge Wilson*, 1883).

The single Victorian sample, although with only immature inflorescences, was accurately determined by F. Mueller, it seems to have been entirely overlooked by Ewart and other writers on our sedges. Otherwise this aquatic species is known from Tasmania ("in stagnant brackish water"—*teste* C. Stuart) and South Australia (Kangaroo Island and Encounter Bay). The filamentous, very long leaf laminae and long chaffy glumes are distinctive.

### 14. *SCHÖENUS TESQUORUM* J. M. Black, 1922.

Goroke Road about 17 miles S. of Nhill—damp depression at southern fringe of Little Desert (*J. H. Willis*, Sept. 1948); Heathmere, near Portland (*F. E. and P. E. Finck*, Dec. 1952—Oct. 1954—ex Herb. A. Cliff Beaureg-hole, Nos. 3851-55 inclusive).

Type locality of this South Australian species was "from between Mount Burr and Mount McIntyre to Nangwarry on the Victorian border", but no collector or date is mentioned; it was later found at Encounter Bay. This reference to "the Victorian border" seems to have escaped the notice of Ewart and other recent botanists in our State. *S. tesquorum* resembles a tall robust condition of *S. apogon* Roem. & Schult., but differs in having no perianth bristles and perfectly smooth, white trigonous nuts.

### 15. *SCHÖENUS BREVICULMIS* Benth., 1878 [incl. *S. tepperi* F. Muell., 1881].

Great Ocean Road, 2 miles E. of Point Addis (Dr. and Mrs. E. Marks, Mar. 1947); Black Range, 5 miles W. of Cherry Pool on the Upper Glenelg (*J. H. Willis*, 2/3/1948); Big Desert, on South Australian border about 18 miles N. of Serviceton (*J. H. Willis*, 17/9/1948); near Catiabrim Spring, Little Desert 8 miles S. of Lawloit (*J. H. Willis*, 11/9/1949).

A low, densely tufted mat-forming sedge, with hidden inflorescences as in the alpine *S. calypttratus* S. T. Blake which it closely resembles. It is widely distributed almost throughout the Little Desert (in at least 11 of the 20 Parishes), and is also abundant in the Big Desert on sandy heathland. How it had escaped detection during a century of botanical exploration in this State is astonishing. West Victorian examples are identical with the South Australian *S. tepperi* F. Muell. from Mt. Lofy Range, Kangaroo Island, Yorke and Eyre Peninsulas. Mr. C. A. Gardner, Government Botanist of Western Australia, reports (10/3/1950) as follows on a Big Desert specimen which I submitted to him for examination:

The specimen of *S. tepperi* F. Muell. from 18 miles north of Serviceton, Vic., agrees very well with our specimen of *S. breviculmis* Benth. collected by Drummond. I would say that they were the same.

G. Kükenthal [in *Report Spec. Nov. Regn. Veg.* 43, 99 (June 1938)] made *S. tepperi* a variety of *S. breviculmis*.

[*S. calypttratus* S. T. Blake, 1941, is recorded only by the type collection (Mt. Buffalo, leg. S. T. Blake, 1935); but it is widely distributed around the edges of sphagnum bogs throughout the Victorian alps (e.g. Lake Murrain, Baw Baws, Mt. Skene, Mt. Buller, Mt. Buffalo, Rogong High Plains), and on Mt. Kosciuszko, N.S.W.—in A. B. Costin's "*Plantago muelleri*—*Montia australasica* Alliance". A collection from Echo Flat, Lake Mountain (*J. H. Willis*, 25/1/1948) shows staminal filaments about 7 mm long, and

S. T. Blake makes this comment concerning it (8/3/1948): "I do not recall having seen such long filaments in *Schœnites* before."

16 RHYNCHOSPORA RUGOSA (Vahl) S. Gale, 1944 [Syn *R. glauca* Vahl, 1806].

Tawonga, on G. A. Tonkin's property (*R. A. Black*, 30/4/1941).

This collection constitutes the first record of the genus *Rhynchospora* for Victoria, and one suspects that the plant may have been introduced from New South Wales or farther north. It is a grass-like species, to 2 ft. high, with a terminal inflorescence of small spikelets clustered in short irregular corymbs. Indigenous to New South Wales and Queensland, it is also widely dispersed in tropical regions of the world.

## FLORA OF VICTORIA: NEW SPECIES AND OTHER ADDITIONS—9

By N. A. WAKEFIELD, Noble Park

### Genus GREVILLEA: Two Undescribed Species Hitherto Included under *G. ilicifolia*

*GREVILLEA DRYOPHYLLA* sp. nov.: ex affinitate *G. ilicifoliae* R.Br., sed foliorum lobis dentatis indumento sparso pertortili ovario subsessili villosa stylo brevi (circiter 1 cm. longo) differt.

HOLOTYPE: Kangaroo Flat (near Bendigo): November 1934; A. J. Tudgeil (MEL.); duplicates to be sent to K and NSW\*).

Divaricate shrub to 3 ft. high; leaves up to 7 cm. long and 5 cm. wide, usually divided (often deeply) with four main lateral lobes which are shallowly toothed with a few pungent points, the venation conspicuously reticulated, sparsely pubescent on both surfaces with short very twisted hairs; flowers secund in racemes 1.5-2.5 cm. long, the pedicels about 1 mm. long, the perianth about 5 mm. long and densely pubescent on the outside, the ovary subsessile and densely villosa, the style about 1 cm. long.

Distribution. Endemic in Victoria in the northern auriferous belt (Castlemaine, Bendigo, Skipton and Upper Avoca areas).

*G. dryophylla* has hitherto been passed by as a form of *G. ilicifolia*, but the latter species has a more cuneate leaf with the lobes  $\pm$  confined to the upper half and usually entire, the vestiture under-leaf is dense and short, the flowers are stalked (with pedicels 1.5-2 mm. long) and invested with sparse vestiture, the ovary is stipitate (with an almost glabrous stalk 2-3 mm. long) and invested with appressed hair, and the style is about 17 mm. long.

*GREVILLEA STEIGLITZIANA* sp. nov.: item ex affinitate *G. ilicifoliae* R.Br., sed foliorum lobis dentatis indumento sparso longo floribus subsessilibus ovario (stipitem includens) villosa stylo basin versus pubescenti recedit

HOLOTYPE: Heathlands near Geelong Reservoir, Brisbane Ranges, Victoria; Sept. 16, 1911; leg. P. R. H., St John (MEL.).

Divaricate shrub to 3 ft. high; leaves up to 5 cm. long and 5 cm. wide, usually shallowly divided with 4 main lateral lobes which are shallowly toothed with a few pungent points, venation conspicuously reticulated, upper-surfaces becoming glabrous, underneath sparsely invested with long  $\pm$  straight hairs; flowers secund in racemes 2-3 cm. long, the pedicels about 1 mm. long, the perianth about 6-7 mm. long and densely pubescent on the outside, the ovary stipitate (stalk 2-3 mm. long) and densely villosa, the style 15-17 mm. long and usually sparsely pubescent towards the base.

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

Distribution: Endemic in the Brisbane Ranges, Victoria, and there apparently quite plentiful over a considerable area, in the general vicinity of the township of Steiglitz.

*G. steglitziana* also has been included in the past with *G. theobolii*, but differs in leaf shape, and in the type of vestiture on the leaves, on the perianth and on the ovary and base of the style. It bears a remarkable superficial resemblance to *G. dryophylla* differing mainly in the type of vestiture on the leaves, in the size of the flowers, in the stipitate ovary and the somewhat pubescent style.

I wish to thank the Director and staff of the Melbourne National Herbarium for facilities in connection with this research.

## ON CHOOSING A MICROSCOPE FOR THE NATURALIST

By C. S. MIDDLETON, F.R.A.S., F.R.M.S.

One is frequently asked for advice on the choice of a microscope for a particular purpose. Here I shall try to answer the Naturalist.

As microscopes are designed to fill specific needs in specialized fields, a very good (or expensive) microscope may not be the most suitable.

Microscopes to-day are chiefly designed for: (1) Medical students; (2) Metallurgists; (3) Geologists; and (4) Large Laboratories, where large universal instruments sometimes costing £1,000 or more are provided. The Naturalist appears to have been forgotten in these days, especially the man with not too deep a pocket.

The so-called single purpose research microscopes for biological work are generally little more than a medical student's microscope, with a mechanical stage and perhaps a rack-focussing sub-stage. Such an instrument, with three objectives, viz. 10x, 40x, and 100x oil immersion, and two eye-pieces—5x and 10x, sells to-day for about £150 and is not suitable for the Naturalist. He requires a greater range of low powers than this, and the 100x oil immersion objective is seldom, if ever, required.

How then can he choose wisely and well? What should he look for?

There are four main features: (i) Objectives; (ii) Eye pieces; (iii) Sub-stage condenser; (iv) Stand.

(i) Objectives: The full battery of objectives best suited to the naturalist would be a 3 inch, 2 inch, 1 inch, 8 mm. and a 3 mm. dry achromatic, not apochromatic.

While not decrying the apochromatic objective for certain critical work by an experienced microscopist, these beautiful and very expensive lenses are by no means suitable for the average naturalist as, unless critically used, they may yield poorer images than an achromat of similar power. The apochromat is much more sensitive to variation in tube length and cover-glass thickness and also has a more curved field. These are disadvantages under certain circumstances. The expense of apochromats is only warranted where the utmost resolution is necessary for the work in hand and in critical photomicrography.

The purchase of all these lenses may be too expensive at first. If so, purchase the 2 inch and 8 mm., and add the rest as necessary.

(ii) Eyepieces: Get one eyepiece as high a power as possible, preferably an (h)oscopic, and an 8x Huygenian.

(iii) Sub-stage Condenser: The best is a dry achromatic and aplanatic condenser.

An aplanatic condenser, not corrected for colour, is also very suitable if used with filters. These are both rather expensive but may sometimes be bought secondhand. Failing that, then buy an Abbé condenser, preferably a 3 lens form.

(iv) Stand: The most suitable is a Wenham Binocular, not now made but sometimes available secondhand. Since the Wenham Binocular was originally made for long tube lenses, it would be well to see that modern high power lenses were corrected for use with a long tube. This is done by means of a correcting lens or alteration to the objective, but *on no account* should an amateur attempt to alter the lenses himself as this is a job for the expert. Permanent damage can result by even unscrewing the objective for cleaning or any other purpose\*.

If the lenses purchased with the microscope are the originals, no correction will be necessary, but they should be tested carefully by an expert as old lenses sometimes deteriorate.

If the choice is limited to a modern instrument, purchase a stand that can be built up by the addition of a mechanical stage, a rack focussing and centering sub-stage and a binocular body.

Only a few medical student's microscopes can be built up in this way.

If you have any further queries, I would be happy to answer them.

### NOTES ON THE ARMY WORM

By ROX. C. KERSTJAW

The Southern Army Worm, *Persectania crogii* (Westw.) has caused considerable damage to pastures and crops in Tasmania in recent years. During the present season (1955/56) the writer has observed the caterpillars feeding on pears in a West Tamar orchard.

The moths are in flight during September and October, and caterpillars ascend the plant stems where they feed on the seed heads during November and December. Infestations have reached plague proportions in some years and considerable economic damage has resulted. Martyn (1955) records unusual damage to the wheat variety "Magnet", and most crops have been infested to varying degrees. Damage to pears in a West Tamar orchard also seems unusual and the writer has not noticed a prior reference to such an occurrence.

Round holes were noticed in pears, principally of the Winter Cole variety, which at first sight could have been taken for hail marks. On close inspection numbers of caterpillars were observed *in situ*. Infestations of the grasses of the orchard had been noticed, and it is possible that the caterpillars moved into the trees subsequent to the cultivation of the orchard. However, as the object of the cultivation was to produce a mulch and not to eliminate the grass, there was still a goodly amount available standing for the caterpillars to feed on. This was not heavily infested at all so apparently competition was not an important reason for the movement; moreover there were sometimes three or four caterpillars on a very small pear.

Close observation was made of the activity of the caterpillars, and it was noted that individuals moved from place to place on a pear until a site suitable for attack was found. The skin was then removed in small quantities by a gnawing motion, and from time to time was placed to one side and was not eaten. The skin was removed from a roughly circular patch, subsequent to which the caterpillar began to eat the fruit. A rounded hole rather larger than the original opening was excavated, the caterpillars not digging deeply into the fruit as do the codling moth larvae.

In the case of the Winter Cole pears the damaged fruit may be removed during normal fruit thinning operations, but with other varieties not normally requiring thinning the loss is an economic factor. Most damage

\* Such unscrewing of objectives was suggested in an article on "Cleaning Microscope Lenses" in this Journal last month (*Vic. Nat.* 53: 61). There will be published in a forthcoming issue an article on the centering of lenses in the objective.—Editor.

was observed near the ground, but in some cases fruit high in the trees had been reached. Because of the mode of attack of the caterpillar, the poisonous sprays on the skin of the pears were of no use in protecting the fruit. In pasture and cereal crops control is achieved by dusting or spraying with D.D.T. insecticide. This insecticide is commonly used in orchard programmes and an adjustment in the programme if necessary would be all that is required.

#### REFERENCES

- MARTYN, E. J. and HUDSON, N. M. (1953) "Control of the Armyworm, *Persectania evanigii* (Westw.) in Tasmania". *Tasm. J. Agric.* 24 (4): 330-339.
- MARTYN, E. J. (1955)—"Report on an Outbreak of the Southern Armyworm, *Persectania evanigii* (Westw.) in Tasmania in 1954-55". *Tasm. J. Agric.* 26 (4): 329-331.

#### "NATURAL HISTORY OF SELBORNE"

Mr. F. S. Colliver of the Geology Department, University of Queensland, Brisbane, sends the following request:

"For some years now I have been collecting information relating to the various editions of Gilbert White's *Natural History of Selborne*, of which over 200 editions are known. This is many more than I have noted, and it seems to me that F.N.C.V. members might have the volume at home possibly in a form different from those I have collected or seen. What I would like is a complete copy of the Title Page as printed, the date, number of pages, and publisher's name if not already on the title page, original price, and if one of a series, e.g. "100 best books at". Likewise I would be glad to hear about other items pertaining to Gilbert White, for I feel that I must have missed noting some of them."

#### KALORAMA SHOW

A large marquee is to be allotted free to the F.N.C.V. for the display of Australian flowers, for Club publicity and for sale of publications. Arrangements for helpers in setting up and supervision will be completed at the September General Meeting. Absentees may telephone Mr. A. J. Swaby (WF 7294) after the meeting for details, including transport arrangements.

#### WILDFLOWERS IN COLOUR

Mr. H. T. Reeves will stage an exhibition, in conjunction with the Native Plants Preservation Society of Victoria, of about 250 hand-coloured photographs of Australian flora, in Kodak Gallery, Melbourne, during the first fortnight in October next. The show is to be opened, at 4.30 p.m. on Monday, October 1, by Mr. P. Crosbie Morrison.

#### WESTERN AUSTRALIAN WILDFLOWERS

The Home Mission Fund of the Congregational Church is holding a Western Australian Wildflower Show in the Lower Town Hall on Monday, Tuesday and Wednesday, September 10, 11 and 12. (Monday 1.30-10 p.m., other days 10.30 a.m. to 10 p.m.) Admission 2/-, children 1/-.

#### NATIONAL MUSEUM SECTION

Dr. Frank Tate will lecture on the Barrier Reef at 8.15 p.m. on September 28, in the National Museum. Colour film.

**AMY FULLER PAINTINGS**

The beautiful and accurate paintings of wildflowers by the late Miss Amy Fuller are the property of the Club, but we have not the facilities to show them properly.

Members may be interested therefore to know that they have been made available to the Native Plants Preservation Society which will be displaying some of them in the Mutual Store subway windows. This display is due to start on September 17, the pictures will be varied from time to time, and sets should be on show there for several weeks.

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

Monday, October 8—Satin Bower-bird, by N. A. Wakefield; and discussion of Club projects.

**F.N.C.V. Excursions:**

Sunday, September 16—Botany Group excursion to Hurstbridge. Leader: Mrs. Finches. Take 8.53 a.m. train to Hurstbridge. Bring one meal.

Sunday, September 30—Parlour coach excursion to Cape Patterson. Leader: Mr. K. Atkins. Coach leaves Batman Avenue 9 a.m. sharp. Fare, 25/-  
Bring two meals.

Saturday, October 6—Geology Group excursion. Details at group meeting.

**Group Meetings:**

(8 p.m. at National Herbarium)

Wednesday, September 12—Microscopical Group. Subject: Amateur Microscopy Today. Speaker: Mr. A. Busby. Open night for exhibits.

Monday, September 24—Botany Group. Members' Kodachrome Night.

Wednesday, October 3—Geology Group. Subject: Igneous Rocks. Speaker: Mr. Blackburn.

**Preliminary Notices:**

Tuesday, November 6 (Cup Day)—Club picnic to Healesville Sanctuary. Leader: Mr. A. J. Swaby, President. Subject: Nocturnal Animals, and inspection of Nature Trail. Coach leaves Batman Avenue 10 a.m., leaves Sanctuary 7.30 p.m. Bring two meals. Fare, including admission, 18/-.

November 3-4 Weekend at Bendigo. Itinerary: Saturday afternoon Excursion to Sandy Creek. Evening—Illustrated talk with Kodachromes. Sunday—Full day in Whipstick. Transport by Friday evening's or Saturday's trains or private cars. Camping facilities at White Hill Gardens. Wednesday, September 12, is final date for hotel reservations. Bookings with £1 deposit to be made with Mr. K. Atkins, Botanic Gardens, South Yarra, S.E.1. Phone, MU 3755, after 6 p.m. (Note the amended date of excursion.)

**Shows:**

Thursday, September 27 (Cup Day), to Sunday, September 30 General Floral Display in Kalorama Reserve, from 9 a.m. to 10 p.m. (except Sunday, 9 a.m. to 5 p.m.). Admission 2/-, children free. (Possible Club excursion on the Thursday.)

Saturday, October 6 (1-10 p.m.), and Sunday, October 7 (1-5 p.m.)—Wildflowers and associated arts. In Beaumaris East Hall, Cr. Cromer and Wells Roads, near Balcombe Road. Details from A. J. Swaby after September meeting.

MARIE ALLENDER, Excursions Secretary.

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## PROCEEDINGS

There was a good attendance at the General Meeting of the Club at the National Herbarium on September 10. Greetings were received from Mr. T. R. N. Lothian, Director of the Adelaide Botanic Garden.

The Secretary stated that he had received a letter from the executors of the late Mr. F. Cudmore indicating that he had left £100 to the Club.

It was mentioned that the Club has not at present a representative who could attend meetings of the Natural Resources Conservation League, and any member who could do so was asked to get in touch with the President or Secretary.

Mr. Strong offered to make available his room at Parliament House for meetings of the Marine Biology and Entomology Groups, and members interested were asked to get in touch with him after the General Meeting. Miss J. Hope MacPherson was elected as a Metropolitan Member of the Club.

Miss C. Carberry exhibited a series of slides illustrating native flora, mostly from her own garden in Hawthorn and that of Mr. Swanson at Frankston, but included some wild specimens. A commentary was given by the President.

The President explained that the short lecturettes at meetings were intended for members doing research, to let others know what was being done so that field-work, etc., could be co-ordinated. He appealed to members who could give such talks to communicate with him.

Mr. Willis mentioned the recent death of an honorary member, Rev. H. M. R. Rupp; and it was resolved that a letter of sympathy be sent to his family.

Exhibits included garden grown native plants, particularly a number of *Acacia* and *Grevillea* species, shown by Miss Macfie, and Messrs. Jennison, Fisch and Brooks. Mr. Gabriel exhibited some marine shells from southern Tasmania (*Pectea novae-zelandiae* Reeve, *Equichlamys bifrons* Lam. and *Mimachlamys asperrimus* Lam.); and Miss E. Raff showed some hyacinths, grown in bottles of plain water, and having very good root systems.

The meeting closed at 9.45 p.m. for the usual conversazione.

## THE SECRETARY'S COLUMN

*National Museum Lectures:* On October 26 at 8.15 p.m. Mr. P. Crossbie Morrison will lecture in the National Museum on "Why our Animals are Queer"

*To Orchid Lovers*: Mr. J. G. Foley, of Whitaker Avenue, Mont Clare, Pennsylvania, U.S.A., wishes to correspond with Australians interested in Botany, and perhaps exchange specimens. His special interest is orchids, and he states that the climate of his district is about the same as that of Tasmania.

*Nature Photographs*: The Melbourne Camera Club is organizing an International Exhibition of Photography in the Melbourne Town Hall from March 1 to 27. Among the classes is a special Nature Section, the first in Melbourne, for nature prints and colour slides. Closing date, February 13, 1957.

*Conchologists*: The Malacological Club has published a work on "Thauidae" by Mr. Bernard Cotton, Curator of Molluscs, Adelaide University. Price 2/6 per copy, postage included. Address of Honorary Secretary—321 Glenferrie Road, Malvern.

*Birds of New South Wales*: The Illawarra Natural History Society has sent us, at our suggestion, a number of copies of the publication *Birds Recorded from the Illawarra District*. These will be displayed for sale at Club Meetings. Price 2/6.

*Dunedin Science Congress*: If any member proposes to attend the Congress in Dunedin from January 16 to 23, 1957, of the Australian and New Zealand Association for the Advancement of Science, and would like to be accredited as a delegate from this Club, please contact the Secretary.

*Victorian Sub Aqua Group*. This body of skin-divers feels it has got beyond the mere spear-fishing stage and is taking a scientific interest in what goes on under the water. It has written to the Club seeking co-operation generally.

Further particulars may be obtained from Mr. E. H. Coghill, Hon. Secretary, F.N.C.V.

### SPECIAL FUNDS

For a considerable time now it has been apparent that a substantial body of members would like the present arrangement of the Club funds to be altered and some proposals to that end, at present before Council, will probably be considered at its next meeting, and, if adopted, placed before the October General Meeting, for consideration.

Apart from the Life Membership Fund, until 1947 the Club had only one account, into which all receipts were paid, and from which all expenses were met. It was substantially in credit, some of the surplus being invested, the rest being in an ordinary bank account. In that year, it was resolved by Council "that a fund be created to be known as the Building and Contingencies Fund—a fund to include all present investments, exception (sic) those specifically set aside for other purposes and to include income from special sources such as publications and booklets (with the specific exception of the receipts and expenditure connected with the Club Badges), such fund to be available for financing the Club's special publications and the acquisition of a Club Building at some future time".

This motion was carried and the fund set up. It now comprises about £1,250.

It will be noted that this fund was expressly made available for financing Club Publications, and it is this aspect which is now engaging our attention. Some members fear that if it continues to be used for that purpose it will gradually lose its character as a "Building and Contingencies Fund" and become simply and solely a fund for financing Publications. To get over this, Council is being asked to recommend the establishment of a separate "Publications Fund" and the amendment of the resolution setting up the Building and Contingencies Fund to make it clear that it is not to be used for such a purpose in the future.

This problem first became acute with the publication of the Fern Book, and it is accordingly proposed to separate the two funds as from May 1, 1955, before that project was adopted. The Treasurer assures us that there will be no difficulty in doing this. An earlier date, which would give rather more money to the Publications Fund, has also been suggested.

If the first suggestion is adopted, the Building and Contingencies Fund will continue to receive the proceeds of sale of items published before that date, and also the proceeds of any special efforts we may hold in the future, and it will be reimbursed the expenses of publishing the Fern Book, and be not called on to pay for the 2nd edition of the Fungus Book. Despite the terms of the resolution establishing it, it also receives the proceeds of sale of Club badges, and it is proposed that this should continue.

It is proposed that the new fund will take over the Fern Book, and the new edition of the Fungus Book and also sales of back numbers of the *Naturalist* in excess of £20 per year. It will apparently start life with about £150 in cash, and a very substantial capital invested entirely in unsold volumes.

Of course, we all realize that the Building and Contingencies Fund is quite inadequate for any building purpose, but it is a beginning and the sponsors of this idea feel that this subdivision of funds will serve to remind us that some of our money is earmarked for the purpose, and perhaps encourage us to build it up to something worth while.

—E. H. CORNUM, Hon. Secretary.

### OUR POLICY

The Annual Meeting of the Club unanimously adopted the policy recommended by Council:

(a) To stimulate the scientific side of the activities of the Club.

(b) To establish closer contact with country and interstate members, also with affiliated societies and similar bodies in Australia, for pursuit of knowledge and attainment of aims held in common.

Council will communicate with these societies, inviting their co-operation and suggestions, and making recommendations for activity.

The matter will be open for discussion at the October General Meeting. Members will be requested to offer assistance, skilled or unskilled. The following activities have been proposed:

(i) Wider circulation and use of the *Victorian Naturalist* by kindred societies. (Mr. Wakefield.)

(ii) Fostering an association of growers of Australian plants for experiments in nurture, propagation and breeding. (Mr. Swaby.)

(iii) Collection of hearth seeds for scientific study. (Mr. Rayment.)

(iv) Studies in ecology.

(v) Intensive study of single plant species.

### EUCALYPTUS CAMALDULENSIS: CORRECTION

Mr. R. H. Anderson, Chief Botanist and Curator of the Botanic Gardens, Sydney, writes:

"I should like to point out an error in a quotation from a letter of mine in an article by Professor Cleland in *Vict. Nat.* 77, No. 1 (May 1956). On page 12, 7th line from the foot of the page, appears "... the usual River Red Gum\*", and as a footnote "\*Other red gum hybrids". This is clearly meaningless. The original reading was "the usual River Red Gum x other red gum hybrids", that is to say the usual specimens of hybrid origin derived from River Red Gum crossing with other red gums. In a draft copy of his article sent to me, Professor Cleland quoted the sentence correctly; I assume therefore that the error occurred in printing."

## THE SWALLOWING OF STONES BY ANIMALS

By ALFRED A. BAKER\*

Presidential Address to F.N.C.V., May 9, 1955

This paper originated from an investigation into the origin of certain highly polished pebbles found near Inverloch, South Gippsland, Victoria. The possibility of these having been swallowed by animals, and so polished, was considered, but a search through literature on the subject and an examination of polished pebbles available and known to have been swallowed by animals, clearly indicated that the South Gippsland pebbles were polished by other means. Data on this is to be published at a later date.

That stones have been swallowed and still are swallowed by various animals is now firmly established, but the reason for this still remains somewhat uncertain. A review of papers written on the subject over the last hundred years, shows that this phenomenon is not altogether a rarity, and it does allow some conclusions to be formed on the problem.

Stones, as found in the stomachs of living animals or associated with their skeletal remains, are referred to in literature as "gizzard stones", "stomach stones" and "gastroliths".

The word "gastrolith" was first used in 1854 by Mayne, in *Expos. Lév. Gastrolithus*; he defined it as "a stone or calculus in the stomach". In 1880, Huxley used the word when describing crayfish; he writes: "there are . . . found at the side of the stomach, two lenticular calcareous masses, which are known as 'crab's eyes', or gastroliths."

Both these refer to calcareous structures which form on the inner walls of the stomach of freshwater crayfish, prior to the moult, and are a storehouse of material which assists in the forming of the new carapace. These gastroliths, or "yabbie stones" as they are called in Victoria, differ entirely, both in appearance and structure, from those which have been swallowed. Wieland (1906) introduced the word "gastrolith" when referring to quartz pebbles found associated with dinosaurian remains and thought to have been swallowed by them.

Swallowed stones may be of any variety of natural rock, either angular or rounded in shape, and may have a polished or dull surface.

"Stones" occurring in the organs of animals, including man, have no connection with the subject of this paper.

The following animals have been recorded as stone-swallowers:

Extinct reptiles—*Blasmosaurus*, *Plesiosaurus*, *Trinacromerum*, *Polycotylus*, *Mauisaurus*, *Peloneustes*, *Closaur*, *Atlantosaurus*, *Barosaurus*, *Telosaurus*.

Living reptiles—Crocodile, Alligator, Lizard.

Living mammals—Seals (Crab-eater, Fjord, Elephant Furl), Sea-lion, Dolphin, Porpoise, Walrus.

Living fishes—Shark (Basking), Dog-fish, Cod, Hake, Sting-ray, Trout.

Extinct birds—*Protolotus*, *Pezophaps* (Solitaire), *Dimornis* (Moa), *Genyornis*.

Living birds—Penguins (Emperor, King, Adelia), Mutton-bird, Ostrich, Emu, Cockatoo, Parrot, Chough, Plover, Stilt, Pigeon, Grebe, Ibis (large quantity of "yabbie-stones"), Dotterel; not including over sixty species having swallowed gravel, grit, or sand.

### Extinct Reptiles

Early geologists searching for reptilian remains of the Mesozoic period, both in England and in North America, frequently found pebbles in close association with the bones. Considerable discussion arose at the time, as to the possibility of these pebbles having been associated with the living animal.

\* Curator, Geology Department, University of Melbourne.

However, the finding of heaps of stones in the pelvic region of the skeleton resolved the doubts that reptiles of that period did swallow stones.

Further evidence was obtained by the rock types of these polished pebbles, as they did not always compare with those of the surrounding country, and frequently they were the only pebbles in the deposits in which the bones were found.

H. G. Seeley, in 1877, describes the finding, at the base of the Gault, in Folkestone, England (Upper Cretaceous), "about a peck of ovate and rounded pebbles, chiefly of opaque milky quartz, some of black metamorphosed slate, and a few of fine-grained sandstone and hornstone; some of the pebbles showing a veined character, such as might be derived from the neighbouring Palaeozoic rocks of the north of France".



Fig. 1—*Protoplotus beanforti*, from the Tertiary of West Sumatra, with a compact mass of pebbles associated with bone remains.

In his "Descriptive Catalogue of the Marine Reptiles of the Oxford Clay", C. W. Andrews (1910) states that "in a skeleton of *Peloneustes* (a Cretaceous *Plesiosaur*) was obtained a hard mass, lying within the ribs, containing many stones of various sizes from that of a hen's egg downwards, and no doubt representing the fossilized contents of the stomach. The stones of various kinds, included quartz, sandstone and gneiss, and for the most part were rather angular with the edges somewhat rounded off".

In the south central plains of North America, numerous sauropodian skeletons have been unearthed, and with these have been associated highly polished pebbles.

Barnum Brown (1904) states that "in nearly every instance a large number of siliceous stones were found associated with the bones of *Plesiosaurs*."

In one specimen of which the largest dorsal vertebrae were four inches in diameter, there were at least half a bushel of these stomach stones, ranging from the size of a walnut to four inches across".

And in a further paper by the same author (1907): "with a Cloasaur skeleton, imbedded in hard concretionary sandstone were found near the forelegs, three rounded, polished, well-worn pebbles, measuring nearly three inches across. Similar stones had not been seen elsewhere in the deposit".

From the type specimen of *Atlantosaurus immanus* Marsh, were obtained a number of rounded and highly polished siliceous pebbles; these were considered to be gastroliths. G. L. Cannon (1906) describing these says, "no material of similar size, form, surface markings or composition, occurs elsewhere in the *Atlantosaurus* clays in the vicinity".



Fig. 2—"Stomach Stones" of Plesiosaur, with portions of the backbone.

Another record by G. J. Hares (1917) states that "large numbers of gastroliths, some very highly polished, others scarcely polished at all, were found in the Cloverly Formation of the Bighorn Basin, Wyoming, at about the base of Pryor Mountain in Montana, in shales containing animal bones. Some of the stones were over six inches long, and consisted mostly of highly siliceous rocks, jaspers, chalcedony, quartzite, etc. If the highly polished stones are true gastroliths, then it is probably that the unpolished ones are likewise gastroliths".

#### Living Reptiles

Let us turn now to the living reptiles, where there is ample evidence that these still do swallow stones.

A. M. Reece (1915), in his treatise "The Alligator and its Allies", cites gastroliths of from two to three centimetres in diameter as being found in the stomach of a crocodile from Madagascar. Also, "in an alligator thirty inches long, were fourteen pebbles of irregular size, varying from four to seven mm. in diameter, and aggregating six grammes in weight".

Present day crocodile hunters in the north of Australia have also recorded stones in the stomachs of these saurians. Peter Lyell (1950), in *Wild Life*, records that: Two cupped handfuls of stones (from the river bed) is the average quantity inside an ordinary-sized crocodile.

S. W. Williston (1918) gives a more humorous aspect of crocodiles swallowing stones; in his book, *Water Reptiles of Past*, he mentions "an old myth, that the crocodile of the Nile swallows a pebble on each of its birthdays, so giving the Arabs reliable information of its age by the number of stones in its stomach".

Lizards, also, have attained a reputation for swallowing stones. R. L. Moodie, writing in *Science* (1912), records that a living horned toad (*Phrynosoma cornutum* Harlan), collected in the Magdalen Mountains of New Mexico, had "in its stomach twenty large somewhat abraded stones of a rock which resembled lava; some of the stones were large for the size of the animal, measuring nearly one-third of an inch in diameter. There were also in the stomach about 200 red ants. The animal had undoubtedly picked up the stones with the ants, and the association was probably accidental".

G. R. Wieland (1906) also mentions that lizards in captivity swallow stones from the floor of their cages.

#### Living Mammals

We go now to the pinnipedia, where the records are all from living animals. In the report on seals of the Challenger Expedition (1887) W. Turner states that "the dried specimen of a seal's stomach from the Cape of Good Hope, often referred to by fishermen and whalers as the 'seal's ballast bag', contained upwards of twenty smooth pebbles, flattened at the sides as if by mutual attrition.

"They vary in size; one of the largest is  $1\frac{1}{2}$  inches in its long diameter, and there are several of equal dimensions, but the smallest is not much smaller than a coffee bean.

"Captain Henry Pain, when writing of the sea-lion, says that he has seen upwards of twenty-five pounds weight of stones, some of which were the size of a goose's egg, in a 'pouch' inside the animal, obviously the stomach."

In Allen's *History of the North American Pinnipeds* (1880) W. D. Elliot relates that he has opened the stomach in many specimens of *Collorhinus ursinus*, and that in the old bulls he has seen stones which weigh half a pound, and in one stomach he found about five pounds of pebbles. He also possesses the stomach of a sea-lion in which more than ten pounds of stones were present, some of which weighed two and three pounds.

Robert Brown, in his account of the "Pinnepedia of the Greenland Seas" (1868), states that he has often seen small stones or gravel in the stomach of the walrus, and that this is a habit which it possesses in common with the seal (*Phoca barbata*) and even the whale (*Beluga catadon*).

Further records of stone swallowing by pinnipeds is given by K. O. Emery (1941), who "examined the stomachs of eleven dead sea-lions which had drifted up on beaches near La Jolla, California. Although most of the stomachs were empty, one contained a single flat pebble of sandstone, and another had twenty-seven pebbles, mostly of wave-rounded Black Mountain metavolcanics and a few of shale. Both these types of rocks are available on the beaches near La Jolla. Because of the angularity and fragileness of the

shale, it seems likely that the stones had not been carried very long by the sea-lion; although some of the metamorphics seem to be very slightly polished."

For records of stone-swallowing by seals along the southern coast of Australia, Professor Wood-Jones, when writing of seals in the *Mammals of South Australia* (1925) states that "for some reason or other they swallow pebbles which lodge in their stomachs. In the case of *Arctocephalus cinereus*, the pebbles are of granite and range in size from a tennis ball down to a walnut. Depending upon their size, their number varies from half a dozen to forty or so. The weight of the mass varies; a typical set of twelve faceted stones weighed five pounds, but in many cases this weight is considerably exceeded."

Along the Victorian coast, on Lady Julia Percy Island, where the McCoy



Fig. 3—Contents from the stomach of one seal, from Phillip Island, Victoria.

(Photo. by G. A. Thomas, from the collections of the Fisheries and Game Dept., Melb.)

Society's expedition was held in 1936. J. A. Tubb and C. W. Brazenor examined the stomachs of a number of young and adult seals (*Arctocephalus tasmanicus*). In three pups, there were found near the pyloric end of the stomach small pebbles in quantities of four, seven and eight respectively, and from one quarter to one half inch in diameter.

Investigations into the feeding habits of seals along the Victorian coast were undertaken by the late Fred Lewis of the Department of Fisheries and Game of Victoria in the season of 1928-29 at Seal Rocks, Western Port Bay. Results of these showed that "of eight seals taken . . . a small male had in its stomach, three gurnets, three cuttlefish, and some pebbles; and a big pup . . . stomach empty except for some small stones or pebbles. The

further taking of nine seals showed that only one had pebbles in the stomach, and of fifty-seven taken . . . forty-two were found to be empty or containing a little liquid or a few pebbles or stones".

Further investigations were undertaken in the season of 1948-49, when seals were taken from Lady Julia Percy Island, off Port Fairy and at Seal Rocks, Western Port Bay. Of 246 stomachs examined by J. McNally and D. D. Lynch, thirty had varying numbers of stones in them; the largest number obtained from one individual, at Seal Rocks, being 133 very small pebbles of well rounded basalt. In the stomach of another from Lady Julia Percy Island were 42 stones ranging in size from three-quarters to one-quarter of an inch in diameter.

All the pebbles found in the Victorian seals were of dense black basalt, this being the rock which comprises their habitat. Mostly the pebbles are well rounded and show little or no polish on their surface.

#### Living Fish

There is evidence of fish having swallowed stones too. R. L. Mondie (loc. cit.) mentions, "large Cretaceous sharks, which have been received at the University of Kansas Museum. In one specimen, consisting almost entirely of scattered vertebral cartilages, there were associated many hundreds of greatly abraded, very smooth and polished stones of white and black quartzite. That they belong with the shark cannot be doubted on account of the association".

J. A. Kershaw (1904) described a Basking shark, caught off Williams town, Hobson's Bay, in May 1902. When considering its food, Sir E. Home, referring to a specimen which he had examined, states: "The contents of the stomach consisted of several pails full of pebbles, a quantity of mucous, and a small portion of a substance which proves to be a spawn of a bivalve."

During the years 1933-36, K. C. McKinnon conducted investigations into the food of trout and the Macquarie perch in Australia. Apart from sand and gravel in the stomachs of the Brown Trout (*Salmo fario*), there were a number of specimens of the Rainbow Trout (*Salmo irideus*) which had pebbles in the stomach. Two trout had one pebble, three had two, and one contained three pebbles.

The greatest number in one individual was sixteen quartz pebbles of various sizes and jagged in contour; the largest being one quarter ounce in weight; the total weight was one and a half ounces.

#### Extinct Birds

It is with recent birds that the swallowing of sand, grit, small pebbles, and even brightly coloured objects, is probably more familiar to us. However, there is evidence that extinct birds also swallowed quantities of this mineral diet.

Lequat, in his *Voyages of Adventures*, written in 1807, discovered stones associated with skeletons of the Solitaire (*Pezophaps solitaria*)—a bird allied to the Dodo and like it now extinct—in a cavern on the island of Rodriguez, and suggested that they may be stomach stones. J. Caldwell, writing in 1875, after a visit to these caverns says "I got, both with the mounted bird and the male bird, the stones mentioned by Lequat as existing in the gizzard. In each case they were found on hitting the sternum and in the middle of the ribs. They are basaltic pebbles with rough angles and surfaces, and no stone of similar kind is to be found within about two miles of the caverns. I got four in all, but only two of which I could identify the birds they belonged to."

Lambrecht (1931) describes a fossil long-necked bird (*Protoptilus leau forti*) from the Tertiary (Miocene) rocks of West Sumatra. Together

\* Reproduction of illustration is included in the present paper.

with these bones, and in the vicinity of the stomach, was a compact mass of flat pebbles which had been ground and polished.\*

The extinct Moa of New Zealand probably supplies the greatest evidence of stone-swallowing by struthious birds. Excavations of their skeletons has proved the enormous numbers of these birds that had existed, and the stones (commonly called Moa Stones) found associated with their skeletons or in heaps apart from them, showed that they had some definite attraction for these pebbles, more often than not selecting them with regard to colour.

Of his visit to the Mackenzie Country in the South Island of New Zealand, F. Chapman (1884), described three distinct groups of white pebbles of unmistakable appearance. Mostly they were associated with bones, but frequently they were found in heaps without bones; an observation expressed by other writers as well. Individual heaps of stones collected, which are considered to have belonged to distinct birds, are given as 3 lb. 9 oz., 4 lb.,



Fig. 4—An average collection of gizzard stones of greywacke from a *Dinornis* (Moa).

and 5 lb. 7 oz. Included in the last weight were single stones of over 10 oz., and in another series of collections from Lake Manapouri, were sets containing 210 stones weighing only 8 oz., 389 stones weighing 4 lb. 7 oz., and 342 stones weighing 4 lb. 10 oz., nearly all of which were pure white.

In a further description of excavations of Moa remains near Oamaru, H. O. Forbes (1892) states, "In some instances, beneath the sternum were found, lying quite undisturbed, the contents of the stomach, consisting of more or less triturated grass mingled with crop stones. The quantity of these smoothed, rounded (chiefly white quartz) pebbles—in size from that of a bean to that of a plum—mingled with the bones was enormous, and would if collected have formed more than a cart load. Except where the bones were, there were no pebbles of any sort, no small stones nor even sand, anywhere around."

Not all stones collected by Moas were pure white, as reports are given of 'dark stones' and 'transparent flinty stones' having been found in the heaps. Nor were the stones always found to be well rounded.

Roger Duff (1949), referring to the food of the Moa states, "The number, size, and weight of the gizzard stones required by *Dinornis maximus* to digest his food were more fully realized than ever before when the complete skeleton could be found regularly. The average size approximated a half-crown piece, but pebbles up to four inches were noted. Normally, the stones and food remains filled a seven pound biscuit tin, and an average collection of 220 stones weighed five and a half pounds. The pebbles were of dark grey waterworn greywacke such as occur plentifully in the stream beds of the Waipara and its tributaries to the south and the Hurunui and its tributaries to the north. The handsome white pebbles found elsewhere were rare. An interesting realization was that the majority of the stones showed little

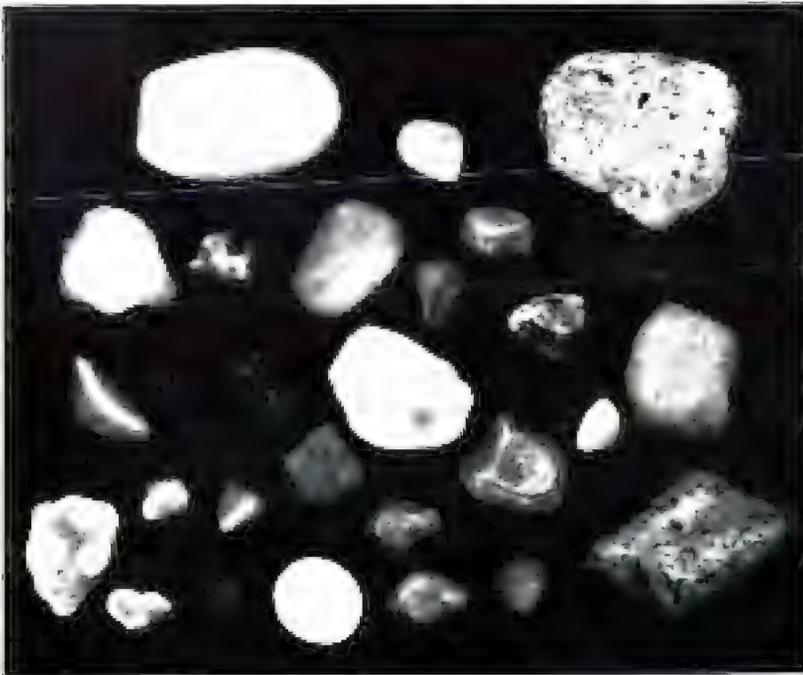


Fig. 5—Highly polished gizzard stones, of quartz, chalcedony and jasper. (Photo. by G. A. Thomas, from the collections of the National Museum, Melbourne).

evidence of wear. This demonstrated that the small heaps of highly worn 'Moa-stones' so widely found by farmers breaking into virgin soil, do not represent the final remains of a Moa whose bones had disappeared, but have been passed or vomited when they become too worn for their purpose."

Another struthious bird, *Genyornis newtoni*, whose remains are found near Lake Callabonna in South Australia, evidently swallowed small stones, as E. C. Stirling (1900) states, "The positions of the bird remains were indicated by the presence of circular surface patches of gizzard stones, consisting of coarse sand and small siliceous pebbles not exceeding three-

quarters of an inch in diameter, the surfaces of which were smooth and worn as if by attrition.

"The stones in one entire patch weighed fourteen ounces, and included siliceous sandstone, jasper, claystone (blackened on the outside), black quartz, clear quartz, chalcedony, together with fragments of blue brittle clay with worn edges. Such pebbles occurred either scattered or in groups at various places in the lake, and were the only stones of any kind to be found anywhere on the surface."

#### Living Birds

Present day birds of the seas have this peculiar habit of swallowing stones. E. A. Wilson (1907), reporting on penguins during the National Antarctic Expedition 1901-04, states, "the Emperor Penguin, its food consisting of fish and crustaceans, always contained pebbles in the stomach, found not only in the young and old, but even in the stomach of a chick which could have emerged from the egg only a day or two before". "Exactly where the pebbles come from is not at first sight evident, as the birds are never seen on land; probably they are picked up at the bottom of shallow seas, or some of them may be found on floating ice. Occasionally the stones are passed with the excreta, and may be found in the radiating pattern which is left on the ice-floes where a company of Emperor Penguins has huddled, all facing towards a common centre for warmth and rest in their spring and autumn wanderings".

Wilson also records the King-Penguin (*Aptenodytes patagonica*) of Macquarie Island, and the Adélie Penguin (*Pygoscelis adeliae*) from Cape Royds in the Ross Sea, as having pebbles constantly in their stomachs.

Investigations into the feeding habits of the Mutton-bird (Short-tailed Shearwater) on Phillip Island, Western Port Bay, Victoria, conducted by E. Lewis (1946) and taken over for breeding seasons, showed that in 40 young birds examined, there were no stones in the gizzard or stomach, only a little sand, and a small proportion, averaging 0.3 gm., of clinker or burnt coal, apparently derived from steamers and often seen floating in the waters or deposited on beaches.

Considerable investigation also has been undertaken into the food of Australian water and land birds. This has been necessary to prove whether or not certain types are injurious to crops, raising of sheep, or fish in the streams.† Although it is necessary that grain-eating birds obtain sand or grit to assist trituration of food in their digestive systems, there have been recorded a number of instances where pebbles have been found in the crop, gizzard or stomach.

G. M. Mathews (1909) records, in his list of birds from the north-west of Australia, the Little Corella or Bare-eyed Cockatoo (*Kakatoe sanguinea*) having "some small stones" associated with the food.

W. McLennan (1917) records having found small pebbles in the Common Bronzewing (*Phaps chalchoptera*) and the Little Grebe (*Podiceps ruficollis*).

J. B. Cleland, with co-authors Maiden, Froggatt, Ferguson and Musson (1918), in an extensive tabulated examination of the food of Australian birds, records ironstone pebbles in the crop of two specimens of a Red-checked Parrot (*Ceoffroyus ceoffroyi*), quartz pebbles in the stomachs of three specimens of the White Cockatoo (*Kakatoe galerita*), and two pieces of quartz with many pieces of black mineral matter in a single specimen of the Pale-headed Rosella (*Platycecus albicollis*). On examination of seven specimens of the White-winged Chough (*Corcorax melanotamphus*), quartz pebbles were found in all of them.

Further work by K. C. McKeown (1934) on birds from south-western

† Most native birds in Australia are protected by laws.

‡ Many streams and water reserves in Victoria are stocked with young fish by the Fisheries and Game Department.

New South Wales, shows that a specimen of the Crested Pigeon (*Ceryphus lophotes*) had its "stomach filled with coarse quartz gravel", the Australian Spur-winged Plover (*Lobibyx norae-hollandiae*) had a "small quantity of mud and a number of pebbles", a Black-fronted Dotterel (*Charadrius melanops*) had "small pebbles and mud", and two specimens of the White-headed Stilt (*Himantopus leucoccephalus*) had small and coarse quartz pebbles. The largest quantity was found in a single specimen of the Straw-necked Ibis (*Threskiornis spinicollis*), which had in its stomach fourteen pebbles ranging up to one quarter ounce in weight. Perhaps of equal interest is that three specimens of the Australian White Ibis (*Threskiornis molucca*) contained 16, 42 and 18 'yabbie stones' of a freshwater crayfish, and a Musk Duck (*Biziura lobata*) had two 'yabbie stones' with sand and gravel.

#### Domestic Animals

Finally there are records of domestic animals and animals kept in zoos having stones found in their stomachs after death, and although this may be worthy of mention, the reasons for this cannot be considered with those animals living under natural conditions. W. J. Beal (1904) mentions that hogs kept in an enclosed area, when slaughtered, were found to have in the stomachs of several, enough pebbles each to fill the two hands of a man, and there were smaller quantities in some instances.

#### Reasons for Stone-Swallowing

Many theories have been advanced to explain this peculiar phenomenon; some have prompted definite investigation into the life histories of the animals, while others have attempted to explain it in connection with the digestive structure, and a few have promoted reasons without having given thought to their possibilities.

W. H. Wicks (1908) discusses some of these theories in his paper "Pebble Swallowing Animals", and, with matter published on this subject since, the theories can be placed in the following order:

- (a) As ballast.
- (b) Accidental.
- (c) Swallowed with food attached, e.g. sea anemones, spawn.
- (d) Already in the food swallowed, i.e. fish, etc.
- (e) Gastric 'chewing gum'.
- (f) Trituration of food.

#### (a) As ballast.

This theory, that stones were swallowed by very fat seals as ballast (A. J. Harrison, 1887) to allow them to sink into deeper water, was the opinion of the sealers of Cape Colony, and also the cod-fishers of Newfoundland. They referred to the seals' stomachs as 'Ballast Bags'. A similar account appears in the Report on Zoology of the Challenger Expedition (W. Turner, 1887), stating that sailors considered the seals to swallow stones to enable them to dive for fish, and they could disgorge the stones at will and so surface again.

In a pamphlet published by the Rev. Canon Brownrigg of St. John's, Lunenburg, about 1872 (quoted by F. Lewis, 1946) it is stated that before a young Mutton-bird could take to the water, it had to take in 'ballast' to enable it to get properly balanced.

A. J. Campbell (1900), dealing with the life history of the Mutton-bird, states, "before the young birds follow their parents to the sea, they devour a quantity of sand or gravel; the popular belief is that they ballast themselves, so that if thrown into the water they would not drown".

It is worthy of note that although the quantity of stones swallowed by the various animals outlined in this paper appears to be considerable, their weight compared with the weight of the animal itself would not make an appreciable difference to the stability of its movements. Also, it has been

observed that the seals at least can disgorge stones that have been swallowed, and this is probably accounted for by their method of 'gulping' food, and when digestion has reached a certain stage, being enabled, naturally, to regurgitate indigestible parts, which would include stones taken during the search for food or at other times.

An interesting account of this is given by C. A. Fleming (1931), of Hooker's Sea-lion, of personal experiences at the Auckland and Snares Islands, to the south of New Zealand.

It is certain that the 'ballast' theory is fundamentally impossible and has been used by later writers without consideration.

(b) *Accidental.*

The accidental theory could possibly account for a small number of stones being swallowed as seals seek their food in water, and in shallow waters especially, stones are kept in turbulence by the waves. The walrus sinks to the sea floor, where, as almost standing on its head, it ploughs the bottom, moving in a backward direction, in search of molluscs which burrow in the mud.

Seal pups have been seen to play with pebbles on ice floes, and the habit of playing with nearby objects is not uncommon with the young of most animals. Lizards (cited) and other reptiles could swallow a few stones accidentally. Birds, in a hurried search for food, have been seen by the writer to pick up and reject small stones and other inedible substances. Exception to this are struthious birds—moa, ostrich and emu.

(c) *Swallowed with food attached, i.e. sea-anemones, sponges, etc.*

This theory, similar to the previous, could account for a small number of stones in the digestive system. Although many forms of the lower invertebrates attach themselves to rocks, which may subsequently become dislodged, these form a very small proportion of the food required by the larger vertebrates.

(d) *Already in the food swallowed, i.e. fish, etc.*

This theory also, as in the two previous ones, would account for even a lesser number of gastroliths.

(e) *Gastric 'chewing gum'.*

This theory, which has been advanced in more recent years, mainly through research work on the pinnepeia in Australia, as well as in other countries, appears to supply, in part, an answer to the problem as concerns the seals, sea-lions, and others of that group. It cannot, as yet, be used in the case of crocodiles or the birds.

Research in connection with the Victorian seals has shown that about twenty-five per cent of seals are attacked by parasitic worms; and, although most of these affected seals had stones in their stomachs, quite often the reverse was the case.

Investigations into the occurrence of gastric ulcers in sea-mammals of the coast of California, by C. R. Schroeder and H. M. Wegeforth (1935), has shown that these mammals swallow the sand of the beaches they inhabit, which, being composed of volcanic rocks and containing obsidian (volcanic glass) is the cause of ulcers in the stomachs of the Elephant Seal, Californian Sea-lion, and the Galapagos Sea-lion.

It is thought that possibly the mammals swallowed the sand to allay irritation caused by parasitic worms, but more probably the sand was used for trituration of their food. It is worthy of mention that nematode parasites have been found in the stomachs of several of the Mutton-bird of Phillip Island, Western Port Bay, Victoria, by the late Fred Lewis (loc. cit.).

Another suggestion, advanced by H. Brazier Howell (1930), is that as the male pinnepeids go without food for several weeks during the breeding

season, they may swallow stones to prevent undue atrophy of the stomach, by functioning as a sort of a 'chewing gum', during the period this sex is guarding the harem.

(f) *Trituration of food.*

In advancing this theory, consideration must be given to the structure of the digestive system of the various animals we have referred to.

The food of the pinnepedia consists mainly of fish, squids and crustacea; their teeth are constructed for tearing and they can neither bite in a clean cut manner nor masticate. Small fish are swallowed whole while larger fish are torn apart. The oesophagus is long and large, allowing easy passage for any object which can be taken into the mouth cavity. The stomach is simple in form, and abundant gastric juice digests the whole fish.

In the alligator group, the food consisting of land or marine animals, the teeth are used for seizing and tearing; the oesophagus connects with a stomach made up of two parts, composed of numerous large muscular folds and capable of being greatly distended. There is no gizzard.

The sharks have sharp rows of teeth to seize and tear their prey, which consists mainly of small fish. Torn off portions, or the whole fish if not too large, are swallowed, there being no mastication. The food reaches the stomach, composed of longitudinal folds, through a very short oesophagus.

Of the birds, where the food consists of seeds, fruits, grass, and in some species, small fish and crustacea, there is an absence of teeth. A beak seizes the food, and it is conveyed by the action of a tongue to the oesophagus and on to the crop. From the crop it passes, as required, into the gizzard, where, with the assistance of abrading material, such as sand, gravel or small stones, the food is ground to a digestible form.

It will be seen therefore that none of the animal forms with which gastroliths are associated have a perfect means of mastication of their food in the manner in which it is taken.

With the birds, it is quite apparent that stone-swallowing is a necessity, as they have a true muscular gizzard; whereas in the other forms of animals, although it is not a prerequisite to the thorough digestion of their food, it does provide additional assistance in its trituration.

A study of the digestive structures of the extinct ancestors of the birds (if only those parts were preserved) would do much to elucidate this apparent phenomenon.

### Conclusion

In reviewing "The Swallowing of Stones by Animals", the question is: "In what way will gastroliths be of use to the naturalist or scientific worker?"

To the geologist, it has been shown that certain animals have been the means of transporting small quantities of stones. By comparing their appearance, polish or unusual occurrence, with or without bone remains, there is a possibility that at least a small amount of the life in the past could be reconstructed. However, it is highly improbable that gastroliths would ever be important criteria in determining stratigraphic horizons.

For the biologist, there still remains much to be observed of the feeding habits of the animals concerned, as in this way only can accurate decisions be formulated.

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#### MICROSCOPICAL GROUP

The lecturer for the September meeting was Mr Arch. Busby. Having recently returned from overseas, Mr. Busby was able to give an excellent talk on the work being done at the Cambridge University for the perpetuance of the type species of the algae. This work was commenced by Fensholt, and left to be continued by his successors when he retired. Mr. Busby illustrated his talk with Kodachrome slides taken in the laboratory and showing the large racks of specimens in test tubes. He also showed some excellent scenes taken around the city of Cambridge itself.

The next meeting will have as its lecturer Mr. C. Middleton, whose subject will be "Illumination—with special reference to dark-ground". The November meeting will have a lecture on "Metallurgy" by Mr. A. Temant, of the firm of Ruwoltz. Please bear these dates in mind.

## FLORA OF VICTORIA: NEW SPECIES AND OTHER ADDITIONS—10

By N. A. WAKEFIELD, Noble Park

### Genus *OLEARIA*: The Delimitation of Some Small-leaved Species

The purpose of this section is to establish the specific status of four species of *Olearia* which have hitherto been variously identified with one or more of the three well-known species, *O. lepidophylla*, *O. floribunda* and *O. ramulosa*. Some details of the latter three species are therefore set out below before the novelties are presented. Some of the revision deals with species which are not known to occur in Victoria, but these are included here for convenience in an appendix to the main part of the section.

#### *OLEARIA LEPIDOPHYLLA* (Pers.) Benth. *Fl. Aust.* 3: 477.

**Key Features:** Leaves in clusters, the outer ones reflexed tightly against the stems, mostly about 0.5 mm. long, almost globular, the subtending ones usually longer (even to 2 mm. long) and oblong, flower-heads sessile at ends of branchlets; involucrel bracts acute with a dorsal patch, towards the apex, of a mixture of exudation and cottony hairs.

**Distribution:** Coasts of Tasmania, mallee areas of north-western Victoria, and adjoining parts of New South Wales and South Australia.

#### *OLEARIA FLORIBUNDA* (Hook. f.) Benth. *l.c.*

**Key Features:** Leaves in loose clusters, mostly 1-2 mm. long, oblong, blunt, glabrous, narrowed to a short flat petiole, thin with revolute margins; flower-heads very numerous, sessile at ends of lateral branchlets (which are often obsolete however); involucrel bracts mostly obtuse, with a dorsal patch, towards the apex, of a mixture of exudation and cottony hairs.

**Distribution:** Scattered in the sub-alps and lowlands of Tasmania and Victoria, and in South Australia.

The *Olearia pineleoides* var. *minor* Benth. (*l.c.*: 479) has fewer larger flower-heads and larger leaves (mostly 3-5 mm. long) but is otherwise the same as *O. floribunda*; it is not referable to *O. pineleoides*. This form occurs in north-western Victoria, south-western New South Wales, and in South Australia.

#### *OLEARIA RAMULOSA* (Labill.) Benth. *l.c.*: 476.

**Key Features:** Stems shortly bristly or aculeate, often cottony also; leaves  $\pm$  narrow-linear, mostly 5-10 mm. (or more) long, the upper surfaces usually acute, the lamina spreading and with revolute margins, but the petiole with flat thin wings and stem-clasping; flower-heads usually on axillary  $\pm$  leafy peduncles, or on short slender lateral branchlets; involucrel bracts acute,  $\pm$  glandular-pubescent on the dorsal surface.

**Distribution:** Lowlands of Tasmania, Victoria, south-eastern New South Wales, and south-eastern South Australia.

#### *OLEARIA LANUGINOSA* (J. H. Willis) stat. nov.

Syn. *Olearia floribunda* var. *lanuginosa* J. H. Willis *Muelleria* 1: 29.

Stems thick, rigid,  $\pm$  woolly-tomentose; leaves forming globular clusters along the stems, incurved and tightly packed, mostly 0.5-1 mm. long (the subtending ones often longer), thick, blunt, usually aculeate-tuberculate, sessile, the bases broad; flower-heads sessile within clusters of leaves lateral to the stems; involucrel bracts acute, glandular-pubescent or cottony.

**Distribution:** North-western Victoria, south-western New South Wales, and South Australia.

This plant was originally considered (by Bentham, Muesler and others) to be a form of *O. lepidophylla*, to which species it is most closely allied; it is much further removed from *O. floribunda* (sens. strict.).

**OLEARIA ALGIDA** sp. nov.; a *O. floribunda* (Hk.f.) Benth.

similis, sed foliis percrassis sessilibus subamcunctis distinguitur, ex affinitate *O. lepidophyllae* (Pers.) Benth. a qua recedit foliis ad ramulos non appressis, et ab utroque bracteis glandris praeterea differt.

Holotype: Bogong Mt., Victoria: Jan. 1922; leg. A. J. Tadgell (MEL - duplicates to be sent to K and NSW\*).

Leaves sessile in loose clusters, broadly ovate, usually 1-2 mm. long, auriculate, thick, blunt, the margins revolute, the upper surfaces smooth and glabrous; flower-heads sessile in leaf-clusters lateral on the branches; involueral bracts blunt, glabrous.

Distribution: Alps of south-eastern Australia (New South Wales—Munyang Mts., Victoria—Mts. Buffalo, Bogong, Raw Raws, Tasmania—Middlesex Plains, Great Lake).

This species includes the *O. lepidophylla* var. *lanceolati* Hook. & Fl. Tasm. J. 178; and specimens of it were variously identified in the Melbourne National Herbarium collections as *O. lepidophylla* and *O. floribunda*.

## APPENDIX: NON-VICTORIAN SPECIES

**OLEARIA BRACHYPHYLLA** (F. Muell. ex Sond.) comb. nov.

Absolute Synonym: *Eurybia brachyphylla* F. Muell. ex Sond. *Linnæa* 25: 455 (1853).

Equivalent Synonym: *Aster exilifolius* F. Muell. *Fragm. Phyt. Aust.* 5: 69 (1865); *Olearia exilifolia* (F. Muell.) Benth. *l.c.*: 426.

The type specimens of each of the above plants are in the Melbourne National Herbarium, and they are certainly conspecific.

In most respects *O. brachyphylla* is similar to *O. floribunda*, but it can be distinguished at once by its sessile broad-based leaves, and the ligules of the ray-florets are normally not longer than their styles. There are some specimens however with well-developed ligules.

*O. brachyphylla* is apparently confined to South Australia. The collection upon which a Victorian record of the species was based (as *O. exilifolia*, in *Muelleria* 1: 30) is actually of *O. tubuliflora* (Sond. et F. Muell.) Benth. with the ligules of the ray-florets abnormally well developed.

**OLEARIA ERICOIDES** (Steetz) comb. nov.

Syn.: *Eurybia ericoides* Steetz *Pl. Preiss.* 1: 423

Holotype: Located at MEL. (ex Herb. Sonder).

Branchlets ± erect, leaves oblong, blunt, the margins revolute, mostly 3-5 mm long, sessile with broad bases, usually aculate-tuberculate, erect along the stems or somewhat spreading and subtending erect axillary clusters of shorter leaves; flower-heads sessile, terminating long or short branchlets; the involueral bracts acute; the whole plant very viscid (oil stems, leaves and bracts) with a little cottony vestiture.

Distribution: Mid-eastern to southern Tasmania.

*O. ericoides* is well distinguished from *O. canulosu* under which Bentham synonymized it.

**OLEARIA HOOKERI** (Sond.) Benth. *l.c.* 483.

Syn. *Eurybia hookeri* Sond. *l.c.*: 463.

A specimen located at MEL. ex Herb. Sonder, is taken to be the holotype of this species; it is certainly the specimen to which the diagnosis applies, and it is cited by the author before he sets out any synonymy.

My thanks are again due to the Director of the National Herbarium of Victoria for the opportunity to investigate material in that institution.

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

**REVIEW: "COWRY SHELLS OF WORLD SEAS"—JOYCE ALLAN**

This is an authoritative and comprehensive survey of the cowries not only of the Australian Indo-Pacific region, but of the whole world. The author has given us far more than a descriptive catalogue of these varied and beautiful specimens of mollusca. With great detail and much collective information, she has set out not only to catch the interest of the uninformed amateur but to clarify the systematic classification of cowries for the experienced collector. She introduces a great number of newly named species and subspecies which are involved in recent subdivisions of the *Cypræidae* and allied groups, but in doing so points out the reasons for such reclassification. This will help many a naturalist not only to obtain a better idea of the value of careful classification but also to be able to recognize many of the minor differences that lead to the delimitation of the species.

The book measures 10 x 7 inches and contains 224 pages. It is copiously and beautifully illustrated by the author, with seven full colour plates, eight half-tone plates and thirty text-figures. These illustrations are well indexed with cross-references to the pages on which the respective shells are dealt with.

*Cowry Shells of World Seas* is published by Georgian House, Melbourne and may be bought from booksellers for 13/3/-. It is a most acceptable addition to the available up-to-date information on the mollusca of Australia and the world in general.

—E. MACFIE

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

Monday, November 12—Preparation of Spider Ventrals, by Dr. S. Wiener

**F.N.C.V. Excursions:**

Saturday, October 13—Beaconsfield to Officer via Beaconsfield Reservoir. Walk of six miles. Leader: Mr. A. E. Brooks. Travel by 9.15 a.m. train to Dandenong then bus to Beaconsfield (fare 2/6) where leader will meet party. Book second return to Dandenong, bring one meal. Train leaves Officer on return at 3.45 p.m.

Sunday, October 14—Maranba Gardens. Leader: Mr. A. J. Swaby. Take Mont Albert tram to stop 54, Parring Road. Meet leader at gates 2.30 p.m.

November 3-4—Weekend at Bendigo. Itinerary: Saturday afternoon—Excursion to Sandy Creek. Evening—Illustrated talk with Kodachromes. Sunday—Full day in Whipstick. Transport by Friday evening's or Saturday's trains or private cars. Camping facilities at White Hill Gardens.

Wednesday, September 12, is final date for hotel reservations. Booking with Mr. K. Atkins, Botanic Gardens, South Yarra, S.E.1. Phone MU 3755, after 6 p.m. (Note amended date of excursion.)

Tuesday, November 6 (Cup Day)—Club picnic to Healesville Sanctuary. Leader: Mr. A. J. Swaby, President. Subjects: Nocturnal Animals and Inspection of Nature Trail. Parlour coach leaves Batman Avenue 10 a.m., leaves Sanctuary 7.30 p.m. Bring two meals. Fare, including admission, 18/-. Bookings with Excursion Secretary.

**Group Meetings:**

(8 p.m. at National Herbarium)

Wednesday, October 17—Microscopical Group.

Wednesday, October 31—Botany Group. History of Food Plants. Speaker: Mr. K. Atkins.

Wednesday, November 7—Geology Group. Literature Night. Speaker: Mr. E. D. Gill.

—MARIE ALLENDER, Excursions Secretary

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## PROCEEDINGS

There was a full attendance at the National Herbarium for the October General Meeting of the Club. At the request of the President, one of the Vice-Presidents, Mr W. L. Williams, took the Chair.

Proposed F.N.C.V. activities as set out in the *Naturalist* were discussed, and further suggestions, in writing, were asked for. Mr. Hooke, Treasurer, explained the plan proposed by the Council for the establishment of a Publications Fund, separate from the Building and Contingencies Fund. Mr. Coghill mentioned that this plan was simpler than that he had outlined in the *Naturalist* but that the financial results of the schemes were almost identical.

Mr. Brooks undertook to direct arrangements for the show at Prahran on November 19 to 21 next. Twelve members agreed to assist. Following the offer of some space for native flowers in the Lower Melbourne Town Hall by the Olympic Civic Committee, an F.N.C.V. sub-committee of three was appointed to deal with the matter.

Mr. Wakefield gave a talk on a Satin Bower-bird which had stayed for some months in an East Malvern garden, and illustrated the subject with colour slides of its bower and a fine tape recording of the bird's vocal performance and mimicry.

It was noted that this Club requires two more delegates to the forthcoming A.N.Z.A.A.S. Conference at Dunedin, New Zealand. A letter was received from Mr. K. Atkins, tendering his resignation from the secretaryship of the Botany Group.

Miss H. A. Young and Messrs. E. P. Backer and R. W. Burbury were elected as Metropolitan Members, and Miss F. M. Hyslop as a Joint Member of the F.N.C.V. All are welcomed to the ranks of the Club.

Exhibits included coral shells, shown by Mr. Gabriel, and wild-flowers from Broken Hill and the Grampians, tabled by Mr. Williams. The meeting adjourned at 9.45 p.m. for the conversazione.

## NOTES FROM COUNCIL

As forecast at the October General Meeting, a new account is to be opened for publications, and the Building and Contingencies Account will retain the invested funds and the interest thereon.

The show at the Prahran Town Hall, to be current from 10 a.m. to 10 p.m., on Monday, November 19 to Wednesday 21, needs volunteers to assist with setting up during the previous week-end, to attend during the show, and to

dissemble it on the Wednesday night. These will be called for at the November General Meeting. Please bring your diary.

The Bank of New South Wales, with the assistance of our respected former President, Mr. Tarlton Rayment, will set up and supervise its display, in the Banking Chamber, Collins Street. It is to run, we understand, from 10 a.m. to 10 p.m., for about five weeks. Persons are required to act as guides from time to time, lecturing to visitors on exhibits; the Bank is prepared to pay for such services.

Dr. R. M. Wishart has been appointed Vice-President in place of the late Fred Lewis; and Miss M. Eider has been appointed to Council. Mr. A. N. Bulbin, of the National Museum, having been a member of the Club since June 1916, has been made an Honorary Member.

Members desirous of attending meetings of the Entomology and Marine Biology Group are requested to meet Mr. Strong at the November General Meeting. Also, the matter of stimulating the scientific side of our activities will be further discussed at the next meeting, and members who have suggestions to offer should see the President before the meeting opens.

### EXCURSION TO BEACONSFIELD RESERVOIR

Some twelve people met at Beaconsfield on Saturday, October 11, for the excursion to Beaconsfield Reservoir. We were very pleased to find three country members among this number—Mr. R. N. Aughterton of Narracan, and Mr. P. Lewis and Miss Lewis from Trafalgar.

The route followed was along O'Neill's Road, where a wide variety of plants was to be seen in flower. These included Nodding Greenhoods (*Pterostylis nutans*), Tall Greenhoods (*P. longifolia*) Maroonhoods (*P. pedunculata*), Spreading Flax-lily (*Diastella revoluta*), Common Apple-berry (*Billardiera scandens*), Love-creeper (*Bredoncyera volubile*), and numerous others.

A discussion on whether numerous pitted specimens seen by the roadside were plants of the Sweet Pittosporum (*P. undulatum*) or of the Genoa Pittosporum (*P. revolutum*) naturalized in the area had to be discontinued when it was discovered that the matter could not be decided without seeing the seed-capsules.\*

Birds observed or heard included the Rufous Whistler, Grey Shrike-Thrush, Pallid Cuckoo, and Bronze Cuckoo.

A pleasant place for lunch was found overlooking the Reservoir, after which the walk was continued along the aqueduct, where a sheep joined the party. It followed the party for about a mile and attempts to send it back were of no avail; but to show how independent a sheep can be, it departed of its own accord shortly afterwards.

Almost immediately after reaching a road to the east of the Reservoir a wonderful patch of orchids was discovered. There were Fringed Spider-orchids (*Caladenia dilatata*), Tall Diuris (*D. longifolia*), one Large Waxlip (*Glossodia major*), and, perhaps most beautiful of all, two Common Spider-orchids (*Caladenia patersonii*), one a tall and stately specimen with two flowers. Directly across the road several Bearded Greenhoods (*Pterostylis barbata*) were to be seen.

With most of the remaining part of the route being downhill, good time was made to the Officer station, where everyone voted the excursion a very happy and successful one.

—A. E. BROOKS

\* Neither pitted specimen is native here, but *P. undulatum* has become established in abundance in districts east of Melbourne, its seeds being dispersed by birds from cultivated trees.—Editor.

## DIMORPHISM IN HALICTINE BEES

(Digest of Presidential Address by TARTON RAYMENT, F.R.Z.S.,  
delivered to the F.N.C.V. in May 1956)

For over thirty years I have been studying certain small fossorial bees known as *Halictus*, and the complexity of their biology intrigues me today even more than it did when I discovered my first colony. The bees are small in stature, about six or eight millimetres in length, but the group that has held my unflinching interest throughout the years is comprised of the highly coloured metallic species falling within the subgenus *Chloralictus* (i.e. "coloured *Halictus*").

And what delightful little gems they are! Most have a green head and thorax and an apricot-coloured abdomen. On several the head is almost black, but others will be so magnificently iridescent on the thorax that even the most fiery opals cannot excel the brilliance of their colour. The abdomen, too, is no less surprising in its range of colours, many have the rich dark castaneous-red of the chestnut, but the majority match the clear orange tints of the apricot: one or two are cadmium, verging on yellow. Whatever their tints may be, the bees are exquisite gems.

I made my first acquaintance with these chloralictine bees on the sandy eastern shore of Port Phillip, when the blues of the sea and of the sky were perfectly translucent, and the sun's rays were tempered by the breeze from the sea. . . . It was a day for the gods to dream. So I, too, fell under the spell of Mother Nature, but I did not dream.

Presently my eyes focussed on a small black ant carrying some thing on its back; it was a shred of withered golden leaf. Right before my startled gaze, a minute polished black insect "shot out of the ether" and attempted to mate with the ant. My natural history told me something unusual was afoot. My net cut the air, and I had both insects imprisoned in its meshes.

Now I can examine them critically under a lens. Yes, a small black worker ant, known to everybody, and the other, an even smaller halictine bee, not known to anybody! [Later, my revered mentor and friend, Professor Cockerell, dedicated the species as *Chloralictus raymenti* Ckll.] For several years afterwards, I spent hours in that locality, searching for a black female to correspond with the tiny male. I never found one, but in due time I did discover a colony of the bees, and also the cause of my forgivable error. You see, every one of the females, and there were hundreds of them, had a metallic-green head and thorax and an apricot-coloured abdomen. And what of the males? There were hundreds of them, too, but all were jet-black and polished. I have dissected perhaps thousands of *Halictus* and I am sure of my facts.

I did discover then the explanation of the initial phenomenon with the ant. In the sunlight, the piece of yellow leaf, thrown over its

back, created the impression of a female halictine bee with an apricot-coloured abdomen, hence the male's attempt to effect copulation. Of course, scent would assert itself almost immediately to remedy the fault, but in the first headlong flash through the air there is no time to check up all the minutiae of the chase.

Did I say I found my first colony of halictine bees on the sandy shore of Port Phillip? Of course I did, because I can never forget it—the heart-breaking searching for such tiny shafts—they have the diameter of a piece of thin string; the inevitable confusion brought about by the difference in the colour of the two sexes, the frustration engendered by the avalanches of fine sand that poured down into the smallest excavations, effectively drowning shafts, cells, puddings, larvae and adults. Moreover, I was increasingly obsessed with the fear that my unsuccessful delvings and concomitant destruction of the colonies would eventually leave me without any material whatever for future researches. I had perforce to abandon my excavations in the sandy soil. The colonies were too difficult to discover, and the exceedingly friable soil, interlaced as it is with a million rootlets of the tea-trees, utterly defeated me and left me very dispirited.

The tide of research had run out, and was at its lowest ebb. But as one should never forget, the tide turns, and the flood pours back, laden with a full harvest to revivify the heart and delight the spirit with the richness of its treasures. The "high water" rose far beyond Sandringham. It rolled inland even to the Dandenongs, where I have a friend, Mr. W. R. Richardson, a well-known engineer in the city, and one who finds the essential relaxation from his extensive business on a model farm. Now, do not conclude from this summary that all things are possible on a "pocket-handkerchief." That would not be true, for the farm is an extensive one. About the homestead is a lovely garden, where the lawns form green pictures framed here and there with arbours of roses. Well, in the middle of that closely tended sward, I find a shaft of *Halictus*. Of course, I do not expect to disrupt my friend's beautiful garden. Nevertheless, I recount to him the problems of the bees.

"Dig up the lawn," he assures me instantly, "the gardeners here will make the grass quite right again." Thank you, Sir! So the next time I visit my friend I take an assistant, and together we tape the lawn into areas one foot square and search every square on our hands and knees. We are abundantly rewarded for our care and patience, we find nineteen tiny halictine shafts, each, I would remind you, of no greater diameter than a piece of fine string. Of course, I am elated.

At last I have a quiet place for study; one far removed from the vandals of the foreshore and the thoughtless feet of the picnickers, even from the bulldozers of the Council. There are no disturbing intruders, only the friendliness and co-operation of a very fine citizen. The damp soil pares off as cleanly and easily as a piece of cheese.

Why, I can follow the shafts to their utmost extremities and see every detail, cells, puddings, eggs, larvae, everything!

How shall I mark the precious nests so arduously detected, and so laden with promise for the future? It is essential for me to identify, not only every shaft, but also each bee that uses it. Well, I have on hand a number of roofing nails, the large heads of which had been previously painted in various colours, and given numbers. I press down into the grass a nail for every shaft, and prepare a diagram after triangulating their relative positions.

I am highly satisfied: I face the new investigations with renewed pleasure and hope, and I return to the sea-shore to other work awaiting my attention. A week later finds me back in Dandenong. The weather is fine, and I am eager to pick up once again the threads of the research in the biology of chloralictine bees. I hurry out onto the lawn; it is as green and close-shaven as ever. But some subtle change has taken place, one difficult for me to contemplate, every nail has been meticulously removed. Alas! The colonies are gone!

My host is no less concerned over my loss. He questions the gardeners. Yes, one man is obviously perplexed. "Who on earth," he asks, "would do such a miserable trick as to sow the lawn with nails to blunt the mower?" Nevertheless, the damage is done. The shafts are lost for winter, and my season's patient searching had been altogether in vain. I leave the blue Dandenongs behind me; I am frustrated, and unhappy.

However, there comes a day in spring when my assistant and I are indeed successful, and we locate most of the colonies again. Then follows the critical investigation, and its surprising results. But Dandenong is a long way from home, and I ponder over the expense and loss of time involved in the study. "Would it be possible," I dream, "to force, train, or deceive wild bees into establishing colonies nearer home?" Well, it has never been done before, but is that a valid reason for my not attempting it? I already know the exact depth, contours and diameter of the shafts, and at length find a similar tough ground in the lawn of Miss L. Young, at Toorak.

In the depth of winter, and while the bees are still hibernating, I make shafts in her lawn, of the exact size and contour, and transfer to them pupae obtained from Dandenong. My experiments succeed beyond my utmost expectations. Not only have I colonies established in a convenient location, but I have gained an assistant who has volunteered to observe them daily and keep a written record. The lady's vigil extends over nearly three years, the longest continuous observation of a species recorded in the literature of the science. Here is the order of the amazing generations:

In spring, a brood of virgin females emerge; all have a green head and thorax and apricot-coloured abdomen. There is not a male amongst them, and the virgins will remain in the parental home because there is no sexual urge to call them forth. [The worker-

bees similarly do not depart from the parental hive. It is the true female, the queen, that leaves to found a new home. This rule applies also to human beings; the married daughters depart to found new homes, but the virgin sisters remain with the parents under the natal roof-tree; so do the bachelor sons.

The bisexual brood of these highly-coloured virgins will emerge in mid summer, and all will be jet-black males and females. They mate over the flowers, and the males soon disappear and die. The fecundated mother will depart from the parental nest to establish a new colony elsewhere. In autumn, the progeny of the mated females will mature, but they will be invariably black virgins, and, in due course, *their* children will be the highly coloured virgins of the spring generation.

In concluding my address, I am sure there is little need to assure you that the problems presented by *Halictus* are very difficult to investigate, because of the maze of galleries which transect the architecture in seemingly inextricable confusion. They constitute well-nigh insuperable difficulties in following the activities of any one specific individual, no matter what system of identification is used.

*All species do not have black males.* At Portland, Victoria, there is *Halictus (Chloralictus) paradimorphus* Raym. (*n.s.*), the females of which are hardly distinguishable from *Chloralictus dimorphus* Raym. from Dandenong; but surprisingly, the males are as highly coloured as the females. Portland, alas! is a far cry from my home for the meticulous study of a small bee, but it is clearly evident that vital genetical phenomena await investigation. A diagram to explain the genetical inheritance of the drone of the hive is easily constructed, but the parthenogenetic virgins of *Halictus* require a much more complicated elucidation.

I am not called upon to find an explanation for every observation, but if I am permitted to speculate, then I would say that perhaps the many species of chloralictine bees probably derive as mutations from some basic stock, such as *Halictus erythrinus* Ckll., and whether or not the male is to be coloured is determined by an alteration of its genes.

#### VICTORIAN SEDGE FLORA: CORRECTION

In a recent number of the *Victorian Naturalist* [73: 74 (Sept. 1955)] I recorded *Rhynchospora rugosa* (Vahl) S. Gale as new to Victoria. Mr. S. J. Blake of the Queensland Herbarium has just pointed out to me (personal communication) that the Australian and Malaysian plant is *not* identical with *R. rugosa* of America, and it should be referred to *R. brownei* Roem. & Schult., 1817. Our Victorian representative, *R. brownii*, differs from *R. rugosa* in having larger spikelets and larger, less rugose nuts with non-acute style bases.

—J. H. WILSON

## THE PASSING OF A GREAT ORCHIDOLOGIST

(Rev. H. M. R. Rupp, 1872-1956)

By J. H. WILLIS

*I Background, Schooling, and the Ministry*

Herman Montague Rucker Rupp was born on December 27, 1872, at Port Fairy, Victoria, where his father—Rev. C. L. Herman Rupp—was then the Church of England vicar. His mother (*née* Marie Ann Catherine Rowcroft, daughter of General Horatio Rowcroft, who was an Indian Mutiny veteran) died at the birth, and there was only one other child, Florence—now Mrs. Monypenny, still living in Sydney.

The paternal grandfather had been a schoolmaster at Frankfurt-am-Oder, Germany. In 1847 (the same year as Baron von Mueller's arrival in Adelaide) he emigrated to Australia with his wife, two sons and a daughter; but the father, mother and infant Paul all died during the voyage. The young orphaned Herman and Augusta were adopted by W. F. A. Rucker, a merchant of early Melbourne, and the former child went first to Mr. Brookfield's school, Melbourne, then to Moore College at Liverpool, N.S.W. He was ordained an Anglican deacon in 1862 and priest in 1867; his whole ministry was spent in the dioceses of Melbourne and Ballarat, most of the parishes being in western Victoria (Port Fairy, Koroit, Coleraine and Bunnyong successively). Rev. Rupp senior wedded again in 1874, but there were no children of this later marriage with Rachel E. T. Kirkpatrick. He died at the age of 79 in 1917.

The boy Montague Rupp's first education was received at a small private school connected with the Presbyterian manse at Koroit, Victoria. Next, he attended the Koroit State School for about two years and, at the age of eleven, went for a year to the Junior Grammar School, Geelong, then in charge of his uncle Alfred Rowcroft.

In 1885 he became a boarder at Geelong C. of E. Grammar School, under the headmastership of John Bracebridge Wilson, M.A., F.L.S.—noted educationist and algologist whose wife was the sister of Rupp's deceased mother. Charles Belcher (later Sir Charles, of Kenya) was one of his school-mates who kept in touch over the years. Rupp remained at Geelong Grammar School until December 1891, when he matriculated with first class honours in English and History, and also won the Mary Armytage Scholarship from G.G.S. to Trinity College, Melbourne University. He was prefect of his school in 1891, played in the football team and won the athletic championships for both 1890 and 1891. The Cusack Russell ethnological scholarship, for students intending to enter the Ballarat diocese, was granted to Rupp at Trinity College in 1893. He won the Wyselaskie Scholarship in Natural Science, Melbourne Univer-

sity, in 1896 and graduated B.A. the following year, having failed in his attempt to complete a combined Arts and Science course.

During 1898 he was a lay reader in the Colar Parish and was ordained deacon in St. Paul's Cathedral, Melbourne, in 1899 (by Bishop Goe for the Bishop of Ballarat). He then served as curate of Colac-with-Beeac until ordination to the priesthood by Bishop Green in St. Peter's Church, Ballarat, in 1901 when he became priest-in-charge at Beeac. In 1903 he accepted the offer of senior curacy at Tamworth, N.S.W., under the late Archdeacon T. K. Alhott, and the next year was married by Archdeacon Abbott to Florence Mabel Dowe, eldest daughter of Richard Dowe—a solicitor of Tamworth.

Subsequent appointments were as vicar of: Wariakla, N.S.W. (a parish ranging over about 7,000 square miles of mountainous country toward the Queensland border) from 1904-6; Yea, Vic., where he went because of his father's indifferent health (1906-8); Copmanhurst, N.S.W. (1908-11), and Barraba (1911-14)—again on the rugged north-eastern tablelands of New South Wales.

At the beginning of World War I he was appointed Assistant-Secretary, and later Secretary, to the Australian Board of Missions, travelling through many parts of New South Wales, Victoria and Tasmania from 1914 to 1920. In the latter year he acted as *locum-tenens* at Holy Trinity in Hobart, Tas., and was thereafter rector of St. Aidan's, Launceston (1921-22).

In 1923 he returned to New South Wales, occupying in turn the rectories of Bulladelah (1923-24), Paterson (1924-30) and St. Mary's Church at Weston (Jan. 1930—May 1932). The last two were hard depression years, work was exacting and he left Weston to take three months' rest at Collaroy, following medical advice. September 1932 found him at Pilliga, of which he wrote, "a more dismal, drought-stricken landscape would not be easily found." Then followed temporary work at East Maitland (Feb.-Apr. 1933), after which Rupp resumed his duties as rector, first at Woy Woy (1933-36) and then at Raymond Terrace (1936-39). In May 1939 he retired from the ministry on a pension and lived at Northbridge, enjoying "one of the loveliest views in Sydney". After having moved to the neighbouring suburb of Willoughby in October 1951, he suffered a deterioration in health, and for the last two years he was chronically ill for weeks at a time with cardiac asthma; he died on September 2 last, his wife having predeceased him by only four months.

While at Paterson, Rupp organized a "restoration" of the old church in memory of its first incumbent, the Rev. John Jennings Smith who had taught Queen Victoria before she came to the throne. In the course of these proceedings a Queensland grandson of Jennings Smith offered a stained-glass window with the Jennings Smith coat-of-arms, beautifully coloured; it had belonged to the

donor's father, Harold Selwyn Smith in Melbourne, and now stands near the pulpit of Paterson Church. During September 1948 Rupp paid a last visit to Victoria—to attend the Golden Jubilee of St. Augustine's Church of England at Beac, the first church building erected under his charge.

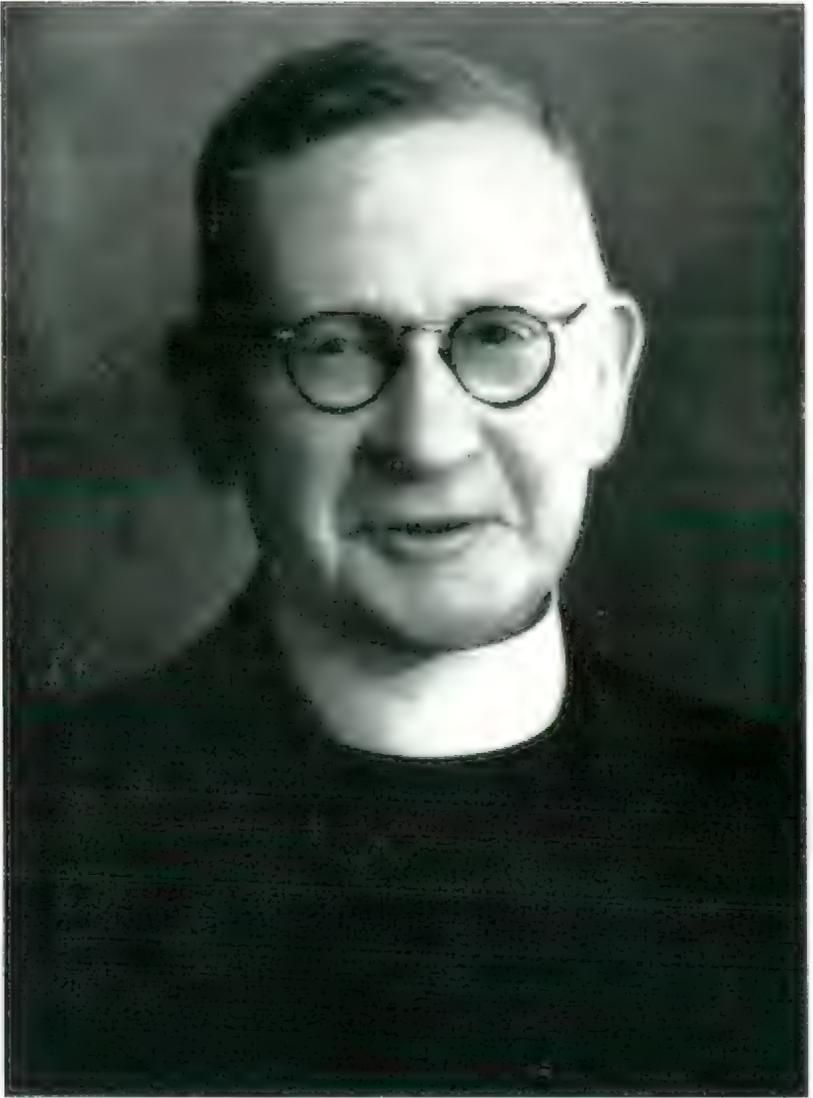
### II. Botanical Attainments

R. D. FitzGerald (1830-92) pioneered the field of all-Australian orchidology and his sumptuous work in colour, *Australian Orchids*, appeared in twelve parts between 1875 and 1894, the final part being posthumous; a little more than 200 species were portrayed and described therein. Since the deaths of Dr. R. S. Rogers (1942) and W. H. Nicholls (1951), undisputed authority in the systematics of our *Orchidaceae* had remained with the Reverend Rupp. Indeed, of this distinguished quartet, it would be invidious to say *who* made the most important contribution; but, with the departure of the last of them, it is certain that a great epoch has closed. Who now will shoulder their mantle?

In a series of three articles for the *Australian Orchid Review*—entitled "Memories of an Orchid Lover" (I, June 1941; II, Sept. 1941; III, June 1945), and also in "Memories of Victorian Orchids" [*Viet. Nat.* 69, 145-6 (Mar. 1953)], Rupp virtually provided a botanical autobiography. His interest in wildflowers, he records, went back to the time of early boyhood at Koroit, where he vividly remembered finding two spider-orchids (*Caladenia dilatata* and *C. patersonii*). While his father was stationed at Coleraine, in far-western Victoria, Montague explored the local bush and, even after he was sent to school in Geelong at the age of eleven, vacations were spent in botanizing around home and as far afield as Wannon Falls toward Hamilton. He often holidayed with the Moodie family at lovely Wando Vale near the Glenelg River, Mr. William Moodie being a nephew of J. G. Robertson who contributed records from that district for Bentham's *Flora Australiensis*—"Wendu" and "Hindu" are the quaint mis-spellings used by Bentham. Rupp compiled a "Catalogue of the Wildflowers of Wando Vale" in 1892.

By the time he left Geelong Grammar, he knew between 30 and 40 different Victorian orchids, some from the rich Torquay-Anglesea coastal heathlands. Later, University vacations were spent at Buninyong, where his father had become rector in 1895, and Rupp was able to record 31 orchids for this small district in 1896. It was during Trinity College days too that he made the acquaintance of Baron von Mueller [see *Aust. Orch. Rev.* 6: 41 (June 1941)] and was thereby spurred on to further botanical endeavours. About this time, two of his best-remembered "finds" were the intriguing Gann Orchid (*Sarcophilus australis*), epiphytic on prickly currant-bushes at Ferntree Gully, and the very rare Stout Sun-orchid (*Thelymitra epipactoides*) at Portarlington in 1897. The Melbourne Herbarium

PLATE III



Portrait by Mrs. C. J. Cox  
The Late Rev. H. M. R. RUPP

has specimens of various dryland plants from the interior of New South Wales bearing Rupp's handwriting and the date 1895, but it is not clear whether he collected these himself during a University vacation or received them from some correspondent.

Everywhere he went, orchids were assiduously collected and studied, and many were the exciting experiences of the chase. In September 1912 at Wollombin, eight miles from Barraba, he found a new species of *Boronia*; this was named *B. ruppii* by Edwin Cheel in 1928. The previous year (1927) Dr. Rogers had named in his honour *Prasophyllum ruppii*—a small orchid from Paterson N.S.W. He made only one ascent of Mt. Kosciuszko, in 1913. During June 1939 he spent a fortnight with his son-in-law, L. C. Cox of Armidale, on the lofty and immensely interesting Barrington Tops. One of his last, but most pleasant, exploits was through the Gannoo Forest (Dulibo district) in September 1950—he wrote glowingly of its floral treasures.

Contacts were formed with many kindred minds in all States: he met the Tasmanian orchid-lover, Archdeacon H. B. Atkinson, while serving his Church in that State, and shortly afterwards Dr. H. I. Kesteven at Bulladelah, N.S.W.—90 species of orchids were found in that rich area. With his fellow orchidologists, Dr. R. S. Rogers and W. H. Nicholls, a large correspondence grew and continued until their deaths; splendid comradeship prevailed between the three and they collaborated variously in a number of researches. Latterly Rupp also collaborated with E. D. Hatch of New Zealand in investigating those orchid genera and species common to both sides of the Tasman Sea.

It is remarkable that such a specialist, whose mind was packed with orchid lore, should have refrained from publication until his 52nd year! Apparently, his first paper was printed in the *Australian Naturalist* for April 1924—"Notes on the Habits of Certain Orchids" (five pages). Thereafter he contributed at least 215 articles to various natural history journals and scientific periodicals, in addition to publishing two illustrated books—*Guide to the Orchids of New South Wales* (1930) and *Orchids of New South Wales* (1943). He also wrote the article ORCHIDS for the forthcoming *Australian Encyclopedia* (now in press by Angus & Robertson Ltd.) Seventy-two of his contributions appear in the *Victorian Naturalist* (with 30 new species), 46 in the *Australian Orchid Review*, 34 in the *North Queensland Naturalist* and 30 in the *Proceedings of the Linnean Society of New South Wales*. Four new genera, all monotypic, and 71 new species are described among his papers and revisional studies of the Commonwealth's orchid flora. One of the new genera was *Cryptanthemas*, the single species *C. slateri* being discovered at Alton Mountain near Bulladelah by E. Slater in November 1931. This extraordinary plant carries out its life-history, the production of flowers included, entirely beneath the

soil, providing an eastern analogue to *Rhizanthella gardneri*—unique and also subterranean orchid in south-western Australia.

For these outstanding contributions to science he received the Clarke Medal from the Royal Society of New South Wales in April 1949, and the Australian Natural History Medallion from the Field Naturalists Club of Victoria in July 1955. Concerning the latter award Rupp wrote whimsically [personal communication]:

I came through the ordeal of the presentation all right, though I was so ill for several days beforehand that they thought the function would have to be postponed. However, they got me there, and the good fellowship of everybody backed me up tremendously. . . . I got on my hind legs and tried to reply. An A.B.C. reporter was there and gave quite a good report on the 7 o'clock wireless. The *S.M. Herald* ignored it. I being neither a negro prize-fighter nor a dubious jockey!"

Four months later (20/11/1955) he wrote sadly, when forwarding an orchid paper for publication in the *Victorian Naturalist*. "The enclosure is my swan-song: I can't write anything more"—and so it proved to be.

For years he had been gathering data for a life of the renowned Tasmanian botanist, Ronald Campbell Gunn, whom he greatly revered. This material is believed to have been sent for publication to the Royal Society of Tasmania, Northern Branch, about 1952, but its fate is not known.

Rupp's large private orchid herbarium, embracing 470 species, had been presented by him to the National Herbarium, Sydney, early in 1946.

His membership of the Naturalists' Society of New South Wales dated from June 1924, the Linnean Society of New South Wales from July 1927, and the Field Naturalists Club of Victoria from March 1934; in February 1953 the F.N.C.V. council conferred honorary Life Membership upon him. The sympathy of all members in this Club is extended to his son and two married daughters who are left to mourn their illustrious father.

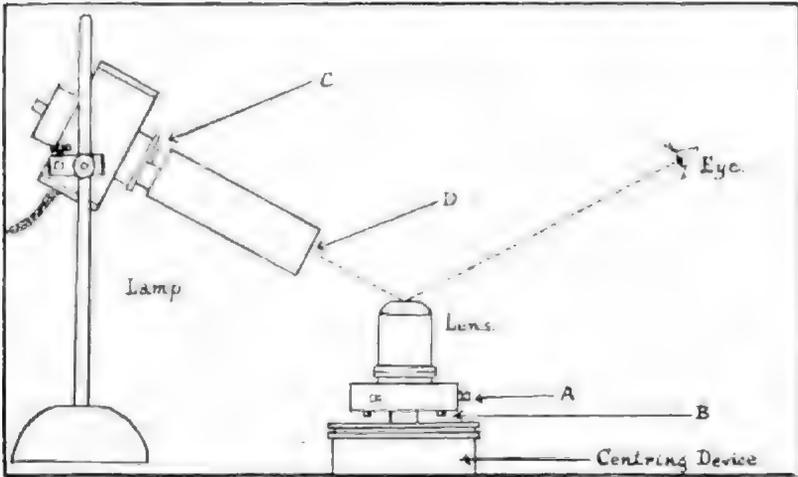
[Much of the material included in this obituary came from autobiographical notes kindly placed at my disposal by Rupp's elder daughter, Mrs. Rachel Cox of Armidale, through Mr. K. Mair of the Sydney Herbarium. The remainder has been gleaned from articles, published by the Rev. Rupp, from personal reminiscences and a voluminous correspondence which I had enjoyed with him during the past 14 years. He was a man of wide culture—a loyal understanding friend, with deeply sensitive nature and a delightful sense of humour that rippled through all his letters—even those written from beds of suffering, or when he was deeply worried by sickness and sorrow among members of his family. Although I met him only twice, for a few hours each time, there was a propinquity of spirit between us, and I shall always treasure my associations with such a life—full and useful far beyond the average, rich and vibrant with helpfulness to others. I have prepared a complete bibliography of his writings, and hope for its publication in some appropriate journal.—J.H.W.]

**ON CENTRING MICROSCOPE OBJECTIVES**

By C. S. MIDDLETON, F.R.M.S., F.R.A.S.

On reading the article entitled "On Cleaning Microscope Lenses" by E. Snell in *Vict. Nat.*, 72: (August, 1956), I was rather perturbed by some statements in it. While agreeing in general with the method suggested for cleaning eyepieces, lens tissue or Kleenex tissue is much better than handkerchiefs as when new it contains no grit—thus lessening the dangers of scratching the lens.

My main criticism is directed at the instructions for the cleaning of objectives. Even a low power objective, when new, is perfectly centred, i.e. the front and back components are centred with each other and only under these conditions can the objective perform at its best. When the components of an objective are unscrewed and reassembled without any attempt at centring, they nearly always screw up to a different position, and are therefore out of centre with each other. While this does not make a very



Centring Process

big difference to the performance of the lens—the loss of from 5 per cent to 10 per cent does render a high quality objective equal to a mediocre lens. Should any members of the Society have followed the advice of the aforementioned article, the following apparatus may make it possible for them to re-centre their objectives.

This centring device, as shown by the illustration, has a mechanical part consisting of a steel ring having the R.M.S. standard thread. This ring is so mounted that it may be centred axially by means of the three centring screws—A on the side and it may be rocked by means of the three screws underneath—B. This is carried on a shaft, which runs in ball bearings and may have a pulley wheel at the bottom as illustrated. This is driven quite slowly, about 120 r.p.m. or less.

To use this apparatus, the back component of the objective is screwed into the ring. An image of the graticule C in the lamp as illustrated, is focused by means of the lens D on to the surface of the back lens of the objective and the six screws adjusted until the image remains perfectly stationary and the objective is revolved. (See figure.) The second lens of the objective

is then screwed into place and the image-forming rays from the lamp are raised slightly to form an image on the second lens. The objective should then be tightened or loosened until this image also remains stationary. Should it be too loose, and therefore liable to unscrew, a little celluloid dissolved in ethyl acetate until it is the consistency of golden syrup may be put on in two tiny spots on opposite sides of the lens mount by means of a pin. Use as little as possible of this mixture, as it may run into the threads and prevent the objective from being unscrewed again.

As advised in the article, all high power objectives should be left for an instrument maker, as they require much more accurate centring and the graticule image is, in this case viewed through a fairly powerful reading telescope.



Lamp and Centring Device

#### LETTER TO EDITOR RE REPORTED BURIAL MOUND AT SUNBURY

Murraba, Coldstream, Vic.  
September 26, 1959

Hon. Editor,  
*The Victorian Naturalist*

Dear Sir,

The mound on Mr. Webb's property near Sunbury, described by Mr. Brunton in the September issue of the *Victorian Naturalist*, was investigated in 1934 by myself and the late D. J. Mahony, then Director of the National Museum. We had heard it was reputed to be a native burial mound, and as such things are otherwise unknown in Australia, we carried out a fairly detailed examination of it. Mr. Mahony was a geologist of some standing, and I had had some experience of archaeological excavation.

The mound stands out prominently from its surroundings, and in general appearance is most artificial looking. Despite this, however, our conclusions were that it is a natural feature and not made by man.

In the open-cut, where some of the mound had been removed for gravel, we cut a clean vertical face right across the centre part, and dug a trench well down below the level of the surrounding ground surface. We thus had a clean vertical section to examine, and were able to study the internal structure of the mound. There were no sloping bedding lines to indicate that the rubble, of which the mound consists, had been heaped up from the surrounding surface. The rubble is of a quite even consistency throughout, showing rather that the mound was carved out of a large deposit of rubble by erosion. At its base there is no clear line of demarcation between the mound and the underlying clay. The one merges into the other.

Towards the centre of the mound there is a mass of darker and more carbonaceous rubble, with an irregular, but fairly well defined, outline. Running through this there are veins of a white clay-like substance. It is this that has been taken for the remains of a burial, or burials, and it has been assumed that the white substance is calcined bone. We found, however, no fragments of bone, and the white material appears to be entirely mineral in character. The white veins continue down into the underlying clay beneath the mound. They have apparently been caused by some process of leaching, by water percolating through the rubble. Within the darker rubble there are some very small fragments of charcoal, but nowhere is there any concentration of these. They may well have been small pieces of wood or root, carbonized, not by fire, but by the slow process of time. The mass of darker rubble had not been inserted into the mound as a burial. The rubble above it had never been disturbed.

There is, thus, no real evidence of burials, and every indication that the mound is of natural origin.

As our findings were all negative, we did not publish any details of them at the time, as perhaps we should have done, but our photographs, plans and drawings were deposited in the files of the National Museum where they may be inspected by anyone interested in them.

Yours truly

D. A. CASEY

## NATURALISTS' NOTEBOOK

(Reserved for your Notes, Observations and Queries)

### NOTES ON THE SPUR-WINGED PLOVER

The habits of this plover (*Lobelia nova-hollandica*) are fairly well known and these notes are not presented as representing anything new. They intend only to record some personal observations of the last few years at Clarence Point in Tasmania.

The bold and fearless strategy of the Spur-winged Plover in defence of its nest and young is common knowledge, and the birds one has watched are no exceptions. Because these birds nest on the ground life may be rather hazardous. But despite the menace of wandering stock, farm implements and so on, the birds appear to return almost to the identical spot each year. The nest, in a tiny depression, contains two, sometimes three eggs, which blend so well with the surroundings as to be very difficult to see. The nest is occupied at night, but in the daytime the sun appears to provide the necessary warmth. One wonders, at times, how many eggs survive the roll of sunless days early in the season.

Any creature approaching is enticed away by the two birds running about and calling loudly to attract attention away from the nest. If this fails, they will take to the wing and swoop on the sometimes unsuspecting visitor.

until he moves away. The Brown Hawk is the worst enemy with which our plovers have to contend. He will wait his opportunity to approach the nest, but usually he is observed in time. There will then be a performance of air acrobatics fascinating in the extreme, until the hawk departs, followed by the plovers. One always returns almost immediately to resume guard over the nest however; the other partner may follow the hawk for some distance.

One morning, a hawk had apparently managed to reach the ground near a nest without first being observed, and two frantic birds flew about above him. Fearing the worst, I ran to take a hand in the matter, and was relieved to find that the enemy had not reached the nest, and all was again peaceful. More often than not only one chick survives, at least one has rarely seen two. When the chick is fairly well grown, there appears to be rather more fraternization between adjoining couples, whose nests are usually a hundred yards or so apart. Perhaps there is a feeling of collective security as the chicks are rather more vulnerable. Once the chick is able to fly the normal gregarious habit is resumed, and by late December they are seen in large flocks. One suddenly finds that some fifty birds have been in the small area under observation. Assisting to keep the pastures clean they are among the farmer's best friends.

On the rocks of the Tamar River bank at low tide, I had noticed that numbers of the small bivalve shell, *Modiolus pulex* were at times dislodged from position, opened and the animal removed, without any apparent damage to the shell. There was some curiosity as to which bird had been responsible, but I have since seen flocks of plovers at the spot several times. On investigation, many freshly opened shells were usually found, so presumably the plovers were responsible. The birds may wait an opportunity to seize the animal when the valves are parted. I have also seen chitons removed from the rocks, but not when plovers were about; these would be hard to shift without damage.

—ROSE C. KERSHAW.

### WHAT, WHERE AND WHEN

#### Future F.N.C.V. Meetings:

Monday, December 10—"Scenes in the Dolomites of Northern Italy", by Dr. G. Christensen of Forest Products Division, C.S.I.R.O.

Monday, January 14—Members' Night, with Mr. and Mrs. F. S. Collier.

#### F.N.C.V. Excursions:

Sunday, November 18—Seville. Subject: Helmeted Honeyeaters and general. Leaders: Mr. and Mrs. Hanks. Take 9.15 a.m. Warburton train to Seville railway station where leaders will meet party. Bring two meals.

Saturday, November 24—Visit to Museum of Mr. S. R. Mitchell, "Arcoona", Overport Rd., Frankston, to see Mr. Mitchell's world-famous collection of Artifacts. Take 9.48 a.m. train to Frankston or meet 10.45 a.m. at Frankston station. Bring one meal.

Sunday, December 9—Geology Group excursion. Details at Group Meeting.

#### Group Meetings:

(8 p.m. at National Herbarium)

Wednesday, November 21—Microscopical Group. Speaker: Mr. A. Tennant. Subject: Metallurgy.

Wednesday, November 28—Botany Group. Speaker: Mr. H. Haase. Subject: "Western Australian Wildflowers", with Kodachrome slides.

Wednesday, December 5—Geology Group. Subject: Origin of Coral Islands. Speaker: Miss B. Nielson.

MARIE ALLENDEY, Excursions Secretary

# The Victorian Naturalist

Vol. 73—No. 8

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No. 876

## PROCEEDINGS

**Honour Conferred on Editor.**—At the General Meeting on Monday, November 12, 1956, Mr. George Coghill spoke in praise of the efforts of our Editor, Mr. N. A. Wakefield, not only in his official capacity, but in organizing sales of the Club's publications. He moved that the Club confer an Honorary Life Membership on Mr. Wakefield. This motion was carried with acclamation.

**Olympic Efforts.**—Volunteers were called to help at a show at Prahran, in setting up and in lecturing at the exhibition of wild flowers being installed by the Bank of New South Wales, and in putting final touches on the nature track at the Sir Colin Mackenzie Sanctuary.

**Poisonous Australian Spiders and their Venom.**—Dr. Weiner's lecture proved most interesting. He pointed out that there are many recorded instances of deaths from spider bite, both of the Red-backed Spider (in all states) and of the Funnel web Spider (mainly in areas near Sydney). He narrated the efforts made and the success achieved in preparing an antivenene, and mentioned that our "red-back" was so closely related, not only to the Katipo of New Zealand but to similar species in South Africa, Eurasia and North America, that antivenene effective with the bite of one gave relief with the others. This had not so far proved to be so with the Funnel-web Spider, though results had been achieved in this case also.

**Membership.**—Mr. A. I. Burns, who first joined the Club in 1916, is entitled to Honorary Membership. Mr. J. C. Johnston was admitted as Ordinary Member. Miss Flora Lloyd of Sumbury, and Mr. A. W. Rose of Kalorama, were elected as Country Members, and Brendon Wilson as a Junior.

## MICROSCOPICAL GROUP

Mr. C. Middleton was the speaker at the meeting on October 17, his subject being "Illumination—with special reference to dark ground". Mr. Middleton referred to and explained the several different methods of illumination in use today, including the Kohler system and Nelson's critical method. He also mentioned the use of the Abbe condenser oiled to the slide, a method which was not used greatly because of its not being well known. The lecturer covered all phases of the subject very thoroughly, exhibiting several types of dark-ground condensers, and mentioned two of the old-fashioned pieces of apparatus which could well be used today, notably the "Leiberkuhn" and the spot lens.

## BOWER-BIRD VISITS MELBOURNE

By N. A. WAKEFIELD

The Satin Bower-bird (*Ptilonorhynchus violaceus*) is widely distributed, particularly in the near-coastal scrubs, from Cape York Peninsula in Queensland to the Otway Ranges in Victoria. It is not the purpose of this article to deal with the species in general, for much has been written about it and the outstanding attributes of these remarkable birds are known to most naturalists. It is intended here to comment on the occurrence of the species in central Victoria, and to put on record the story of the visit of a solitary bird to an eastern suburb of Melbourne in the winter of this year.

In 1909, Isaac Batey wrote (*Emu* 7: 6) that Satin Bower-birds were frequent visitors, in autumn or early winter, to the Jackson's Creek area near Sunbury, up to 1851, but that he knew of none there since that date. He recorded too that the Hurst family of Diamond Creek (Hurstbridge) told him "forty years ago" that these birds used to visit them and attack their fruit.

In A. J. Campbell's *Nests and Eggs of Australian Birds* (1901), it is noted that flocks of about one hundred Satin Bower-birds were often seen in the Gembrook district; but with the turn of the century it seems that this species has become very uncommon in central Victoria.

In Donald Macdonald's nature column in the *Argus* of November 5, 1927, R. A. Paull of "Carn Brea" on the old Monbulk road, reported a bower (which he referred to as a nest) in an adjoining paddock, and he wrote that the bird concerned visited his house "a couple of dozen times a day".

In 1928, F. E. Howe reported (*Emu* 27: 265) that these birds were "plentiful at Whittlesea some years ago" but that he had looked in vain for them there since. Then in 1931, Blanche Miller wrote (*Emu* 31: 14) of a solitary one which came to a garden at Deep Creek on the Keilor Plains, building a bower there and remaining for several months.

Last year a bower and three birds were reported to be at the Maroondah Dam, and from Crosbie Morrison's "Backyard Diary" (*Argus*, July 27, 1956) we learn that one was about Warrandyte during the winter of this year.

For the Melbourne suburban area there have apparently been only three occasions upon which bower birds have paid visits. Gregory Mathews, in *Birds of Australia*, cites a record "on the 17th September, 1906, in the Melbourne Botanic Gardens, supposed to be the first time observed in the city".

In the Melbourne B.O.C. *Monthly Notes* of July 1940, W. Heathcote wrote of a bower which he observed in the same gardens in May of that year. It appears that five of the birds came there "after the 1939 fires" and that one stayed for some time. It built

the bower out of the roots of the New Zealand Christmas tree, and decorated it round about with blue articles, flowers and cicada cases.

News of the latest visitor came to the writer in a letter from Stephen Berrigan of the School of Forestry, Creswick. He told of the arrival of an immature male Satin Bower-bird at his family-home in East Malvern; and the story went thus:

Maybe he found some resemblance to wilder haunts in our big broad Mahogany Gum and massed shrubbery. From the first he adopted the sill of a couple of upstairs windows, shrouded externally by pittosporums (*Pittosporum undulatum*), as the stage for his vocal and gymnastic talents. I say "his" for it has a few flecks of blue on the rump. My Dad first noticed and recognized him and as soon as I learnt of it I absconded and came down home to see him. Though it was very cold for Melbourn, I was out of bed next morning at seven o'clock to hear and see.

He is a fine big bird about a foot long and, though not satin blue, is very beautifully coloured, the delicate green and white crenulations across his broad chest particularly. Already up to his tricks, he cantered up and down the narrow sill, stopping to stare at the window where no doubt he gets a glimpse of himself, all the time singing in great volume. His own "song" (!!) resembles the whirring noise of a tractor's starter motor. But what a mimic! I heard the White-throated Treecreeper and the Kookaburra, although he never broke into the full cry of the latter.

Besides giving this rolling husliand repertoire, he vigorously cavorts along the sill with his "toys" of which he has made a collection—pieces of blue paper, plastic and cloth—the most amusing being a cap off a Biro pen which he sports in his beak like a cigar. Every so often he jacks the window with his strong beak so hard we fear he will soon break it. There's no doubt, we believe, of him noting his reflection, even to the point of vanity, for since one of the windows was washed to see him better, he adopted it exclusive of the other.

Of course, this narrow window-sill is a poor place for a bower—impossible! The wattle-birds make constant attacks on him and the wind and rain blow his "toys" away. But he's there every morning still, from seven till ten, filling the house with his thrilling mimicry. You cannot approach the window without frightening him, but by watching through the crack or round the door when it is ajar, you see it all.

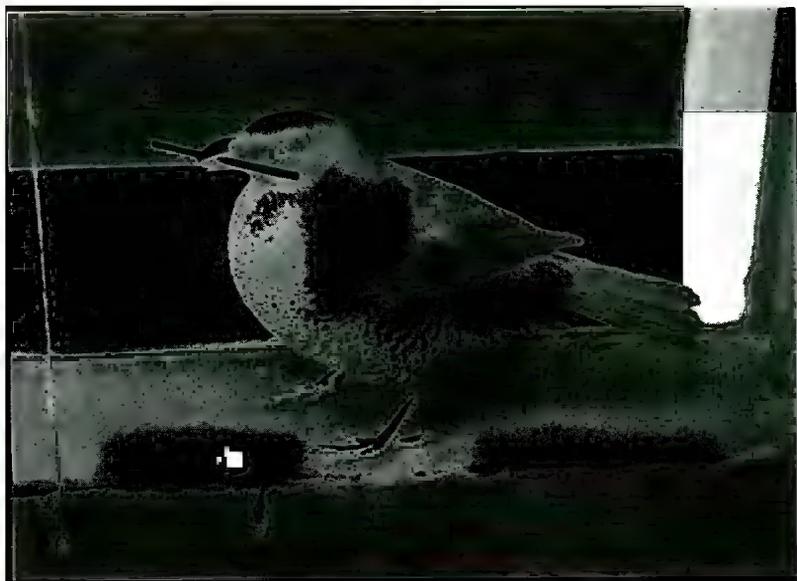
Dad leaves out pieces of fruit for him on the sill, and of these sliced banana is the favourite. Besides this though, his staple food is pittosporum berries. The pittosporums are in full fruit now and I suppose this is the big attraction. We are all thrilled about him and will be sorry to see him go.

Upon receipt of this interesting news, contact was made with "Dad"—Mr. G. S. Berrigan of 41 Grant Street, East Malvern—who proved to be as enthusiastic about the avian visitor as was his son; and he promptly made his house available for photographic and other operations.

One Saturday morning, an early excursion was made with suitable equipment and a ten-minute tape recording was made of the vocal performance of the bird on the window-sill. Conditions were perfect for this operation, with an electric power-point in the room concerned, a corner in which one could sit out of sight, and even a window-catch upon which to hang the microphone.

The result was illuminating. Most of the bird's own notes were short, loud and very harsh, some even resembling the sudden screeching of a White Cockatoo. The main "performing" call was

PLATE IV



Window-sill Performance. with Piece of Knitting-needle.



Approaching the Bower.

the "tractor's starter-motor"—a most apt description—this being rendered quite loudly and sustained, with variations, for about twenty or thirty seconds. Outstanding amongst the mimicry was the call of the Kookaburra; it *did* break into the full "laugh" and rendered this much better than the Lyrebird usually does. It gave, too, a half-minute imitation of the repeated whistling of the White-plumed Honeyeater and a somewhat shorter rendition of the rather similar call of the White-throated Treecreeper. These three items were always done in full voice. By turning up the volume of the recording, one could hear quite plainly the flying calls of a party of Gang-gang Cockatoos and the chorus of a flock of Australian Ravens: these recurred several times each but were normally hardly audible as the performance progressed, and there were always superimposed on them, without breaking their continuity, numerous of the loud, harsh notes of the bower-bird itself.

Much of the bird's time was spent on the window-sills of the house next door, No. 43, so acquaintance was made with the neighbour, Mr. W. J. M. Davey, who proved to be as interested in the bower-bird, and in feeding it, as were the Berrigans. Moreover, his garden, with a great silky-oak and some acacias, as well as masses of large exotic shrubs, was an even more suitable habitat for the bushland visitor. The Davey house, too, was made open for natural history operations.

During August, the activities of the bird were closely observed from time to time. One became familiar with its natural call—a "clear whistle, from tenor down to base", as it is described in *Nests and Eggs of Australian Birds*; this was usually alternated two or three times with a shorter, lower-pitched whistle.

It was noted that the bower-bird often brought a certain piece of blue knitting-needle to the window-sills, and that it always took away scraps of blue cloth that were put out for it. Mr. Berrigan suggested that it must have a bower somewhere, and an unsuccessful search was made amongst the massed shrubbery which surrounds Mr. Davey's garden.

One evening, the latter gentleman reported by telephone that the bird had a collection of blue articles under shrubs in a central garden bed in front of the house. This was taken to be one of those rudimentary bowers such as females and juvenile males sometimes build, but when it was investigated a few days later, it proved to be a perfect playground—platform and bower complete.

It was situated under a Japanese Maple and a large Pink Pearl rhododendron, and it was partly concealed from view by a clump of azaleas. The stick platform was about three feet across and the twin walls of erected twigs made a small but perfect arbour. Sure enough, it was decorated with the scraps of blue cloth, and the piece of knitting-needle was there too. But as well, there were two blue-lettered cream-bottle tops, a large piece of blue glass and one greenish piece, the blue-stained centre of a Biro pen, and about

PLATE V



Location of the Bower: Under the large Japanese Maple.



At the Bower.

twenty-four spikes of the Grape Hyacinth which had been stolen from nearby garden beds.

Naturally, this spot became the centre of interest. Cameras were set up and a number of black-and-white and several colour shots were taken of the bird at the bower. It took no notice at all of two cameras within three feet of the bower, and even the firing of a flash-bulb did not disturb it in the slightest. However, it left the playground immediately anyone moved within sight of it.

Two long pneumatic releases were used, and a front room of Mr. Davey's house was the "hide", with a comfortable arm-chair from which to observe the bird, and with occasional cups of tea! It came to the bower at irregular intervals throughout the day, either to build and decorate, to paint, or to perform; but it never mixed these operations at any one visit.

The actual decorations were of the blue articles already mentioned, and this bird was interested only in the one shade of blue, the deep colour of the Grape Hyacinth. It would not touch the pale blue forget-me-nots in the nearby garden beds. Experiment was made by turning over and shifting the cream-bottle tops, but the bird immediately readjusted these exactly as it had had them originally. On one occasion it had added about a dozen silver milk-bottle tops to the layout—an unprecedented thing for a Satin Bower-bird to do, and what would be expected of its Spotted cousin—but this was only a temporary lapse, for the next day these were all gone and only the blues remained.

The bird spent some time each day picking up and rearranging the sticks of the platform and in pushing more down amongst the erect walls of the passage-way. The latter was done rather forcibly each time, with the head held sideways and with a single strong down-thrust.

More visits were made for the purpose of painting than for building. This should be called "plastering", for the bird would arrive with its beak full of what appeared to be dark material and would carefully and systematically work up and down stick after stick of the walls of the passage-way, nibbling them with its mandibles. Investigation revealed that the medium used was the masticulated pulp of the banana which its human hosts had so kindly provided for its sustenance!

Most remarkable of all were its performances, both on the window-sills and at the bower. It seemed to prefer the former, evidently under the delusion that it had an audience. It usually had something whitish or pale brown in its beak. A favourite article was the yellowish outside skin of an onion; it kept two such pieces at its bower. It might be concluded that brownish articles (such as cicada cases) are playthings rather than ornaments at the bowers.

At one time it would stand high with its body arched and wings slightly raised, appearing quite slim; at another it would fluff out its feathers and droop its wings, thus appearing plump. It would

PLATE VI



"Plastering" Sticks of the Bower—with Banana Pulp.



Performance at Bower, with Onion Peel in Mandibles.

maintain either position, as if in a trance, for a minute or more at a time, giving its "starter-motor" song and its mimicry. Then suddenly it would erect its wings and dance back and forth and up and down, uttering harsh cries, and, when at a window, vigorously pecking the glass. All this was done quite loudly and with the beak clamped on whatever plaything it had in its grasp, only a slight pulsating of its throat feathers indicating its vocal efforts. When such performances were given without anything in the beak, this was still held closed, except for occasional gaping of the mandibles, this not being connected in any way however with the rhythm of the "song".

Sometimes the bird perched on a branch in the dense shrubbery and sang there. On these occasions some different calls were given, and several times a perfect imitation was heard of the cry of a koala. In time, it became apparent that the bower-bird had a definite repertoire of calls and mimicry, and that there were at least several definite sequences in which they were usually given. One learned to recognize its three different kookaburra calls, and it was noted that these, and the honeyeater and tree creeper calls, always followed the "starter-motor". Furthermore, the half-minute imitation of the White-plumed Honeyeater did not vary, it always had exactly the same pauses and runs in its sequence of notes.

The accomplished mimicry of this Victorian bird is particularly interesting in view of the comment made by A. H. Chisholm in 1946 (*Vict. Nat.* 63: 39) that "A. J. Marshall has written that whereas in the Sydney region he rarely knew the Satin-bird to be imitative, he found in the Macpherson Range, Queensland, that mimicry was quite characteristic". Vocal mimicry, by "green" bower-birds, was noted too by Charles Belcher in *The Birds of the District of Geelong, Victoria*; these built a playground on the limbs of a pine-tree, in October 1893.

Furthermore, the Malvern bower-bird was not only a master mimic but also a master architect and decorator, even though it had not assumed its full adult plumage—the uniform blue-black of the old male. There were about a dozen feathers of this colour here and there amongst its greenish and brown plumage, so it was evidently approaching its final adult stage. This indicates that it was probably about five or six years old.

Investigation has not brought to light any reason to believe that this bird was an escapee from captivity. For instance, there has been none at the Sir Colin Mackenzie Sanctuary for at least a year. Its obvious past acquaintance with koala, tree creeper and gang-gang suggests that it came from South Gippsland.

In 1934, A. H. Chisholm wrote (*Vict. Nat.* 51: 128) that the bowers "usually face north and south, with the platform (and its decorations) at the northern end". At East Malvern, the platform and decorations were at the southerly end of the bower. It is interesting that the 1927 report from Monbulk told of the bower-bird

pecking at window-panes, and that Donald Macdonald suggested that it was "jealously fighting its own reflection".

Our suburban bower-bird was reported in the *Age* in the "News of the Day" column, on September 6, 1956, and on October 13, the General Meeting of the F.N.C.V. heard the recording of its vocal performance and saw several colour slides of the bird and its bower.

The final chapter in the story came in a letter from Mr. Davey; on September 20 he wrote:

During the last week, he did no knocking on the bathroom window. This was most noticeable, as since June he had done so much of it. He spent a lot of time at the window, preening and eating and whistling, but not knocking.

The days gradually grew warmer and this may have urged him to change his habits and eventually move away. The condition of the bower deteriorated a little, and on the Thursday we saw him working at it for a short time. It did not look much improved, however.

On the Saturday morning (September 15) it was in fair condition. He seemed unusually friendly that morning and spent a couple of hours on the western window-sill, giving a fine performance there. I was working in the garden quite near and he took little notice of me. He was on the window at 2 p.m. when I left home. At about 3 p.m. Mrs. Davey, who was sitting in the garden, heard him give two piercing calls but did not see him. From that moment we have seen or heard nothing of him.

As I heard nothing from him on Sunday morning I looked at the bower and found it almost flattened. Only a few of the heavier sticks were standing.

I am hoping that no harm came to him and shall look forward to finding him in our garden again some future day.

## INTERMEDIATE LOCALITY FOR VICTORIAN BUTTERFLY

By CECIL L. C. SMITH, Blairgowrie

When the first Victorian race of the small Skipper *Hesperilla crypsargyrea* was found in the Grampians in 1950, it was at once thought that there would probably be an intermediate race in eastern Victoria.

When checking the species of its food plant with J. H. Willis of the National Herbarium, it was surprising to find that the Saw-sedge, *Cobania microstachia*, had not before been recorded from this locality despite the fact that it grows in profusion along the Mt. William track. However, it had been recorded by Baron von Mueller in Gippsland.

In 1954, accompanied by my son Nicolas, I visited the Briagolong area in search of this patch of Saw-sedge. After two days' searching, we eventually found it on a little used forest access track about twenty miles from Briagolong. Here Nicolas netted a male and we took several larvae. On a later visit he took a female and we netted several more males. Their numbers were very limited.

On a recent visit to Mr. N. B. Tindale at the South Australian Museum, it was with some interest that we checked the series from Gippsland with those from the Grampians and the Blue Mountains. This study confirmed the theory earlier put forward by Mr. Tindale, in his paper in the *Records of the S.A. Museum*, that the Gippsland race would be more closely allied to the N.S.W. race *Hesperilla crypsargyrea crypsargyrea* than to the western race *H. crypsargyrea leonardi*.

An interesting feature is that, while the Blue Mountains race is found above 2,000 feet and the Grampians one between 1,800 and 2,000 feet, the Gippsland specimens were taken at an altitude of between 200 and 400 feet.

## A NEW GENUS OF ALPINE LICHENS

By J. H. WILLIS, National Herbarium of Victoria

## USNEACEÆ

**Bibbya** *J. H. Willis*;

genus novum austro-alpinum a *Dactylina* Nyl. proximum differt sporis acicularibus multiseptatis (sporæ *Dactylina* unicellulares globosæ vel ellipsoideæ).

*Thallus* fruticosus, aliquanto radiatus, sparse et irregulariter ramosus [in specie unica usque ad 15 mm. altus, glaber, infra ochraceus, supra ambustobrunnescens nitens, pulvinos madreporiformes vel sub-cerebriformes usque ad 10 cm. in latitudine formans, inter muscos alpinos—præcipue *Andreæ* species—secus rupes crescens]. *Rami* late teres, cavernosi, dactyliformes, sursum insigniter et irregulariter inflati, conferti; apices perobtusî (sub-orbiculati), sparse pertusi. *Cortex* crassus (50-150 mic.), hyphis ad superficiem perpendicularis gelifactus. *Medulla* alba, ex hyphis laxè intertextis et irregulariter ramosis (quæque 2-4 mic. diam.) consistens, centrum excavatum relinquens. *Apothecia* terminalia, discoidea lecanoroidea, rotunda vel distorta [in specie unica usque ad 4 mm. lata, subnigra, hypothecio læte brunneo], amphithecio manifeste formato sed parathecio subnullo. *Asci* clavato-cylindrici, usque ad 70 mic. longi, apice obtusi obnubilantes. *Ascospore* multiseptatæ, hyalinae, obtuse virgiformes [in specie unica 35-40 × 3 mic.].

Hospes algensis protococcoidens.

GENOTYPUS: **B. muelleri** (F. R. M. Wilson) combinatio nova—species unica.

[*Siphula muelleri* F. R. M. Wilson in *Vict. Nat.* 6: 179 (Apr. 1890)].

SITUS: Victoria—Mt. Hotham, inter muscos ad rupes subalpinas alt. 6000' (F. R. M. Wilson, 17 Jan. 1890—HOLOTYPUS infertilis in MEL); Bogong High Plains, "in cracks of granitic rocks at heads of Middle Creek", circ. 5500' (H. T. Clifford, 26 Jan. 1948—MEL); Mt. Stirling, "on granite boulders of eastern scarp", circ. 5600' (J. H. Willis, 8 Mar. 1953—MEL).

## COMBINED GENERIC-SPECIFIC DESCRIPTION

*BIBBYA MUELLERI* (F. R. M. Wilson) *J. H. Willis*

*Thallus* fruticosus, to 15 mm. high, sparingly and irregularly branched, somewhat radiate, smooth and polished, ochraceous beneath, shiny and becoming scorched brown above, forming stone-coral-like or rather brain-like cushions (to 10 cm. in extent) which grow amongst and upon alpine mosses—chiefly *Andreæ* species—on rock surfaces. *Branches* broadly terete, hollow, finger-like, curiously and irregularly inflated upwards, densely compacted; apices very obtuse and rounded, bearing a few large pits. *Cortex* thick (0.05-0.15 mm.), gelified, with hyphæ perpendicular to the surface. *Medulla* white, of rather loosely interwoven and irregularly branched hyphæ (2-4 mic. diameter), leaving the centre hollow; K—, C—. *Apothecia* terminal, discoid and lecanorine, round or variously distorted, up to 4 mm. wide, almost black, with bright brownish hypothecium; amphithecium well-developed, but prac-

PLATE VII

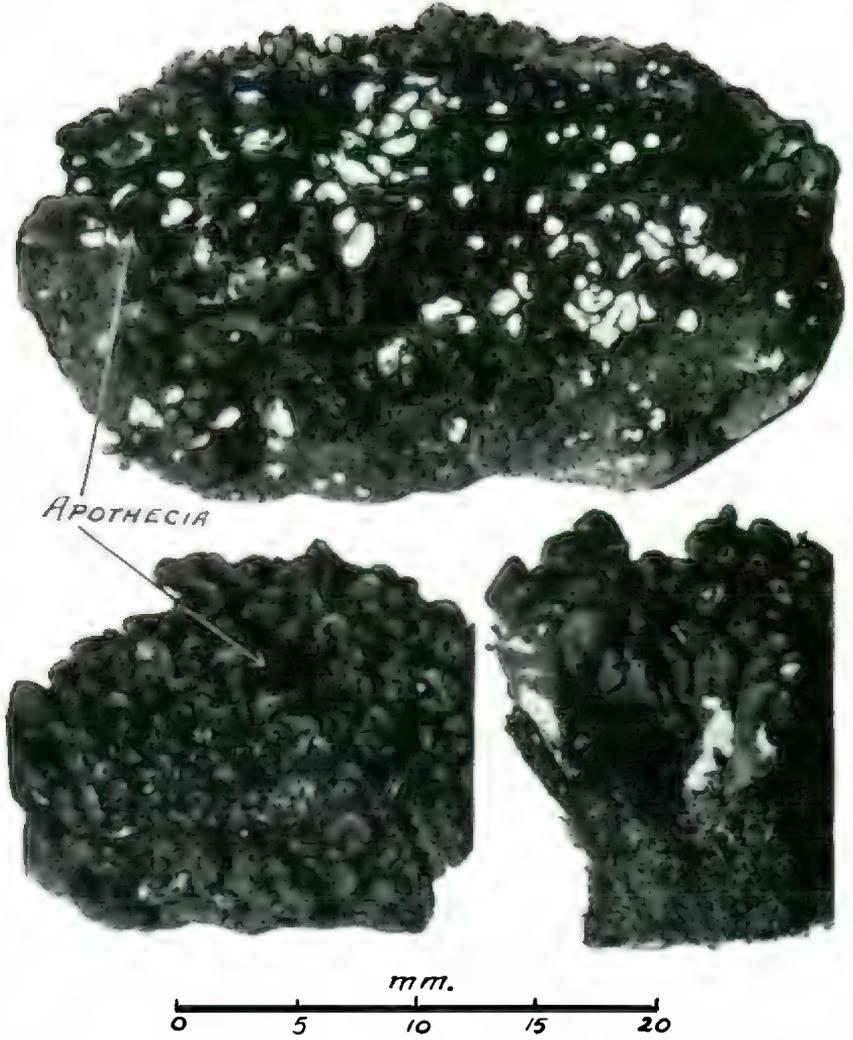


Photo.: H. T. Reeves

*Bibby muelleri* (F. R. M. Wilson) J. H. Willis

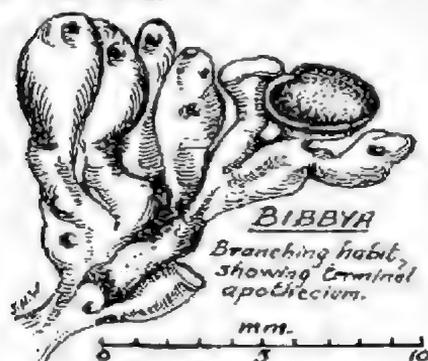
(Parts of three fertile colonies: lower from Mt. Stirling, in plan and elevation; upper from Bogong High Plains, the white patches indicating interiors of hollow branches eaten off by some animal)

tically no parathecium. *Asci* clavate cylindrical, to 0.07 mm. long, darker toward the rounded apex. *Ascospores* multiseptate, hyaline, rod shaped, with bluntish extremities, 35-40 x 3 mic. *Algal host* protodocoid.

#### DISCUSSION

After the deaths of Rev. F. R. M. Wilson in 1903 and R. A. Eastw. in 1920, there was no one in Victoria with a good working knowledge of the lichen flora. About 1940 the late P. Bibby took up the study of these fascinating, if neglected, plants, and in the course of a few years he became the only lichen authority and informant of Australia, corresponding regularly with experts in Europe and America. His untimely death last year was a sad blow to lichenology. One of his most intriguing problems was the true

nature of a rare alpine species which Rev. Wilson had found on Mt. Hotham in January 1890; the specimen was barren, but three months later Wilson described it as *Siphula muelleri*. No other collections came to light for 58 years: then, while Bibby and H. T. Clifford were botanizing together on the Bogong High Plains (Jan. 1948), the latter botanist was fortunate enough to rediscover



**BIBBYA**  
Branching habit,  
showing circular  
apothecium.

*Siphula muelleri*—in quantity and in fruit! The present writer also located material with fruiting bodies on granitic boulders at Mt. Stirling, March 1953. On March 19, 1953, Bibby sent specimens to the world authority on Antarctic lichens, Dr. Carrol W. Dodge of Missouri, who announced (1/6/1953) that a new genus of *Ustulaceae* was involved; he pointed out the differences from other genera in this family and suggested that Bibby go ahead with its formal description. Unfortunately, publication had not been made up to the time of Bibby's death, and I do not even know what he intended to call it. With Dr. Dodge's approval, I now bestow on it the surname of my late friend and colleague—as a permanent, fitting tribute to one who did so much toward the elucidation of Australian lichens and hepatics.

*Bibbya* is most closely related to the boreal *Dactylina* Nyl. which displays a similar madreporiform, hollowed thallus with lecanorine apothecia, but the latter has much smaller, unicellular, spherical to ellipsoid spores. *Endocena informis* Cronh. of Patagonia also has a dwarf, fruticose, radiate and somewhat hollowed thallus, but the surface is chalky and fruiting body unknown. *Siphula*, the genus under which Wilson described *B. muelleri*, is not known in the fruiting condition and all species have a solid thallus.

On the type sheet of *B. muelleri* in Melbourne Herbarium someone had pencilled "*Dufourea madreporiformis?*", and this collection had been placed in the *Dufourea* folder. *D. madreporiformis* (Wulf.) Ach. occurs on the alps of Europe and North America, and is really referable to *Dactylina madreporiformis* Tuck. (1866), differing from *Bibhya* in its much thinner branches and unicellular ellipsoid spores (7-10 × 3-4 mic.). The new genus is almost certainly of Antarctic origin and its occurrence might be anticipated in Tasmania, New Zealand and Fuegia.

## NATIONAL PARKS ACT

By J. R. GARNET

On October 25, 1956, the National Parks Bill was passed by the Victorian Parliament. With its passage has ended a phase of the long campaign commenced many years ago by the Field Naturalists' Club of Victoria and continued unremittingly by the Club and associated organizations—a campaign for a better deal for our national parks, for the conservation of nature and natural resources.

We use the term "phase" advisedly because an Act of Parliament, of itself, can only provide the machinery for establishing our nature conservation areas on a satisfactory basis. The real job remains yet as a task for the future, and naturalists throughout the State will assuredly be called upon to help make the new Act a workable instrument. By reason of their acquaintance with the natural history of the State, its geology and physiography, the ecological associations of its flora and fauna, its scenic places and those of peculiar scientific interest, naturalists can contribute a fund of knowledge which should be of inestimable value to those who are to be appointed to carry out the provisions of the Act.

The debates in Parliament on the Bill tended to confirm an opinion already held by some naturalists, that the F.N.C.V. has been far too modest about the remarkable contribution it has made to the cause of nature conservation. Perhaps many of the present-day members of the Club, as well as parliamentarians, are unaware that Victoria owes to the F.N.C.V. the very existence of the majority of our national parks. The long struggle to have Wilson's Promontory reserved is recorded in early volumes of the *Victorian Naturalist*, but the journal has given little prominence to the representations by naturalists and the subsequent negotiations which led to the proclamation of Wyeefeld, Lakes, Lind, Alfred, Wangan Inlet and Mallacoota Inlet as well as numerous other important nature reserves.

Despite the growth of population and the steady development of economically utilizable natural resources, there still remain areas which should be brought within the ambit of the National Parks Act. All naturalists should be alert to see that such areas are not overlooked when the Authority commences a task which it surely will undertake at an early date—a survey of the State to determine where new national parks should be established.

The Act is recognized as an experimental measure, and it remains to be seen how effective its administration will be. Much will depend on the amount of money the Government will be prepared to set aside for the work (there is no statutory appropriation!) and on the calibre of the individuals chosen to serve on the National Parks Authority. The Act contains only fifteen clauses but the provisions are such that its administration should prove to be reasonably flexible. Some of the clauses warrant comment so that members of the Club will be able to appreciate the problems which will confront the new Authority.

Clause 3 indicates that the Premier of Victoria will be the Minister administering the Act, the objects of which are to:

- (a) provide for the establishment and control of national parks;
- (b) protect and preserve indigenous plant and animal wild life and features of special scenic scientific or historical interest in national parks;
- (c) maintain the existing environment of national parks;
- (d) provide for the education and enjoyment of visitors to national parks and to encourage and control such visitors.

Clause 4 provides for the creation of the office of Director of National Parks who is to be the executive officer of the National Parks Authority.

Clause 5 lays down the constitution of the National Parks Authority, which is to consist of the Premier or his Ministerial delegate as chairman and ten members, including the Director, the Secretary for Lands or his nominee, the Secretary of the Public Works Department or his nominee, the Chairman of the Forests Commission or his nominee, the Chairman of the Soil Conservation Authority or his nominee, the Director of Fisheries and Game, a representative of the Victorian Tourist Bureau, a representative of the Victorian Ski Association, a representative of organizations concerned with the protection of fauna and flora and a representative of persons having a special interest in national parks—the last three being honorary, triennial appointments by the Governor in Council.

Some curiosity may be aroused by the inclusion of a representative of the Victorian Ski Association—particularly when it is understood that none of the existing national parks contains snow-fields in which ski organizations are interested. Indeed, such organizations have shown little evidence of their concern for the welfare of our national parks or with nature conservation movements. The Member for Benambra, Mr. T. Mitchell, a man well known in skiing circles, was responsible for the inclusion of the Association. The Government was forced to accept the amendment which designated this body to the exclusion of a more appropriate representative. The Government was faced with the alternative of acceptance or dropping the Bill altogether to avoid defeat. Those who listened to the committee stage debate in the Legislative Assembly can scarcely have failed to be surprised that one so prone to utter foolish speeches could exert so much influence in the House.

Several organizations much more intimately concerned with our national parks could have furnished a more acceptable representative on the Authority but even had they desired it they had no spokesman in Parliament to urge their cause. The F.N.C.V., in fact, was strongly opposed to private clubs and societies being designated in the Act and its views were made known to all Members of Parliament.

As well as providing for the constitution of the Authority, the same Clause 5 empowers it, as a body corporate, to acquire, hold and dispose of property. From this it may be inferred that the Authority, as time goes on, will function as the Victorian counterpart of the British Nature Conservancy, which is able to acquire, by purchase or through gift sites and objects of peculiar scientific interest and importance which are held in private control.

Clause 7 (1) declares, as national parks, thirteen areas listed in an appended schedule. The Authority thus will assume immediate control of a number of our important nature conservation reserves. The thirteen parks are: Wyperfeld, Kinglake, Fern Tree Gully, Wilson's Promontory, Mount Buffalo, Lakes (Spern Whale Head) Lind (Euchre Creek Valley), Alfred (Mount Drummer), Wingan Inlet, Mullaoola Inlet, Tarra Valley, Bulga and Churchill.

Clause 7 (2) permits the Governor in Council (in effect, the Government) on the recommendation of the Authority to impose, revoke, amend or vary conditions, restrictions and reservations of the terms of dedication of any national park. This provision appears to have been included to leave the way

open for the creation of national parks in areas where is contemplated continuance of some measure of economic exploitation already in operation—timber-logging, for example.

It is unlikely that the Forests Commission would ever agree to the incorporation of, say, the Grampians into our national park system unless it could be assured of the continuity of its right to utilize the timber resources of these mountains. The State Rivers Commission, also, would expect to retain its own measure of control of the region as a water catchment reserve.

*Clause 7 (3)* provides for the classification of national parks. From this we may infer that the Authority can recommend the creation of special-purpose reserves such as fauna or wildflower sanctuaries, scenic reserves, national monuments, and so on. Thus one can envisage Werribee Gorge being declared a national park and classified as a National Geological Monument. A system of classification of nature reserves has been developed and is becoming internationally recognized. Doubtless the Authority will be influenced by this when recommending the classification of our national parks.

*Clause 7 (4)* is of particular importance because it provides that each and every national park, additional to those at present scheduled in the Act, can be declared as national parks only on the authority of Parliament. In other words, new national parks will come into being only by Act of Parliament. Once declared they come under the complete control of the National Parks Authority as provided in *Clause 8*.

*Clause 9 (a)* is worth quoting: "It shall be the duty of the Authority unless inconsistent with any special purpose for which a national park has been proclaimed, to maintain every national park in its natural condition and to conserve therein ecological associations and species of native plants and animals and protect the special features of the park and so far as practicable to exterminate exotic plants and animals therein."

This clause should be read in conjunction with *7 (2)*, *7 (3)* and, possibly, *12* when it becomes evident that the obligation to maintain a national park in its natural condition will apply only to the extent dictated by the "conditions, restrictions and reservations" mentioned in *Clause 7 (2)* or by the classification of the park as determined under *Clause 7 (3)*. Those interested in nature conservation may need to remain watchful to see that their interpretation of the spirit of the Act is kept well to the fore.

*Clause 10* provides that no mining lease or licence shall operate in any national park except with the consent of the Authority. This provision is likely to have considerable value in view of recent trends in mineralogical exploration.

Under *Clause 11* the system of management of national parks by honorary committees is retained and honorary committees may be retained or appointed at the discretion of the Authority. However, all such committees will exercise only such powers as are delegated to it by the Authority to whom they will be responsible.

*Clause 13* established a special National Parks Fund into which will be paid all moneys received in one way or another by the Authority—including the Parliamentary appropriation—and from which its administrative expenses will be paid. The Authority, by the way, will be open to receive gifts and bequests.

Such, in essence, is the substance of Victoria's National Parks Act. The Field Naturalists' Club of Victoria will express the thoughts of all naturalists, conservators and nature-lovers when it records its appreciation of the interest displayed by the Government in sponsoring the Bill and the spirit of co-operation displayed by all parties in permitting the measure to be debated on non-party lines. There is good reason, too, to be grateful to the Premier, Mr. Henry Bolte, for the part he personally played in bringing the Bill into being. Despite its shortcomings and obvious omissions there is now some hope that, at last, there is the prospect of a better deal for Victoria's National Parks and for nature conservation generally.

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## NATURAL HISTORY IN AUSTRALIA: A LIST OF HISTORICAL PAPERS

By BRYAN GANDEVIA<sup>\*</sup>

Material recently collected for a list of papers on the history of medicine in Australia<sup>1</sup> included a number of articles in the field of natural history. Most of these were ultimately excluded from the finished work. However, as I am aware of no reference list of historical papers in this field it seemed that there might be some value in their publication. I know that the list must be incomplete. I would be most grateful to learn of omissions, which I would undertake to collate and publish as a supplement. In particular I would appreciate notification of any papers which have a bearing on the medical history of Australia. For the past two years an effort has been made to collect reprints or journal issues relevant to this study in the Museum of Medical History, Medical Society of Victoria, and I am anxious that the resultant files and indexes should form as exhaustive a reference work as possible.

The list which follows is limited to historical articles published in historical journals in Australia. Separate publications, contributions to overseas journals and newspaper and popular periodical articles have been excluded. Some papers listed in the major work are included here when they are concerned predominantly with natural history or an acknowledged naturalist. Although care has been taken to ensure that the references are accurate, I regret that a complete revision of each entry has not been possible.

Within these limitations, which are unfortunately inevitable as far as the present writer is concerned, the list is presented in the hope that it may be a useful guide for research workers and librarians, and perhaps a stimulus to the production of a more elaborate reference work.

### ACKNOWLEDGMENTS

The work of preparing a bibliography of the history of medicine in Australia was made possible by a grant received from the Wellcome Foundation and the Victorian Branch of the British Medical Association. My thanks are due in particular to Dr. E. A. Underwood and Dr. F. N. L. Poynter, of the Wellcome Historical Medical Museum and Library, for their advice and encouragement, and to the libraries of many institutions in London. Fuller acknowledgment of help received is made in the major work.

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NOTES ON THE INTERTIDAL FAUNA OF THE WEST HEAD,  
NORTH TASMANIA

By ROSE C. KERSTAW

At West Head a fauna typical of the North Coast is developed. It is the fauna of an exposed coast, but it lacks many features of that of the exposed oceanic coast. The gastropod *Melmerita melanotragus* occurs in large numbers here, in contrast to the poor development of this species on the East Coast. The alga, *Hormosira banksii*, is also a noticeable feature of this shore; though not forming an hormosiretum, it nevertheless provides shelter for numerous individuals.

## THE ENVIRONMENT

West Head is the westerly of the two rocky headlands at the mouth of the Tamar River, North Tasmania. Further to the west, Badger Head is another prominent headland. A map and a view of West Head from Badger Head Bay are given by Edwards (1941), who described the coast from the Tamar to Marawah in the far north-west of Tasmania.

The shore line at West Head, proceeding from the eastern or Green's Beach end, is rocky and littered with large boulders. The rock is dolerite, an intrusive lava abundant in Tasmania. In this instance it forms a headland which rises into several hills or three to four hundred feet high. The back shore rises steeply and is clothed for the most part with dense tea-tree scrub. For some distance the rocky shore faces east, then it turns to face the north where there is a levelling out so that one meets what appears to be a wave-cut platform. This is an unusual feature in the dolerite, for this rock is highly resistant and has not commonly formed extensive platforms on the rather youthful Tasmanian coast.

There are two indentations, one of which has a "pocket" beach. Finally the shoreline faces to the west and is backed by vertical cliffs, some a hundred feet in height.

The tidal range at the Tamar is approximately seven feet six inches with a maximum of ten feet at spring tides.\* Little other tidal data is available; however, a tide gauge has recently been installed at George Town near the mouth of the River. So far, indications are that the tide does not necessarily rise or ebb uniformly there. Flood waters entering the Tamar coincident with spring tides result in abnormally high tides. However, these factors are not applicable to West Head which is exposed to the waters and weather of Bass Strait.

Records of the temperature of the sea at monthly intervals taken at the exposed northern aspect of the headland, have been kept by the writer from February 27, 1955, to January 29, 1956. The average temperature for the twelve months was 14.25 degrees Centigrade. (Table 1.) Climatic conditions during the twelve months were rather mild, and it may be that the average obtained here is a little higher than normal in consequence. The temperature was taken inshore, but where possible, at low tide.

The area is one of winter rainfall with maximum winter conditions in July and August, while maximum heat is generally expected in January and February of any year. The range of temperature is a reflection of the normal cycle to be expected. Unfortunately a rigorous time-table could not be adhered to and hence the results have considerable shortcomings; however they may be taken as a general guide. It was found necessary to abandon a continuance of the programme for the time being.

The shore may be classed as an exposed rocky coast experiencing considerable wave action, but it is not oceanic, being centrally situated in relation

\* Information by courtesy of the former Harbour Master, Capt. M. J. MacKenzie.

TABLE 1.—SEA TEMPERATURE

Date	Degrees Centigrade	Date	Degrees Centigrade
1955		1955	
27 February . . . . .	17	2 October . . . . .	12
27 March . . . . .	18	23 October . . . . .	14
1 May . . . . .	16.5	27 November . . . . .	15.5
29 May . . . . .	12		
17 July . . . . .	9	1956	
7 August . . . . .	10	1 January . . . . .	16.5
4 September . . . . .	10.5	29 January . . . . .	20

Maximum Temperature recorded: 29 January 1956—20 degrees Centigrade.

Minimum Temperature recorded: 17 July 1955—9 degrees Centigrade.

Average twelve months—14.25 degrees.

to Bass Strait. Prevailing weather is from the north-west or south-west with winds up to gale force. The average rainfall is in the vicinity of twenty-five inches per annum; the climate is mild and distinct from the super-humid climate further to the west. Easterly winds, sometimes near gales, may bring light rain in the early spring. In an abnormal year such as that during which the above temperatures were taken, easterly weather tended to predominate for a greatly extended period, resulting in considerably increased rainfall and humidity. Normally, greatest desiccation may be expected on the shore in July and in January and February of any year.

The appearance of the fauna and the situation of the area suggest a condition midway between the exposure of the oceanic rocky coasts and the semi-exposed coasts to the south of Tasmania when comparisons are made with the data given by Guiler (1952a) for these coasts. The available data relating to the Bass Strait area has been reviewed by Bennett & Pope (1953) working on the exposed coasts of Victoria.

The terminology used in this work is that adopted by Guiler (1950) in southern Tasmania. Most of the observations recorded were made during the spring and summer of 1954, but this shore has been under observation by the author for a number of years, and more recent notes have also been used.

A site for a transect was selected about three quarters of a mile from Green's Beach at a point where a reasonably wide stretch of fairly level platform could be viewed. At this point the shore faces north and slopes gently into sand below mean low water spring tides.

#### FAUNA

*Supra-littoral*: Terrestrial coastal fauna on steeply sloping back shore. The scrub is the habitat of numbers of small birds, and the mollusc, *Helicarion cuneifer* occurs on the ground. At the edge of the platform the flora has a decided marine facies.

*Supra-littoral Fringe*: The platform slopes gently seaward at the site examined and hence the various zones are relatively wide, compared with other parts of the shore. *Melaraphe unifasciata* Gray is found over some fifty feet, but the population is by no means dense. *M. praetermissa* May is present but is more plentiful at the Green's Beach end of the headland where there is probably more spray due to the rougher nature of the shoreline. *Ligia australiensis* Dana has been observed under stones and amongst dead seaweed.

**Midlittoral:** Initially the mollusc *Melawerita melanotrapas* Smith is dominant and is very plentiful for at least thirty feet. This is not typical of other Tasmanian shores and resembles the occurrence of this mollusc in Victoria. In Tasmania, at least from Bridport east, *Melawerita* is a relatively unimportant species, and this seems to be true also in the far north-west and west. On the present transect it is found over much of the shore, but is only dominant above the main barnacle zone. It is accompanied by *Bembicium nanum* Lamarck rather sparsely, with *Austrocochlea constricta* Lamarck and *A. concamerata* Wood under stones. *Melawerita* may be seen in numbers on the surface just after the tide has ebbed, but later moves under stones, particularly as the heat of the sun takes effect. *Austrocochlea constricta* is well distributed, but not especially plentiful, however, in one of the small indentations on an area of flat shingle with plentiful water at all times low on the shore it is very plentiful. The barnacle *Tetraclita purpurascens* (Wood) occurs very sparsely and most specimens seen were dead.

**Barnacle Zone:** On the transect the barnacles occupy between forty and fifty feet of the shore, but the zone is very variable in constitution and depth as well as in width. The species are *Chthamalus antennatus* Darwin, and *Chamaesiphon columna* (Spengler) with the eroded form of *Tetraclita purpurascens* plentiful in more sheltered positions between rocks. Large uneroded specimens of this latter species occur above the zone as already mentioned, while uneroded juveniles occur near the foot of the mid-littoral. The total depth occupied by the barnacles on the shore is in the vicinity of nine feet, but the actual area in which they are dominant is very much less. In general the zone is easy to trace along the shore. At one point a count of eleven hundred individuals of the first two species was made to the square foot, but only a few feet away only one hundred were present. This is apparently due to the uneven and broken surface. On large boulders the barnacles tend to congregate on the south-east faces, that is, not directly facing the open sea. On the seaward side they are more or less isolated; but on the platform, boulders may be covered on the upper surface.

Below the barnacle zone, the alga *Horosira banksii* appears in gutters. Numerous *Bembicium* and *Austrocochlea* seek shelter amongst the growth. Also observed were two species of star-fish, one individual of the pulmonate, *Onchidella patelloides* Quoy & Gaimard, *Siphonochiton maugeanus* Ledaile & May, groups of *Modiolus pulex* Lamarck, and the anemone, *Actinia tenebrosa* (Farg.). *Actinia* is plentiful, notably in pools, but at the southern end of the headland it is sparsely distributed beneath stones. *Montfortula conoides* Reeve and *M. rugosa* Quoy & Gaimard first appear at this point, on the algae. The limpet *Chiazamnea flamma* var. *mixta* Reeve is also represented by a few individuals.

**Patelloid Zone:** The limpets are sparsely distributed and the rock looks rather bare because of the concentration of the barnacles and that of *Galeolaria*. *Collana salida* is distributed over the exposed surface of this narrow "bare" area, which is soon taken up by patches of tiny barnacles *Chamaesiphon* and *Tetraclita* (uneroded) and patches of small, tightly packed *Modiolus pulex*. As elsewhere on the north coast of Tasmania, *Modiolus* occurs in pure populations, but at West Head it is confined to small patches perhaps a foot in extent. In the West Arm of the Tamar River it is much more extensive and the individuals are much larger. The greatest development of the species however was seen at Bridport on the north-east sector of the north coast where the bivalve covers large areas of the granite boulders and is of "normal" size.

On the sides of boulders and gutters or pools, *Siphonaria diemenensis* Quoy & Gaimard is plentiful. The sea lettuce, *Ulva lactuca* is not common

on the surface *Patelloida alticostata* (Angas) appears but is more plentiful among the *Galcolaria* and below.

*Galcolaria* Zone: *Galcolaria caespitosa* Lamarek forms a thin veneer over the rock, making a conspicuous white zone, which is approximately two feet in depth, generally less. It does not develop masses of tubes in this exposed area, but does so to some extent near Green's Beach where the tubes provide some shelter for *Montfortula* and other forms such as the bivalve *Kellia australis* Lamarek. The large chiton *Panoploea albida* Blainville is present, and one specimen was taken on the worm tubes. *Patelloida alticostata* is generally covered by the tubes, while immediately below them on the smooth rock *Cellina solida* reappears, with the addition of *Conacomoca subundulata* (Angas). *Sypharochiton maugeanus*, *Austrocochlea constricta*, and *A. concaerata* are present throughout.

*Hormosira banksii* (Turn.) DeCanac *Hormosira* is well developed below the *Galcolaria* zone and commonly has *Cystophora* associated with it. These algae shelter numerous gastropods. *Hormosira* covers a good deal of the surface but is not continuous. It appears to reach its maximum development near the worm tubes and below them. It is of some importance in sheltering the fauna.

*Coralline* algae: A turf of corallines is present at the foot of the littoral. Mollusca are plentiful and include the gastropods *Dicathais bailyana* (Tension-Woods), *Comiella lineolata* (Lamarek), *Submucella undulata* (Solander), *Austrocochlea concaerata* (Wood), *Chlorodiloma odontis* (Wood), while below stones there are juvenile *Fasciolaria (Plexoploca)*, *Micrastraea aurea* (Jonas), *Nolukaliotis ruber* (Leach), and the chitons, *Ischnochiton elongatus* (Blainville), and *Ischnoradisia oenuda* (Sowerby). The bivalve *Kellia australis* is also present beneath stones when there are also present sponges and other encrusting organisms to which it often adheres. Several small gastropods are often attached and others are partly buried in the debris below. The algae harbour others of the small forms; however, it is not intended to discuss these here. A small crab unknown to the writer, is also present.

*Infralittoral Fringe*: The algae appear to form a dense population from here for some distance off-shore. The belt is important not only to the fauna it harbours, but also to the shore as there is a noticeable deadening of the wave action at low water. Among others *Phyllospora comosa* is noted, but the constituent species have not been investigated.

Ascidians are present but do not appear of importance.

#### SUMMARY

These notes have been made while investigating the mollusca and hence refer particularly to these animals. The main species appearing on the shore have been noted and generally show similar features of occurrence to those of other parts of the north coast of Tasmania which have been visited by the author. Individual differences of importance occur, such as that of the development of *Mollusca* at Bridport which may be due to local conditions of the environment. There are some affinities with the Victorian coast, of which the most noticeable is the development of *Melaneris* which here is the most extensive yet seen in Tasmania. The exposure is not oceanic and lacks species found only on such shores. It is considerable, however, and there is a nice grading of exposure with consequent variation in constitution as the shore is followed easterly to Green's Beach. However, markedly sheltered conditions do not occur as they do for example at Stanley where the exposure grades into a sheltered mud flat with numerous *Salinator solida*, but these soon give way to open beach conditions with usual North Coast beach bivalves, as at Green's Beach.

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## DIURIS PALACHILA: SPECIES OR HYBRID?

By W. I. WILLIAMS

Doubts must always assail the student of Victorian orchids as to the validity of the species *Diuris palachila* Rogers. During the period 1928-34 I found the orchid on several occasions close to the Grampians, chiefly in the Pongnial area. There, it was invariably associated with large displays of *Diuris pedunculata*, with an admixture of *Diuris maculata*. On all occasions, only one or two specimens of *Diuris palachila* were found.

During a visit to Lake Eyans in early October 1956, I again came across the orchid, in a spot where *Diuris pedunculata* (the early, lemon-yellow form) was abundant, and where there were also several specimens of *Diuris maculata*. One clump, consisting of five specimens, was observed, and a further very doubtful specimen occurred about a quarter of a mile away. These specimens could be divided into three groups for purposes of study. In the clump referred to there were two stems of three flowers each which were in complete agreement with published descriptions of *D. palachila*. In the same clump were three stems of two flowers each which differed in some respects from the first group. The lone specimen differed still further. I shall refer to specimens in each of these three categories as A, B, and C, respectively.

Specimen A had the general formation of *Diuris pedunculata*, but was of a much more golden yellow; the dorsal sepal and the labellum were marked with brown blotches or spots. The labellum was of the typical spade shape, coming to a pronounced point, though not so long or so sharply pointed as the labellum of *D. pedunculata*. The basal plate had three raised lines, the central one continuing as the central ridge of the labellum proper, as happens in *D. pedunculata*. The two outer lines, however, did not remain parallel or converge, as is characteristic of the last-named orchid, but diverged, as do the two lines in *D. maculata*. The labellum was divided, as is the case in both *D. pedunculata* and *D. maculata*, into three lobes. The two outer lobes were denticulate, but much smaller than those of *D. pedunculata*. The lateral sepals were parallel or slightly divergent.

Specimen B differed in the following respects: It was lemon-yellow rather than golden. Except for a thin streak on either side of the saddle ridge of the labellum, it was innocent of brown markings. The labellum, though broad and generally spade-shaped, did not come to a point; in fact it was slightly

indented, as is commonly the case in *D. maculata*. One flower on the stem carried its lateral sepals parallel, as in *D. pedunculata*; the other carried them crossed, as in *D. maculata*.

Specimen C had a lip which was in nearly every respect like the lip of *D. maculata* enlarged to about twice the normal size. The whole orchid, including the backs of the lateral petals, was faintly touched with brown upon an otherwise lemon background. The plate at the base of the labellum, however, showed a somewhat indistinct central line, as in *D. pedunculata*, while the main section of the middle lobe tended to spread in the horizontal plane rather than to be saddle-shaped as in *D. maculata*. The lateral sepals were crossed.

All three specimens carried lateral petals that lay in approximately the same plane as the dorsal sepal (as in *D. pedunculata*), but the petals were more nearly orbicular (as in *D. maculata*).

If the theory that the parents of *D. palachula* are in fact *D. maculata* and *D. pedunculata* has as much foundation as I think, then in specimens A, B, and C, we clearly had to do with three hybrids varying only in their proximity to one parent or the other. If any observer has noted *D. palachula* growing entirely divorced from *D. pedunculata* and *D. maculata* or has found the orchid in numbers, then the theory would be weakened considerably.

#### OBITUARY: GEORGE BAXTER PRITCHARD

Dr. G. B. Pritchard, well-known Melbourne geologist and former member of the Field Naturalists Club, died at his home in Hawthorn on August 2, 1956, and was interred in the Springvale Cemetery four days later.

He was born on October 17, 1869, at Gravesend, Kent, England, but when he was three his father died and his mother, *née* Annie Baxter, an Australian, returned with her small son to her family in Victoria. He spent his early life in Melbourne where he was educated at Scotch College. From there he went on to the Melbourne University, but before he had completed his engineering course he decided that his chief interest lay in geology and kindred sciences. He went to Adelaide for a year, where he did some work in science subjects. When he returned to Melbourne, he was given an appointment at the Working Men's College, now the Melbourne Technical School, in the School of Mines Department where he remained until his retirement in 1934 as head of the Department. While attached to this College he lectured at the Melbourne University in Dental Metallurgy and he, together with Dr. T. S. Hall, was acting Professor of Geology at the Melbourne University for three years. While lecturing at the College he took out degrees from the Melbourne University; B.Sc. in 1908 and D.Sc. in 1911.

His association with the Field Naturalists Club commenced in 1902 and for many years he was a most active member. On several occasions he contributed papers on geology and conchology to the Club's meetings and in 1910 he published a most useful book, *The Geology of Melbourne*, a work which, because of its value to field geologists, has become very scarce.

After his retirement Dr. Pritchard continued to live an active life. He spent a year or two teaching part-time at Trinity Grammar School at Kew and at the beginning of the 1939-45 war he returned to his old school, Scotch College, to assist teaching science subjects, as a large number of the young teachers had left to join the armed forces. He remained there for eight years and when he left he retired from teaching completely. Throughout his long life he had worked on geological surveys and he continued to do these when required (usually for oil search purposes) until his fatal illness. At the age of 80 he commenced to compile data on the life of his uncle, Robert Hoddie, Melbourne's first surveyor. Miss Irene Pritchard hopes to complete this work.

Dr. Pritchard was a life member of the Old Scotch Collegians Association and a foundation member of the Council. He was appointed vice-president of

the Association during the centenary celebrations of the college. He was a member of the American Association of Petroleum Geologists and a member of the Geologists Society of London.

For most of the above information I am indebted to Miss Irene Pritchard.

—D. J. DICKISON

#### OBITUARY: FRED LEWIS, 1882-1956

Mr Fred Lewis, J.P., Vice-President of the Field Naturalists Club of Victoria, whose death occurred on August 7, 1956, was a man who will be sadly missed by all who knew him and by many others to whom he was perhaps but a name. His long and active association with nature conservation movements has ensured for him a place in the memory of Australian naturalists and a special place in the hearts of F.N.C.V. members.

In 1905 he joined the State Government Service as an officer of the Fisheries and Game Section of the Ports and Harbours Department and, when the Section became a separate office in 1910, transferred to what then became the Fisheries and Game Department. Of the latter he became the Acting Head in 1914. In 1924, at the age of 42, he became Chief Inspector of Fisheries and Game and permanent head of the Department, an office which he held with distinction until his retirement in 1947.

It was as the Department's Chief Inspector that Mr. Lewis became known and respected alike by naturalists, conservators, sportsmen, professional fishermen and hosts of others throughout the State and beyond its borders. His strong influence in shaping the policy of his Department is reflected in its present high status and in the scientific approach of its officers to the problems of nature conservation and the protection of the wildlife with which it has to deal.

He was never content to make a decision without the justification of facts, and it was this trait that led him to undertake investigations of great biological importance. Thus, rather than accede to the demands of a vocal group that some animal should be added or removed from the list of protected species, he preferred to investigate first the biological implications, and then, from the facts gleaned in the field, to determine a course of action. Such work took him to almost every part of the State, and the first-hand knowledge of our indigenous fauna so obtained has been a notable contribution to our knowledge of the natural history of a number of them. One need mention only the Koala, Mutton Bird, Loran, Lyrebird and Seal to recall such work published by him as official Government Reports or as papers and articles in such journals as the *Victorian Naturalist*, the *Emu* and *Wild Life*. His most publicly recognized achievement was in the steps he took to ensure the preservation of the Koala which, by 1910, had become almost extinct in this State. Thanks largely to Fred Lewis the animal is now firmly re-established in safe sanctuary.

He did splendid work too in having marram grass planted at Cape Woolamai, over thirty years ago, when serious sand drifts threatened to destroy the mutton bird rookeries there. Through this timely action the whole area was saved and there are more birds breeding there now than there were at the beginning of the century.

It was inevitable that a man of his quality and sympathies should, on his retirement, seek to maintain his interest in the conservation of our native fauna and flora. In 1948 he joined the Field Naturalists Club, a body with which, in his official capacity, he had always enjoyed amicable relations. In the following year he was elected Vice-President, and from April 1951 to June 1955 was the Club's Honorary Secretary, an office he held with distinction. He represented the Club on several important deputations to Ministers of the Crown on occasions when matters affecting national parks and nature protection were discussed. He was the Club's delegate to the Victorian

National Parks Association, of which body he was a foundation member of Council. His association with our national parks, wildlife reserves and fauna sanctuaries was intimate and of many years standing, and at the time of his death he was a member of the Committee of Management of the Sperm Whale Head (Lakes) National Park.

He was a good "mixer", a courteous and friendly man who seemed perennially young. Among his recreations was photography, and in this he excelled. His black-and-white studies of native animals were a notable feature of Melbourne photographic exhibitions, while his Cine and colour films of nature were a delight to see. The F.N.C.V. has reason to remember gratefully a number of his nature talks which invariably were illustrated by such films.

—J. R. GARNER

#### OBITUARY: F. A. CUDMORE

Frank Alexander Cudmore was elected to F.N.C.V. Membership in May, 1912, according to an early membership list issued as a supplement for the April 1913 issue of the *Victorian Naturalist*. He was elected to the Committee in July 1924 and served for one year; he was nominated for committee for the next year but not elected, and as far as I know he did not serve the Club in any other official capacity during his long membership.

Frank, as he was known to all his friends, was never really happy in the midst of things, being much more at home behind the scenes doing the necessary work quietly and well and taking a delight in the jobs that demanded much more patience than is given to the average individual. His close association with the Royal Society of Victoria as their Honorary Librarian and his position as Honorary Palaeontologist to the National Museum were just suited to his temperament, and many years of careful work in both positions saved for the future much valuable literature and fossil records. As a one time Assistant Librarian working under him at the Royal Society, I remember well there were no short cuts allowed in the standard practice he laid down.

Very early in his life he showed a great interest in collecting fossils of all sorts. He later specialized in the Australian Tertiary forms and amassed an enormous collection of Tertiary marine items from almost every known locality. He travelled far and wide in his search and on one occasion made an extraordinary trip by boat down the Murray River collecting from the cliff sections and landing wherever possible to search further inland. Every specimen to him was worth care and proper attention and his accuracy in recording localities was second to none, so that the Cudmore collection soon became known for its wealth of material and perfect record.

I remember well his technique of pouring plaster of paris into hollow specimens that came to light when collecting in the blue clays of Balcombe Bay, then the cutting out of a solid block of material for later development at home. By this means he was able to obtain good examples of very thin rhinoceroses frequently with spines in place, something not possible by the collecting methods usually employed. I remember too his method of driving iron spikes into cliff faces at Torquay, Victoria, and his climbing up them to reach a good specimen or a convenient ledge to work from. There were no short cuts taken and care in collecting was instilled in all who were with him at the time.

His vast Tertiary collections were housed in beautifully built cabinets, it being felt that nothing makeshift was worthy of holding those wonderful relics of past days. Some years ago the whole collection in these cabinets was transferred to the National Museum, Melbourne, where they now remain as a monument to a great worker and a source of research material on the Victorian Tertiary deposits that will never be excelled.

As Librarian to the Royal Society he noted current literature and brought important items before fellow workers and it was in doing such things that

I believe he was happiest. It was difficult to persuade him to write anything and almost as difficult to get him to talk to an audience. He was not happy even in collaboration and I feel sure we are the poorer in knowledge for this introspective attitude.

Probably not many present members of the F.N.C.V. know that Frank Cudmore did much in his quiet way to further the Club's interests, and many a clue to an important item of Natural History knowledge came to me as Honorary Secretary from him. For instance he told of experiences with Wedge-tailed Eagles on sheep stations, that give us some good points in a "Shoot the Eagles Campaign" we as a Club were fighting.

Ill health came upon him and the loss of his wife made a great difference to his social activities which, at the best, were never very prominent, and gradually he withdrew from his earlier associations and in recent years one heard of him only at odd times. He was a frequent visitor to my home and he enjoyed the company of the naturalists who gathered there. He felt the break-up of this association a great deal and I think here we saw the real man more closely—a kindly person, interested in Natural History beyond his fossils and able to take part in the conversation, adding his quota of items of interest.

To me his passing means that one more of the old school naturalists has gone, and such do not seem to develop so readily nowadays. Vale Frank Cudmore—a good friend and a good fossil hunter!

Following are items written by F. A. Cudmore and published in the *Pictorian Naturalist*:

- 1924 Vol. 41, p. 146 (Report on the) Excursion to Mornington.
- 1926 Vol. 42, p. 232 A Complete Corallum of *Thamnostraca sora*, Duncan. illust.
- 1926 Vol. 43, p. 78 Extinct vertebrates from Beaumaris.
- 1928 Vol. 45, p. 132 Fossil Collection (Report of a visit to inspect the Cudmore Collection at his Home).

—F. S. COLLIER

## NATURALISTS' NOTEBOOK

(Reserved for your Notes, Observations and Queries)

### GIPPSLAND SPRING

Spring is here in this Gippsland mountain gully. Above the thicket of pittosporum and blanket-wood the sides of the gully are glowing with the wattle shrubbery, and the gums reach up beyond them, while pink heath and tetraheca cluster round their feet. In this particular spot, I lately saw a lyrebird fly down the gully at dusk. Its nest is fifty yards up the creek, hung precariously on the side of a huge gum tree. How that untidy mass of sticks and dry moss hangs there is a miracle.

Last week I startled a wallaby on the hillside, and there are often koalas to be seen. Some of the gums with thick bark have regular tracks up them where these "monkey bears" climb. Rabbits too have their home here; while wombats live a truly glorious existence, if the number of holes is any indication of their enjoyment. As the car went up the track a few nights ago, one lumbered across in its pathway.

About here there are birds galore—fantails, wrens, parrots, wattle birds, magpies, golden whistlers, and mountain thrushes, to list but a few. There is one friendly thrush who comes for lunch scraps each day. Further down the gully there is the home of a coachwhip bird with a few yellow robins' nests. Almost straight above, high in a very tall gum, there is an eagle's nest—an unruly bundle of sticks forming a rude platform. Some of the sticks are as thick as a man's arm, and as long.

Helmet orchids, greenhoods (three types), mosquito orchids, are flowering

at present. There is a tree orchid in bud which still has last year's withered flower stem hanging from it. Away at the top of the gully there are many banks of the tiny helmet orchids with their maroon caps, yellow centres, and striped "sideboards". The nodding greenhoods dance on a sunny slope: with a few tinier ones with several heads to each stem, quite nearby. In some patches of this very rich countryside it is impossible to walk through the bush without standing upon orchids of some kind.

A few yards below in the creek there are beautiful little fern bowers—tree ferns with moss of many kinds mingled with kangaroo fern upon their trunks. There are other tree ferns with fieldia and young musks growing upon them. In places there are huge canopies of clematis over the tree tops, with—woe to the unwary explorer—masses of vicious nettles below them. The gully is so damp that it is quite unsafe to grasp a sapling to help pull oneself up the crumbling sides of earth and leaves—as likely as not the tree itself will come down upon you.

There is a lyrebird calling down the gully now, and the thrush is warbling above. From the top end of the gully there is a view to the north of miles of green cultivated country—flats and rises, with an industrial centre in their midst, stretching away to the blueness of the Raw Baws, where snow is gleaming.

EULALIE P. BREWSTER, "Nerreman", via Leongatha

#### WHAT, WHERE AND WHEN

##### F.N.C.V. Meetings:

Monday, January 14—Members' Night, with Mr. and Mrs. Colliver.  
Monday, February 11—Members' Picture Night

##### F.N.C.V. Excursions:

Sunday, December 16—Botany Group excursion to Sherbrooke. Take 8.55 a.m. train to Upper Ferntree Gully, then Olinda bus to Sherbrooke Junction. Bring one meal and a snack.  
Saturday, January 5—Tremont to Boronia. Leaders: Mr. and Mrs. D. Lewis. Take 9.18 a.m. train to Upper Ferntree Gully, then bus to Tremont. Bring two meals.  
Sunday, January 20—Botany Group excursion to Sherbrooke. Subject: Continuation of Botany census. Take 8.55 a.m. tram to Upper Ferntree Gully, then bus to Kallista. Bring one meal and a snack.  
Sunday, February 10—Geology Group excursion. Details at Group meeting.

##### Group Meetings:

(8 p.m., at National Herbarium)

Wednesday, January 16—Microscopical Group. Subject: *Entomostroea*, of the common water flea. Speakers: Mr. McInnes and Mr. Evans.  
Wednesday, January 30—Botany Group. Subject: Acacias. Speaker: Miss V. Balaam.  
Wednesday, February 6—Geology Group.

##### Preliminary Notices:

Sunday, February 24—Parlour-coach excursion to Sorrento. Leader: Mr. Strong. Subjects: Marine Biology and General. Coach leaves Batman Avenue at 9 a.m., returns approximately 8.30 p.m. Fare 17/-. Bring two meals. Bookings with Excursions Secretary.  
Thursday, April 18, to Monday, April 22 (Easter)—Dimboola, under the leadership of the Wimmera Field Naturalists Club. Hotel accommodation is available and bookings, with £2 deposit, should be made with the Excursion Secretary by February 25. Further details in February *Naturalist*.

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

# The Victorian Naturalist

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## PROCEEDINGS

GENERAL MEETING, DECEMBER 10, 1956

The President reported that Dr. Wishart was making satisfactory progress after his recent illness, and that Mr. Chas. Oke, one of the older Club members, would be pleased to receive visits from members.

*Shows.*—The President congratulated and thanked Mr. Brooke for his organization of the Prahran show, and also those who helped towards its success, particularly Messrs. Sarovich and Hooke. Mr. Rayment was congratulated on the excellence of the wildflower display staged by the Bank of New South Wales. It is proposed to hold a Club Show in 1957, and members will be advised on the matter early in the year.

*Policy.*—In furtherance of the policy outlined at the Annual Meeting, a circular has been prepared and sent to kindred societies in Victoria, inviting their help and co-operation. The suggestion was made that a committee of experienced members should be appointed to help Council in this matter.

*Subject for the Evening.*—Dr. G. Christensen, of the C.S.I.R.O. Forests Products Division, gave an illustrated travel talk on the Dolomites of Northern Italy. He included some slides of Switzerland, too, for purposes of comparison. Mr. A. A. Baker spoke on dolomites generally and pointed out that Australian occurrences were fresh-water sedimentary rocks and not marine deposits as in Europe and elsewhere. A vote of thanks to the speakers was carried by acclamation.

*Election of Members.*—Mr. G. M. Boddy of East Geelong was elected as a Country Member, and Mrs. Boddy as a Joint Country Member. Two nominations for membership were received.

*State Floral Emblems.*—Mr. H. C. E. Stewart referred to previous attempts by a committee to establish as a State Floral Emblem the Common Heath, *Epacris impressa*, and as a Tree Emblem the White Mountain Ash, *Eucalyptus regnans*. Council is to explore the matter further.

*Junior Age Nature Record.*—Mr. J. R. Garnet stated that the Age, Native Plants Preservation Society and Junior Chamber of Commerce has organized a competition for the compilation of lists of native plants, and he suggested that members might give the scheme their sympathetic co-operation.

*Nature Notes and Exhibits.*—Mr. Garnet commented on the prevalence this season of the Cineraria Moth and of dragon flies

Mr. Brooks showed home-grown *Callistemon* and *Melaleuca*, and Mr. Atkins one of the many forms of *Correa reflexa*.

Mr. Sarovich exhibited introduced land shells, *Helix pisana*, from Torquay. Other members commented on the abundance of that species in the Bellarine Peninsula and Geelong district.

Mr. Baker tabled samples of dolomite rock.

#### GENERAL MEETING, JANUARY 14, 1957

The President extended a welcome to all members, and best wishes for the New Year. It was decided to send a letter to Mr. Rayment, conveying good wishes from the Club and the hope that he would soon be well enough to attend meetings again.

*Cultural Centre.*—Mr. George Coghill drew attention to the renewal of activity towards the establishment of a Cultural Centre at Wirth's Park, and suggested that the Club should indicate its interest in the matter. The President agreed to pursue the matter further immediately.

*Subject for the Evening.*—Mr. Stan Colliver was welcomed; he expressed pleasure in once again being back with the Club, and conveyed greetings from the Brisbane Club. He then showed a number of colour slides illustrating geology of Queensland, native flowers, the Currumbin Bird Sanctuary, David Fleay's Fauna Sanctuary, and the whaling station on Moreton Island. The President expressed the appreciation of members for this most interesting lecture.

*Election of Members.*—Mr. W. J. Begley and Miss Thelma J. Dusting, of Surrey Hills, were elected as Ordinary Members.

*Invitation to Bendigo F.N.C.*—It was decided to invite the Bendigo Club to visit Melbourne for a week-end in October; and it was suggested that the B.O.C. be asked to assist with their entertainment.

*Re-discovery of Thylacine.*—Mr. Stewart suggested that the Club send a letter of congratulation to the Tasmanian Government Fauna Protection Board on the re-discovery of the Thylacine (Tasmanian Marsupial "Wolf" or "Tiger").

*Mr. J. H. Willis.*—The best wishes of the Club were extended to Mr. Willis who is to leave shortly for a year overseas in connection with his profession.

*Nature Notes and Exhibits.*—Mr. D. E. McInnes showed a Water Flea, with young in its brood pouch.

Mr. Swaby exhibited a branch of Wentworth Flame-tree and twigs from various native plants, to indicate that now was the time to make cuttings.

Mr. Woollard gave notes on the Fringe-lily, and Mr. Colliver on the marine stinging animals of Queensland.

## EDITORIAL

This issue of the *Victorian Naturalist* is a special one, being devoted almost entirely to original contributions in the field of systematic botany. The papers concerned are published with a view to finalizing some of the necessary revision to the classification of groups of Victorian vascular plants, so that the new names provided will be available for use in forthcoming botanical works. This number is being subsidized by the Maud Gibson Trust Fund, the trustees of which are organizing the preparation of a new key to the Victorian flora.

## VASCULAR FLORA OF VICTORIA AND SOUTH AUSTRALIA

(Sundry New Species, Varieties, Combinations, Records  
and Synonymies)

By J. H. WILLIS, National Herbarium of Victoria

## Gramineæ

## STIPA NIVICOLA J. H. Willis:

species nova alpina, distinctissima seriei "*Striata*" (sens. D. K. Hughesae, 1921) inserenda, ex affinitate *S. pubescentis* R.Br. et *S. nervosae* J. W. Vickery sed ab utroque præcipue differt: statura minore (culmis quam 40 cm. brevioribus), foliis rigidis teretibus subpungentibus omnino glabris nitentibus, inflorescentia vix exserta pauciflora (spiculis usque ad 16), arista robustiore minus hirsuta (ad partem inferam omnino glabra), antheris minutis (ut videntur, 1-1.5 mm. longis).

LOCUS: VICTORIA (boreali-orientalis)—Bogong High Plains, "associated with *Eucalyptus niphophila* along grassy slopes of Middle Creek near Rover Scout Hut", alt. circa 1650 m. (HOLOTYPE in Herb. MEL, PARATYPE in NSW, K—J. H. Willis, 2 Feb. 1949); loc. cit (MEL.—J. H. Willis, 10 Jan. 1946).

Glabrous tufted perennial. *Leaf-blades* up to 20 cm. long, rigid, almost pungent-pointed, tightly inrolled and terete (except at ligule), about 1.5 mm. wide at base when flattened out, lower convex surface shining and without grooves, upper (hidden) surface shallowly grooved, minutely scabrid along the incurving margins; *sheaths* 3-4 mm. wide when flattened, often brown or purplish, with up to 2 deep dorsal grooves, the apical auricles manifestly ciliate and up to 1 mm. high; *ligule* very short and truncate, forming a minutely ciliate rim. *Culms* rigid, glabrous, grooved, up to 40 cm. high and 1-1.5 mm. in diameter; nodes 1 or 2, minutely pubescent. *Panicle* tardily spreading, its base scarcely or not exerted beyond the uppermost leaf-sheath, up to 15 cm. long (awns included), few-flowered (less than 16 spikelets in all materials examined); branches and pedicels filiform, angular and very minutely scabrid, the latter 10-20 mm. long widening beneath spikelet and bearing a few forwardly-appressed hairs. *Spikelets* narrow, elongated, mostly erect. *Glumes* almost equal, about 20 mm. long, hardly diverging, glabrous, thin, chaffy, translucent and purplish, the shortly acuminate apices hyaline and soon torn; first glume finely 3-nerved almost to apex, second or upper glume slightly wider (about 2 mm. when flattened out), 5-nerved below and 3-nerved above, both glumes showing a few scattered, irregular, transverse connecting venules toward their apices. *Lemna* narrow, cylindrical, 13-15 mm. long and

about 1 mm. in diameter, pale brown, bearing scattered appressed whitish hairs almost to the summit, with longer denser pubescence toward the very short callus (about 0.5-1.0 mm.), very minutely papillose above, upper margins without obvious lobes. *Awn* strongly articulated, stout, rigid, 7-10 cm. long and about 0.4 mm. in diameter at base, straight for about 3 cm. and slightly twisted, then trigonulate, the column occupying about two-thirds of total length, minutely pubescent with white forward-pointing hairs (except for the lower 20 mm. which is almost or quite glabrous and shining). *Palea* glabrous, 10-12 mm. long (almost equalling lemma). *Anthers* 3, linear and exceptionally small (only 1-1.5 mm. long in material examined).

#### Discussion

This distinctive grass was at first believed to represent a stunted high-mountain form of *S. pubescens* R.Br., but further investigation of its foliage and floral morphology (especially the proportion of glumes, lemma and awn) has convinced me that a distinct and hitherto-undescribed species is involved—an opinion endorsed by Miss J. W. Vickery in a letter to the writer (5/2/1953). *S. nivicola* falls within Miss D. K. Hughes' group *Striatae* [see *Kew Bull.*, 1921] and approaches nearest to *S. pubescens* and *S. nervosa* J. W. Vickery (1951) than to any other species. It differs from both, however, in the shorter very rigid and almost spiny foliage, much shorter culms, very few-flowered (to 16) scarcely exerted panicles and comparatively longer glumes, lemmas and awns (which are very stout and glabrescent in their basal parts). The anthers (to 1.5 mm. long) are exceptionally small for the group *Striatae*, but may not have been fully developed in the several flowers opened for inspection.

The new species would seem to be endemic on the Bogong High Plains, Vic., above 5,000 ft., and has been noted there only in a limited area—heads of Rocky Valley, Wild-horse Creek and Middle Creek, eastern slopes of Mt. Cope and at Buckety Plain. A. B. Costin records *Stipa pubescens* for his *Eucalyptus niphophila* Alliance [see *Study Ecosyst. Monaro Region N.S.W.* 365 (1954)], and it would be interesting to re-check the identity of this plant from sub-alpine terrain in south-eastern New South Wales.

#### Proteaceae

**HAKEA VITTATA** R.Br., var. **GLABRIFLORA** J. M. Black;

varietas nova a planta typica perianthio (sed non pedicello) omnino glabro solum recedit.

[Vite et. J. M. Black *Flora N. Aust.* vol. 3, p. 265 (1945).  
—descriptio Anglica non Latina]

**FRAGATIO: AUSTRALIA MERIDIONALIS**—Stirling East (**HOLOTYPE** in Herb. AD 95643058, ex Herb. J. M. Black, J. B. Cleland leg. Aug. 1944—"about 12 plants near Stirling E. school"); Stirling East (Herb. AD, ex Herb. J. M. Black, J. B. Cleland leg. 6 May 1944). **VICTORIA**—"Mallee" [probabiliter prope Stationem "Pine Plains"] (Herb. MEL., ex Herb. C. Walter, C. French Jur. leg. Oct. 1898).

The purpose of this note is to legalize the late J. M. Black's epithet (which was published as a variety, but without the obligatory diagnosis in Latin—*see* reference above) and also to record an occurrence of this plant in north-western Victoria. A good specimen, bearing flowers (up to 6 per cluster), fruits and seeds, has been annotated in detail by Black and is located in the newly-established State Herbarium of South Australia; this I have examined and now designate as **HOLOTYPE**.

The sole constant departure from *Hakea vittata* R.Br. var. *vittata* is in the *totally glabrous* perianth; but scattered, appressed, centrifixed hairs beset

the pedicel as usual. Black (*loc.*) further differentiates his new variety by specifying fruits 20-25 mm. in length, as against 17-20 mm. in the typical hairy-flowered plant. Such a distinction, however, cannot be upheld, because fruits of the latter form frequently attain 30 and even 35 mm.—as noted in material at the Melbourne Herbarium. The type of var. *glabriflora* shows a maximum leaf-length of 5 cm., whereas leaves on the single Victorian "Mallee" collection range to 7 cm. Frequently but not always, var. *vittata* exhibits a distinctly curved or even uncinate spine at the leaf-tip, but all specimens of var. *glabriflora* (known at present) have pungent points that are quite straight. Length, thickness, and curvature (or not) of apical spine, in the leaves of hairy-flowered var. *vittata* itself vary astonishingly: a stout form from the South Australian "Murray scrub" (*leg.* F. Mueller, about 1850) has many leaves that are only 2.5 cm. long (1") but 2 mm. in diameter.

[See Jean Galbraith, *Ilakea vittata*, "Black" and "White" in *Viet. Nat.* 66: 179 (Jan. 1950)].

### Santalaceae

*EXOCARPOS LEPTOMERIODES* F. Muell. ex Miq. in Nederl. Kruidk. Arch. 4: 103 (1856)

*E. aphylla* Benth. *Flora-Aust.* 6: 230 (1873) pro parte, Ewart (1930) et al., non R.Br.

The true identity of R. Brown's *Exocarpos aphylla* has for long been in doubt. Bentham's description under this name covers two quite distinct leafless plants: (1) a dense bush 2-6 ft. high, with stout thick (to 4 mm.) ultimate branches (narrowly grooved between the numerous, close-set, broadish, flattened ridges), crowded inflorescences and almost globoid, smooth (but minutely pubescent) fruits which at maturity surmount very broadly swollen, bright-red fleshy stalks; (2) a small divaricate tree, usually 6-12 ft. high, with more slender branches (widely grooved and with rather fewer, more acute intervening ridges) and pyramidal, persistently white-hairy, manifestly furrowed fruits (to 5 mm. long) with conspicuous flattened and swollen stigmatic annulus at the summit (the fleshy stalk being rather inconspicuous).

The writer forwarded material of both entities to the British Museum (Nat. Hist.) for careful comparison with type *E. aphylla*, and Mr. J. F. M. Carron of that institution very kindly advised (13/3/1956) that, although the Brownian type is without fruit, its stem striations closely match those of the first plant briefly described above, viz. the small stoutly branched bush with smooth globoid fruits (my specimen from Sreaky Bay, S. Aust.—*leg.* A. J. Hicks, Dec. 1953). This means that true *Exocarpos aphylla* is restricted to near-coastal, rather arid tracts of South and Western Australia, extending from Yorke Peninsula across Eyre Peninsula (as far north as Warramboo) and with isolated occurrences in the western State (e.g. between Esperance and Grasspatch).

The different, larger, eastern plant, until now known as *E. aphylla* in Victoria, requires another name and the possibilities were *E. dasytachys* Schlechtendal (1847) and *E. leptomerioides* F. Muell. ex Miq. (1856)—both cited as synonyms of *E. aphylla* by Bentham (*loc.*). Herr K. Werner communicated his opinion (29/6/1956) that the type of *E. dasytachys* in Schlechtendal's herbarium (at Halle, Germany) is identical with *E. cypressiformis* Labill.—a very different species from *E. aphylla*. On the other hand, a haplotype specimen ("Murray scrub") of *E. leptomerioides* in Melbourne Herbarium conforms well in stem striations, to the Victorian Mallee tree with pyramidal furrowed fruits, and it is my opinion that this name must replace that of "*E. aphylla*" in the floras of Victoria, New South Wales and Queensland; both species, however, occur in South Australia.

## Chenopodiaceae

## ATRIPLEX PAPILLATA J. H. Willis:

species nova ob formam perianthii fructiferi inter congeneras valde distincta planta sat parva, 1<sup>2</sup>) annua, monoica, caulibus pluribus prostratis stramineoloribus usque ad 30 cm. longis; foliis cinerea, dense farinaceo-papillosa, lanceolata vel linearia, plerumque 1-2 cm. longa, sepe fasciculata, marginibus subintegris involutis; flores masculi in glomerulis paucis globosis terminalibus; flores feminei 2-4 in axillis foliorum quae quam inflorescentiae masculae inferiores sunt; perianthium fructiferum 2-5 mm. longum (praecipue 3-4 mm.), 2-3 mm. latum, irregulariter trilobatum vel subflabellatum, basin versus ab appendicibus conspicuis irregularibus mollibus papilliformibus dense obtectum, bracteolis duobus saltem usque ad medium connexis.

**VAGATIO:** VICTORIA (boreali-occidentalis remota)—"Gypsum workings, about 4 miles south-west of Nowingi" (*HOLOTYPE* in Herb. MEL, *PARATYPI* in AD, NSW, R—J. H. Willis, 28 Aug. 1955); "Clay-pan at Nowingi" (MEL—E. Ramsay, 23 Jul. 1950); "Edge of a salt-pan at Raak" (MEL—E. Ramsay, 2 Nov. 1949); "Gypsum flat, about 7½ miles south of the 65-mile post on Sturt Highway west of Mildura" (MEL—J. H. Willis, 3 Sept. 1948).

In habit and superficial appearance, the new species somewhat resembles *A. leptocarpa* F. Muell., but the fruiting perianths are very dissimilar. Branches of *A. papillata* are prostrate, slender, straw-yellow and almost glabrous, contrasting with the sage-grey mealy-papillose narrow and involute leaves (appearing almost fasciculate on the shortened lateral branches). Male inflorescences consist of one to several dense, yellowish, globose clusters of flowers at the ends of branchlets, the female flowers being in aggregates of 2-4 in lower leaf axils (both immediately below and also remote from the male inflorescences).

Within the group of species having equal flattened fruiting-bracteoles, united for more than half their length and bearing conspicuous appendages, *A. papillata* approaches *A. acutibracteata* R. H. Anderson and *A. cornigera* Domin; but it differs from these and all other Australian congeners in the numerous, large, irregular, soft papillae which form a star-like cluster around the base of the fruiting-perianth. The upper smooth part of the bracteole is flattened, irregularly tridentate or almost flabellate, and the whole is minutely farinaceous-granular. The few known Victorian occurrences have all been on temporarily damp clay-flats highly impregnated with gypsum, and the species will most probably be found to extend over similar terrain along the Murray lands of South Australia and into far south-western New South Wales.

*BASSIA RAMSAYÆ* J. H. Willis:

species nova ob formam et dimensiones perianthii fructiferi *B. brachyptera* (F. Muell.) R. H. Anderson atque *B. chinapsila* F. Muell. affinis, sed a priore pilis foliorum appresso-villosis (non arachnoideis) et praecipue perianthii fructifero pubescenti lateraliter exalato spinis multo longioribus differt: a *B. chinapsila* foliis semper dense pilosis, perianthio fructifero ad basin excavato atque spinis manifesto complanatis (discum palmatipartitum formantibus) certe recedit.

*Perianthium fructiferum* 2.4 x 2.3 mm. (nna cum spinis), coroniforme, perianthio complanatum, leviter 10-costatum, in parte media minute pubescens; tubus caudiformis 1.5-2 mm. longus (ad basin circiter 0.5 mm. tenuis excavatus); spinae 3-6, divaricatae, valde complanatae, basin versus = coalescentes (in disco indurato horizontali), earum 3 usitate longiores (1.5-2.5 mm.) et 2 pauciores ad apicem renatae; semen horizontale, sed usitate obliquum.

**LOCUS:** VICTORIA (boreali-occidentalis remota)—"Meridian Road about 5-6 miles south of Benetook" (*HOLOTYPE* in Herb. MEL, *PARATYPE* in NSW—E. Ramsay, 1 Jul. 1950); "Sandalong, near Mildura golf-links" (MEL—E. Ramsay, 21 Mar. 1950).

The new species seems most closely related to *Bassia brachyptera* (F. Muell.) R. H. Anderson, which is fairly common in the same region. It has a similar squat fruiting-perianth with hollowed base, horizontal seed and fused spines, which form a horizontal wing-like disk, but the perianth is hairy and without vertical wings (cf. glabrous and narrowly 5-winged in *B. brachyptera*) and the unequal flattened spines protrude far beyond their irregularly fused bases (cf. 5 small equal spine-teeth to the pentagonal and quite horizontal disk or wing of *B. brachyptera*). *B. ramsayae* is also a more upright plant than *B. brachyptera* and its leaves, although villose with appressed hairs, lack the long interwoven arachnoid hairs so characteristic of the latter species, *B. costata* R. H. Anderson (from Central Australia) and *B. schimopsila* F. Muell. show an approach in the configuration of their ribbed fruiting-perianths, with 5-6 spines; but the perianth of the latter is without an excavated base (it usually has 1 or 2 hardened decurved basal lobes or flaps) and its seed is vertical or almost so, while the spines in both are comparatively longer and neither flattened nor webbed with a connecting wing as in *B. ramsayae*. In many fruits sectioned, the seed was found to be abortive (minute and shrivelled up).

The specific epithet is a tribute to Mrs. E. Ramsay of Red Cliffs, whose energy and high enthusiasm have been responsible for the discovery of this and several new species in her district, also for other important additions to our Victorian Mallee flora during the past decade.

**BASSIA CAPUT-CASUARI** F. H. Willis.

species nova ab faciem perianthii fructiferi distinctissima: suffruticulus decumbens, multiramis: rami = glabrescentes; folia crassa, teretia, apice subobtusata, circiter 4-7 x 1 mm., leniter pilosa; flores numerosi, in axillis solitarii; perianthium fructiferum (una cum spinis) circiter 2-3 mm. longum et latum, paulum complanatum, in longitudinem pluri-costatum, minute et sparse pubescens, tubo cadiformi 1.5-2.5 mm. longo (a base 0.5-1 mm. tenuis excavato), spinis 2 valde divaricatis quarum una multo latior (1 mm. tenuis) lateraliter complanata subobtusaque (spina tertia minuta saepe adest); scutum abortivum in ieructu, horizontale.

**LOCUS:** VICTORIA (boreali-occidentalis remota)—"Meridian Road, about 5-6 miles south of Benetook" (*HOLOTYPE* in Herb. MEL, *PARATYPE* in AD, NSW, BRI, CANB, K—E. Ramsay, 1 Jul. 1950).

The specific epithet ("cassowary's head") was chosen in allusion to the curious shape of the fruiting-perianth, which has no parallel among other Australian species of *Bassia*; in form it also somewhat resembles a miniature tea-pot or watering-can. At maturity the fruiting structure is barrel-shaped, more or less flattened, finely pubescent, vertically ribbed and produced into two very unequal appendages—the shorter one acicular, the other much broader laterally-flattened and obtuse, with the aspect of a shoulder-like extension or high asymmetric hump to one side of the perianth tube which is manifestly excavated at its base. A third very small spine is often present between the two major excrescences.

In its larger hollowed appendage, the perianth of *B. caput-casuarie* bears a striking resemblance to that of *Babbagia acroptera* F. Muell. var. *demissa* J. M. Black—a smaller glabrous plant occurring in the same region—but the latter is entirely spineless. In view of the fact that seeds on the type specimens of the new *Bassia* are totally abortive, it may perhaps represent a natural

inter-generic hybrid between some *Bassia* species, e.g. *B. uniflora*, and *Babbagia acroptera* (or even *Thelkeldia salustiginosa*): but, whatever its origin, the occurrence of spines on the fruiting-perianth demands classification for the present under *Bassia*.

#### Mimosaceae

#### ACACIA NANO-DEALBATA J. H. Willis:

species nova *A. dealbata* Link maxime accedit, sed statura minore, foliis minoribus, foliolis brevioribus approximatis ferme glabris, fructu comparate multo latiore (eius longitudo quam latitudo minus utraque sexies longior) distinguitur.

**VAGATIO:** VICTORIA (in montibus)—"Poley Hill in Melb. & Metrop. Board of Works O'Shannassy Reserve, about 10 miles north-east of Warburton, in forest of *Eucalyptus delegatensis* at 4200 ft. [ $\pm$  1300 m. alt.]" (*HOLOTYPE* cum fructibus in Herb. MEL. *ISOTYP* in NSW. K—J. H. Willis, 18 Feb. 1954); Mt. St. Leonard (*PARATYPE* cum floribus in Herb. MEL.—Keith Watson, 31 Aug. 1954); "Rowallan Scout Camp at foot of Mt. Charlie, Macedon Ranges near Riddell, growing with typical *A. dealbata* along a permanent creek" (MEL.—J. H. Willis, 24 Jan. 1954); "Camel's Hump, Mt. Macedon" (MEL. etiam NSW, No. 8636—J. H. Willis, 1 Sept. 1945); Lorne (NSW, No. 8637—E. E. Pascott, Feb. 1922).

Small montane or subalpine forest tree 2.6 m. [6-20 ft.] high, often of bushy habit; bark smooth on major limbs and branches, quite glaucous on trunks of young saplings and the angular branchlets of older trees. Bipinnate foliage retained throughout life. *Leaves* to 10 cm. long (usually much less) and 2-4 cm. wide; pinnæ close-set in 10-20 pairs, 10-20 mm. long, paripinnate, with one large prominent hemispherical gland at base of each pair. *Leaflets* 13-30 on each primary pinna, almost touching or even overlapping [cf. *A. dealbata*, with spaces between all the leaflets], each 1-2.5 x 0.5-1 mm., obtuse; the surfaces obscurely and minutely tuberculate, with a few very short minute hairs, but appearing green and glabrous [cf. forwardly-appressed white hairs on leaflets of *A. dealbata*]. *Inflorescence* consisting of short axillary or large terminal panicles of bright yellow heads. *Flower-heads* globose, with 20-30 flowers (as in *A. dealbata*) on very short, almost glabrous peduncles. *Individual flowers* 5-partite, 1.5 mm. long at expansion; subtending bracteole with slender hairy claw and lateral or almost peltate fringed lamina. *Calyx* with tube half as long as corolla, obconic, broadly- and shallowly-lobed above; sepal points acute, ciliate and somewhat recurved. *Petals* lanceolate, with rather granular margins. *Pollen* polyads 40-55 mic. diameter, composed of 16 grains (as in *A. dealbata*). *Pod* oblong, 4-6 x 1-2 cm., at optimum development no more than six times as long as broad, and then with about 9 seeds [cf. seven or more times as long as broad in *A. dealbata* where, if only six times, then with about 5 seeds], straight, flat, smooth, purplish flexible. *Seeds* rather obliquely arranged, broadly oblong-elliptic, about 4 mm. long, black and shining, with conspicuous white aril at base and short, straight, slender funicle (all exactly as in *A. dealbata*).

#### Discussion

This small montane tree flowers in early spring, and obviously bears a close relationship to Silver Wattle (*Acacia dealbata* Link.)—hence the specific epithet. When I first observed *A. nano-dealbata*, at the western limit of its range (viz. South Bullarto, in the Wombat Forest near Daylesford) during 1937, I was inclined to regard it as a stunted, small-leaved condition of the well-known *A. dealbata* (which may become a tall forest tree, to

100 ft.). The subsequent examination of plants, growing with but quite distinct from *dealbata*, in the Mr. Macedon area (and elsewhere) has revealed significant differences in foliage and comparative dimensions of pods. Leaflets in *A. unum-dealbata* are virtually glabrous (only a few very minute hairs), obtuse at the apices, never more than 2.5 mm long and almost touching or even overlapping along the sides of the rachis, whereas those of *A. dealbata* are distinctly hairy (often copiously), more or less acute, always exceeding 3 mm. in length, and separated from each other by narrow spaces; the former plant also has a comparatively much wider pod—less than six times as long as broad. The new species has a rather wide distribution in south-central Victoria, but is not abundant; there are no indications of its occurrence in any other State.

#### ACACIA GRAYANA J. H. Willis;

species nova *A. microcarpa* F. Muell. affinis, sed phyllodis angustioribus, pedunculis hirsutis, sepalorum laminis latioribus, fructu multo latiore (duplo vel triplo) et praecipue seminibus funiculo longo bigenulato recedit.

**LOCUS:** VICTORIA (occidentalis)—"Woraigwern Parish, south of Kiata and about 14 miles west of Dimboola, on sandy ground near margin of Little Desert" (**HOLOTYPE** cum floribus in Herb. MEL—*A. J. Gray*, 10 Sept. 1951; **PARATYPE** cum fructibus in MEL—*A. J. Gray*, 24 Feb. 1951; **MEIOTYPE** cum floribus in MEL—*misit A. J. Hicks*, 30 Nov. 1955, ex "Kiata-wildflower display" Oct. 1955).

Tall shrub or small spreading tree 2-3 m. [to 10 ft.] high. Ultimate branchlets slightly angular, puberulous. *Phyllodes* glabrous, olive-green, rather dense, each 1-3 cm. x 1.5-3 mm [to 5 cm long in vigorously growing seedlings], linear, very shortly petiolate, with sharp uninate-mucronate apex; marginal gland small, rather obscure, situated 2-8 mm. above base of blade (even more obscure and 10-15 mm. above base in *A. microcarpa* F. Muell.), nervation consisting of a single rather prominent central vein, with obscure lateral reticulate venation (often appearing as longitudinal wrinkles, as in *A. microcarpa*). *Inflorescence* a reduced axillary raceme of 2-4 heads on a short common axis, the whole about half the length of subtending phyllode. *Flower-heads* globose, bright yellow, with 20-30 flowers (as in *A. microcarpa*), each on a shortly white-hairy peduncle 5-10 mm. long [cf. almost glabrous in *A. microcarpa*]. *Individual flowers* 5-partite, 1.5 mm. long at expansion; subtending bracteole long-clawed with few large hairs, the densely fimbriate terminal lamina appearing almost peltate. *Calyx* half as long as corolla, the spatulate and strongly fimbriate sepals being free almost to base [laminae wider and more fimbriate than is usual in *A. microcarpa*]. *Petals* rather membranous-papyraceous, prominently veined, lanceolate-elliptic, with contracted granular-papillose apices. *Pollen* polyads 35-45 mic. diameter, composed of 16 grains (as in *A. microcarpa*). *Pod* 3-5 cm. x 6-8 mm [cf. up to 3 mm. wide in *A. microcarpa*], linear, straight, more or less constricted between seeds, subcoriaceous, flexible, deep purplish-brown at maturity. *Seeds* 2-4, longitudinal to slightly oblique, about 6 x 3 mm., elliptic, black; aril very small and basal, passing into a long sigmoid funicle with double fold ( $\pm$  4 mm. long) on one side of seed [cf. the large embracing aril and very short, non-folded funicle of *A. microcarpa*].

#### Discussion

Unfortunately, the new species was known only by a single naturally-occurring tree (now dead), but seedling progeny has been brought into cultivation at Wail Forest Nursery, etc. It is most closely related to

*A. macrocarpa*, a familiar Mallee wattle, and the phyllodes are remarkably similar to those of *A. microcarpa* var. *linearis* J. M. Black (from Monarto South and Mannum, S. Aust.); but striking departures from that species are obvious in the hairy peduncles of flower-heads, the much broader pods, larger seeds and, especially, in the long twice-folded funicle of the seed. As an appropriate epithet, I have bestowed the surname of Alfred J. Gray (formerly Superintendent of the Wimmera Forest Nursery at Wail) who discovered the type tree and brought it to my notice; during the past decade Mr. Gray has rendered meritorious service in propagating, popularizing and distributing Australian plants for ornamental and reclamation purposes in dry, inland areas prone to wind-erosion.

ACACIA MONTANA Benth., var. PSILOCARPA J. H. Willis:

varietas nova ob fructum glabrum a forma typica (et usitata) speciei jam distinguenda, ceterum vix separabilis.

LECTOTYPUS: VICTORIA (occidentalis)—"Shire of Dimboola" (HOLOTYPE in Herb. MEL—F. M. Roder, 6 Dec. 1899); Wimmera River (MEL—C. Walter, Mar. 1887): "In railway reserve at Diapur between Nhill and Kaniva, at 262½ miles from Melbourne" (MEL.—F. Muir, Sept. 1946).

This shrub of the Western Wimmera has no parallel among any of the forms of *Acacia montana* Benth. known at present. It is remarkable in bearing glabrous-viscid (or at most slightly granular) pods, whereas the fruits of this species are normally so densely blanketed with coarse white hair that their surfaces are invisible. The new variety does not appear to differ significantly in any other feature (of foliage, flowers or seeds) from typical *A. montana*, otherwise there would be good reason to accord it full specific rank. The 1899 collection, chosen as type, is in good fruit and accompanied by the label "*Acacia montana* Benth., var. *d'Altonii* Walter" in Reader's handwriting; but no evidence can be found that C. Walter ever published a description under this varietal epithet. There is a fragment of the same entity from Wimmera River in Melbourne Herbarium; it was collected by C. Walter himself in 1887 and is annotated in his own writing, but the only name appearing on this label is "*Acacia*". The third, and fairly recent, collection from Diapur is in flower; it shows comparatively shorter broader phyllodes, but pods gathered from the same bushes nine months later are quite identical with those of type var. *psilocarpa* ("Shire of Dimboola"). Dr. Isabel Cookson reported (6/8/1953) that the pollen-grain number of the Diapur material, viz. 8 (two tetrads), was identical with that of typical *A. montana*.

ACACIA HAKEOIDES A. Cunn. ex Benth. in Hook.:

var. ANGUSTIFOLIA (A. J. Ewart) J. H. Willis, combinatio nova.

*A. hakeata* A. Cunn. ex Benth. in Hook., var. *angustifolia* A. J. Ewart *Flora Vict.* 394 (1910).

LECTOTYPUS: VICTORIA—"Whipstick Scrub N.N.W. of Bendigo" (Herb. MEL—D. J. Paton, 14 Sept. 1923).

In the *Victorian Naturalist* 10: 196 (Feb. 1924), the collector of this type material, in flower and in fruit, wrote as follows:

*A. hakeoides* is the species of the Whipstick. It occurs in two distinct forms, the commoner (to which these remarks apply) having very narrow phyllodes, whilst the rarer form has broader phyllodes and larger flower-heads, resembling the narrow-leaved form of *A. pycnantha*. A bush of this species in full bloom—a mound of pure gold—is a wonderful sight.

Paton was correct. The narrow-leaved, virgate and bushy plant (3-6 ft. high), which is such a magnificent and apparently endemic floral feature over

much of the Bendigo Whipstick scrub, cannot be separated from *Acacia hakroides* except in its habit, rather smaller flower-heads and much narrower phyllodes: more typical and less floriferous *A. hakroides* also occurs in the same area.

That Ewart (*l.c.*) should have described the Whipstick plant as a variety of *Acacia ligulata*, with "phyllodes 2 mm. broad" [his complete diagnosis], is astonishing. There is a very narrow-leaved condition of *A. ligulata* in the far north-west of the State (e.g. in the Red Cliffs-Cardross area); but this variant, in common with all other forms of *A. ligulata*, differs manifestly from *A. hakroides* var. *angustifolia* in its irregular few-headed racemes, longer-petunculate heads, moniform pods which are always brittle at the constrictions, unber-coloured (not black) seeds and yellow or reddish (not white) sigmoid aril which is folded 2-3 times beneath the seed.

{ ? } Hybrid of ACACIA ASPERA Lindl.

The plant recorded for the Bendigo Whipstick scrub as "*Acacia sclerophylla* Lindl." by D. J. Paton [*Pict. Nat.* 40: 202 (Feb. 1924)], and thus referred by subsequent workers, clearly has nothing to do with that low, dense, bright green bush with longer, much thicker and almost glossy phyllodes. On the contrary, the former is a dingy straggling shrub to 5 ft. tall, with flattened granular-resinous phyllodes. It is suggested that the Whipstick wattle is of hybrid origin, involving *Acacia aspera* as one parent. The foliage and pods are certainly less bristly than in this species, but the same prominent stipules (to 3 mm. long), and bracteoles in the flower-heads (giving young heads a star-like appearance), are present. Only a study of seedlings, supplemented by genetical research, can throw definite light upon this conjecture.

ACACIA KETTLEWELLIAE J. H. Maiden in J. roy. Soc. NSW, 49: 484 (1916).

*A. nutleri* J. H. Maiden & W. F. Blakely in J. roy. Soc. NSW 60: 184 (1927).

*A. oreophila* Maiden & Blakely *l.c.*: 185 (1927).

*Acacia kettlewelliae* was described (*l.c.*) from fruiting material collected between Harrietsville and Mt. St. Bernard in north-eastern Victoria, the description of flowers being taken from a specimen obtained at Mt. Buffalo by C. Walter in 1902. Eleven years later the author collaborated with W. F. Blakely in describing two other highland *Acacia* species from "Buffalo Mountains"—both of them also collected by C. Walter in 1902. All three are closely related, and it is astonishing that, in their later diagnosis (drawn up without any knowledge of the pods), these authors should make no mention of obvious affinities with the already-published *A. kettlewelliae*.

In the past half-century, only one species of *Acacia* in the old *prominens-hurifolia* group has been found in the region of Mt. Buffalo. This shrub is decidedly variable in length and comparative width of phyllode, degree of glaucescence, number (1-3) and size of marginal glands and width of pod. In general, broad- and obtuse-leaved plants tend to have more glands (2 or even 3 per phyllode), while longer- and rather narrow-leaved conditions have usually a single gland and somewhat broader pods. But there is no constant correlation of these characters, and I regard *A. kettlewelliae* as a polymorphic species of which *A. nutleri* and *A. oreophila* are merely two manifestations—the former with a second or third gland, the latter with shorter phyllodes bearing single glands. Such slight floral and fruiting differences, as occur, are inconsequential. This mountain species extends also into south-eastern New South Wales—from the Kosciusko region to at least as far as Braidwood—with an apparent reduction in size of phyllodes towards the northern limit of its range.

## ACACIA DECORA Reichb., #1827

Thoonia (Herb. MEL.—R. A. Black, 10 Jan. 1938): Sugarloaf Peak, Warby Ranges near Thoonia (MEL.—F. Morley, 20 Sept. & 18 Nov. 1945).

The first records for Victoria of a tree that is not uncommon in Wagga Wagga district, N.S.W. Affinities are with *A. burrifolia* A. Cunn. (also occurring in the Warby Ranges), but the inflorescences of *A. decora* are quite terminal, far exceeding the phyllodes, and the stouter peduncles hairy [cf. always glabrous in *A. burrifolia*].

## ACACIA KYBEANENSIS J. H. Maiden &amp; W. F. Blakely in J. roy. Soc., N.S.W., 60: 188 (1927)

*A. oreades* J. H. Maiden & W. F. Blakely loc. cit. 186-7 (1927)

*Acacia kybeanensis* and *A. oreades*, with descriptions on adjoining pages of the same journal, were based upon types from "head of Tuross River, Kybean" (N.S.W.) and "Clarence to Wolgan" in the Blue Mountains (N.S.W.) respectively. Pods of the former species were not seen, but the authors claim this to be "readily distinguished" from *A. oreades* in its thin, lanceolate, almost acuminate phyllodes, small hairy stipules, smaller thicker calyx and much larger size (6-8 ft., against 18-24" in *A. oreades*). These differences may hold for individual plants, in isolated populations, but are found to be trifling and inapplicable when a range of material is studied from various localities. In October 1948, I was able to visit the very type locality (Tuross River head, at Kydra Peak, Kybean) in *A. kybeanensis*. Specimens from slender shrubs about 6 ft. high were collected: later they evoked the following comment from Mr. R. H. Anderson, Chief Botanist and Curator at Sydney Botanic Gardens (8/7/1953)—"a very good match for the type of *A. oreades* Maid. & Blakely, with the small thick phyllodes." So it seems that quite typical *A. oreades* (as to phyllodes) can occur almost at the spot whence type *A. kybeanensis* came! It is clear that one species only is involved, and the original diagnosis of *A. oreades* probably refers to unusually small plants, dwarfed by environment. Since the circumscription of *A. kybeanensis* better fits the more usual appearance of the species, this name is now chosen for retention and the other relegated to synonymy.

In addition to the above highland localities in New South Wales, *A. kybeanensis* is here recorded for the first time as Victorian, viz.: on the mountain road between Wulgulmerang and McKillop's Bridge [Snowy River], about 3 miles below Little River Falls (J. H. Willis & N. A. Wakefield, 17 Jan. 1948—excellent fruiting specimens); on mountain slopes at Freestone Creek, north of Briagolong (F. Mueller, Feb. 1854). Both collections are in Melbourne Herbarium, and the latter very old one had been filed under Mueller's ms. label "*Acacia burrifolia* var. *scaberrima*". These Victorian representatives exhibit larger phyllodes (to 2" long) than in either of the New South Wales types, but the hoary pubescence on branchlets, inflorescences and young foliage is exactly the same. In view of the recent collection of pods (on the example from near Little River Falls, Vic.), Maiden and Blakely's description given for the fruit of *A. oreades*—they had not seen pods of their *A. kybeanensis*—may be supplemented as follows: to 5 cm. long x 2 cm. wide, very flat, glaucous, bearing up to 7 oblique to transverse (not longitudinal) seeds.

## ACACIA FRIGESCENS J. H. Willis;

species nova ex affinitate, *A. melanoxylon* R. Br. in Ait., sed differt sic: statura minore, cortice laeviore, phyllodibus subcinereis quae 3-4 nervos conspicuos parallelos exhibet, pedunculis manifeste hirsutis, floribus

laete flavis, truncu ferme recto (nunquam spiritaliter involuto) et praecipue seminibus arillo albidio quò ad basin seminis restringitur.

**VARIATIO: VICTORIA** (in montibus orientalibus)—"Result Creek near Bonang, on forest ranges" (**HOLOTYPE** cum floribus in Herb. MEL.—W. Hunter, Sept. 1940); "Poley Range in Melb. & Metrop. Board of Works O'Shannassy Reserve, about 10 miles north-east of Warburton, at upper limit of *Eucalyptus regnans* forest, about 3,500 ft. [ $\pm$  1100 m. alt.]" (**PARATYPE** cum fructibus in Herb. MEL, NSW.—J. H. Willis, 18 Feb. 1954)

Small montane or subalpine forest tree 3-9 m. [10-30 ft.] high; bark olive-rufescent, rather smooth (never rough and fissured as in *A. melanoxylon* R.Br.); branches dense, the ultimate branchlets angular and glabrous. Bipinnate foliage discarded after the first seedling leaves wither. *Phyllodes* greyish (from a minute innate mealiness), 10-16 x 1.5-4 cm., narrowly to broadly fusiform, acute or subacute, conspicuously petiolate; gland small and obscure, at junction of petiole and blade (as in *A. melanoxylon*); nervation consisting of 3 or 4 very bold, prominent, parallel veins [cf. 4-6, seldom prominent in *A. melanoxylon*]. *Flower-heads* globose, bright yellow, about 30-flowered (not pallid-creamy and with up to 50 flowers, as in *A. melanoxylon*), each on a conspicuously white-hairy peduncle 5-10 mm. long [cf. minutely mealy in *A. melanoxylon*]. *Individual flowers* 5-partite, 1.5 mm. long at expansion: subtending bracteole broadly spatulate, shortly granular-fimbriate. *Calyx* with obconic tube half as long as corolla, broadly- and shallowly-lobed at the summit, with minutely lacinate and slightly granular margins. *Pollen* polyads 40-55 mic. diameter, composed of 16 grains. *Pod* 4-10 cm. x 5-8 mm., linear, straight or slightly curved [cf. coiled and often twisted in *A. melanoxylon*], hardly constricted between the seeds, pale brownish, subcoriaceous but flexible. *Seeds* up to 10, longitudinal, black and shining, elliptic, about 4 x 2.5 mm., aril white, entirely basal, forming a double, often sigmoid fold beneath the seed and passing insensibly into a short funicle [cf. the long reddish aril which almost surrounds the seed in *A. melanoxylon*].

#### Discussion

The new species has hitherto been misdetermined in Victoria as a form of Blackwood (*Acacia melanoxylon*), with which it sometimes grows. Although superficially similar in habit and foliage, it may readily be distinguished by the much smoother bark, greyish phyllodes, bright yellow flower-heads on hairy peduncles and, especially, by the small white aril which is merely a basal attachment and does not embrace the seed. At present it appears to be confined to montane and subalpine situations (hence the epithet "*frigescens*") in eastern Victoria. In addition to the two isolated type localities given above, this warble has been noted as abundant on slopes of the Baw Baws and Mt. Hurfall-Toorougo forest area, where copious seedling regrowth followed the disastrous fires of January 1939.

**ACACIA OBTUSIFOLIA** A. Cunn. in *Field Geogr. Mem. N.S.W.* 345 (Apr. 1825)

*A. intertexta* Sieb. ex DC. *Prodr. Syst. Nat. Regn. Vep.* 2: 454 (Nov. 1825).

Both *Acacia obtusifolia* and *A. intertexta* were synonymized by Bentham [*Flora Aust.* 2: 398 (1864)] as mere forms, with narrow and broad phyllodes respectively, under typical *A. longifolia* (Andr.) Willd. That they are inseparable specifically has been confirmed through a recent careful comparison of types at Kew by Dr. Ronald Melville (11/11/1955), and the name *A. obtusifolia* must stand because its valid publication antedates that of *A. intertexta* by seven months in 1825. But Bentham was incorrect in assum-

ing identity also with *A. longifolia*, which has rather thin-textured and often acute phyllodes, bright yellow congested flowers (appearing in early spring), petals united in lower third and only slightly thickened at apices, pods almost terete and thin-walled. *A. obtusifolia*, by contrast, is quite distinct in its thick, leathery, blunt phyllodes, pale yellow or creamy flowers (produced in long interrupted spikes during mid-summer), petals almost or entirely free and conspicuously bossed at the tips by a strong thickening, pods somewhat flattened and with leathery walls about 1 mm. thick. The latter is typically a montane species (very common in the Blue Mountains, N.S.W.), extending from south-eastern Queensland to far-eastern Victoria, for which State it has never been recorded previously.

Occurrences in Victoria are known from the Genoa district, Mt. Ellery region and across the Snowy River to Butcher's Ridge between Buchan and Gelanjiy—apparently its western limit in the State. Good examples in flower and fruit, at the Melbourne Herbarium, were collected at about 2,000 feet some 12 miles north of Murrungowar, along the forest road toward Mt. Ellery (*J. H. Willis & N. A. Wakefield*, 29 Dec. 1951).

#### ACACIA PENDULA *A. Cunn. in G. Don*, 1832

Henty Highway, 5 miles south of Warracknabeal, on property of Gordon Smith (Herb. MEL—*W. R. Wood*, 3 Mar. 1953).

This record establishes the first undoubted occurrence of the true Myall in Victoria, although silvery *A. pendula* is well known in parts of the Riverina, N.S.W. About half a dozen very old spreading trees, with breast-height diameters of 18", are all that now remain of what must once have been a more extensive community: local people call them "blackwoods". The writer's attention was first drawn to the occurrence by Mr. A. J. Gray (former Superintendent of the Wimmera Forest Nursery at Wail), and it is remarkable that these very isolated trees should have gone undetected by any botanist during almost a century of settlement in this part of the State. Several times I have followed up reports by settlers that clumps of "Myall" existed near the Murray River (chiefly in the Goulburn Valley district), but in every instance the surviving trees turned out to be *A. homalophylla* ("Yarra") and not *A. pendula*.

(To be Concluded)

### TWO NEW SPECIES OF PERSOONIA

By L. A. S. JOHNSON\*

1. In montane forests of south-eastern New South Wales and eastern Victoria there grows a species of *Persoonia* which has remained undescribed. It has been confused with *P. confertiflora* Benth. and with *P. lucida* R.Br. The latter, described from the Port Jackson district, is quite unrelated and is probably a hybrid between *P. levis* (Cav.) Donn. (*P. subteina* Pers.) and *P. linearis* Andr.

This species will be fully discussed in a forthcoming revision of the eastern Australian species of *Persoonia*, where a full list of localities will be given. The following diagnosis is here published to validate the name for immediate use in Victorian publications.

#### PERSOONIA SILVATICA L. Johnson, sp. nov.

TYPIFICATION: Brown Mountain, near Littleton, N.S.Wales, E. Belche, II, 1893, HOLOTYPE (NSW. No. 20978), fl.

Arbuseula vel frutex 1.5-7 m. altus, cortice compacto laevique, Ramuli virgati leviter angulato-striati novelli pubescentes mox glabrescentes, rubescentes vel purpurascentes. Folia coriacea mox glabrescentia, opposita, sub-

\* National Herbarium of New South Wales, Sydney.

opposita alternave, adscendentia, subsessilia vel parte petioli-formi ad 0.3 cm. longa tenui vix applanata, oblongo-lanceolata vel anguste lanceolata, rarius oblanceolata vel elliptica, subsessilia, 4-9 cm. longa, 0.6-1.8 (2.0) cm. lata, acuta vel obtusiuscula semper fusco-muricata, olivacea subter pallidiora, plana vel marginibus levissime recurvatis, venis prominulis vel subobscuris, rare sub-triplinerviis. Flores in racemis abbreviatis (ad 1.5 cm. vel fructiferis longioribus, ad 5 cm., rhachidibus subglabris), 2-15-floris axillaribus terminibusve vel raro nonnulli eorum solitarii in axillis tohorum vel bractearum, in pedicellis brevibus (0.1-0.3 cm.) parce ferrugineo-pubescentibus vel glabris bracteis deciduis brevisubulatis subtensis: tepala flava 1.2-1.3 cm. longa breviter caudata vix glabra (in typo!) vel parce breviterque fulvo-pubescentia, basin versus (sub antheris) constricta; antherae 0.7-0.8 cm. longae, glandulae dentiformes incurvae persistentes vel interdum in pedicellis vetustioribus deciduae; ovarium stipitatum glabrum, glaucescens. Drupa pruinosa ovoideo-globularis, ad 1.5 cm. longa, 1.5 cm. crassa, breviter stipitata, stylo gracili circiter 0.6 cm. longo (interdum subreflexo) coronata.

*P. sylvatica* differs from *P. confertiflora* in the taller, often tree-like habit, narrower leaves, slightly shorter flowers, the glabrous or sparingly pubescent tepals and the usually less condensed inflorescence.

2. A second undescribed species is found in the foothills of the Australian Alps, from the southern part of the Australian Capital Territory to the Victorian Alps. This will also be treated in detail in a later publication, but is here described as follows:

*PERSOONIA SUBVELUTINA* L. Johnson, sp. nov.

TYPIFICATION: Island Bend, Upper Snowy River, N.S.Wales; G. W. Althofer, II 1954. HOLOTYPE (N.S.W. No. 26732), "12-15 ft". ♀

Frutex vel arbuscula 0.5-5 m. altus. Ramuli suberecti vix angulati vel vix tomentosi, novelli saepe ferruginei. Folia alterna vel subopposita, obovato-oblanceolata vel elliptica, 3-4 cm. longa, 0.6-1.3 cm. lata, obtusiuscula apice rotundata vel minute apiculata, versus basin attenuata quasi-petiolata, marginibus recurvis, vena mediana utrinque prominula, lateralibus fere obscuris, supra viridia subter pallidiora, novella utrinque densiuscule pubescentia saepe subvelutina, tandem fere glabrescentia, supra minute papillosa. Flores axillares (foliis floralibus rare absolescentibus) solitarii, subsessiles vel in pedicellis brevibus 0.1-0.2 cm. longis (fructiferis 0.3 cm. attenuatis) velutinis, erecti; tepala 1.1-1.3 (1.4) cm. longa, brevissime caudata vel apiculata, sub antheris aliquanto constricta, dense fulvo- vel ferrugineo-pubescentia; antherae 0.6-0.7 cm. longae; glandulae plus minusve truncatae, prominulae, persistentes; ovarium stipitatum, glabrum. Pedicelli fructiferi suberecti 0.3 cm. longi. Drupa subglobosa, 1.2-1.5 cm. longa, 0.9-1.2 cm. lata, atropurpurea, glauco-pruinosa fereis characteres ex specimine Victoriani in Herb. MEL—"Big River between Mts. Nelson and Bogong", circ. 3,300 ped. alt., leg. J. H. Willis, 13.1.1946).

A species of distinctive appearance, but little known, this has been confused with "*P. revoluta*" Sieb. ex Schult. et f. (= *P. mollis* ssp.), *P. confertiflora* Benth. and *P. arborea* F. Muell., none of which it particularly resembles. It is distinguished from all other species by the combination of softly hairy leaves with recurved margins, glabrous ovary and short pedicels. The flowers are much shorter than those of *P. arborea*.

It has a close affinity with *P. rigida* R.Br., which has not been recognized. The short pedicels, rather long flowers, glabrous ovary and papillose leaf-surfaces are characters in common. However, it is readily distinguished from *P. rigida* by the leaf characters (not spatulate or so markedly attenuate at the base as in *P. rigida*, not incurved-spreading, more finely papillose-scabrous) and by the much shorter velvety pubescence of branchlets, leaves and tepals. It grows much taller than *P. rigida*, at least at times.

## NOTES ON TWO SPECIES OF ACACIA IN EASTERN AUSTRALIA

By MARY D. TINDALE\*

*ACACIA SILVESTRIS* Tindale sp. nov.

Arbor 7.5-30 m alta; trunco griseo, laevi, ramulis juvenilibus pilis argenteis dense puberulis; ramulis vix costatis; foliis pinnatis, 8-18-jugis, glandulis interjugalibus 2-3, glandula parva ad basim pinnarum inter jugos inferiores foliorum; foliolis 29-38-jugis, 4-8 mm. longis, 0.8-1.2 mm. latis, anguste lanceolatis, supra glabris, infra semper tere pubescentibus, apice acuto, marginibus ciliatis; floribus flavis, in racemis, capitulis globosis, circa 20-floris; calyce cupulari, minimo, paulo angulato, ciliato; petalis 5, liberis, glabris, acutis, calycis longitudinem circa duplo superantibus; ovario glabro; legumine stipitato, lineari-oblongo, 6-12 cm longo, 0.6-1 cm lato, glauco, parce puberulo, inter semina constricto; seminibus nigris, longitudinalibus, funiculo primario filiformi deinde in arillum piliformem super seminis apicem intercrassato.

*Holotype*: Bodalla State Forest, west of Narooma, 100 ft. alt., spreading tree 25 to 30 ft. high, flowers yellow, bark dark green, when mature turning greyish, E. F. Constable, 10.9.1953 (NSW. 25649), located in the National Herbarium, Sydney.

Tree about 25 to 100 ft. high; trunk grey, smooth; young branches densely puberulous with silvery hairs; branches scarcely ridged; leaves pinnate, 8 to 18-jugate, with 2 to 3 interjugary glands, a small gland at the base of the lower pairs of pinnæ; pinnules 29 to 38 pairs, 4 to 8 mm long, 0.8 to 1.2 mm. broad, narrowly lanceolate, glabrous above, mostly pubescent below, the apex acute, the margins ciliate; the flowers yellow, in racemes, the heads globular, about 20 in a head; the calyx cupular, very small, slightly angular, ciliate, petals 5, free, glabrous, acute, twice as long as the calyx, the ovary glabrous, the pod stipitate, linear-oblong, 6 to 12 cm long, 0.6 to 1 cm broad, glaucous, scarcely puberulous, constricted between the seeds; the seeds black, longitudinal, the funicle filiform at first, then thickened into a fleshy piliform aril over the top of the seed.

*Distribution*. Lower South Coast of New South Wales and East Gippsland, Victoria. New South Wales: Bodalla State Forest, H. C. Buckeridge, 3.11.1953 (NSW 26677); ditto, Spring Creek, height 50 ft., grey blotchy bark, M. Bowyer, 8.9.1952 (NSW, 26676); Gulf Creek, Nerrigundah, 150 ft. alt., erect spreading tree, 25-30 ft. high, smooth bark of light colour, E. F. Constable, 16.9.1953 (NSW 26674); ditto, H. C. Buckeridge, 11.1953 (NSW. 26675); Quamaa, Slater, 11.12.1934 (NSW. 8656). Victoria: Snowy River area, near Wulgulmerang, about 2,000 ft. alt., on rocky outcrop, N. A. Wakefield, No. 2185, 17.1.1948 (NSW 4886); Nowa Nowa, Prince's Highway, W. Hunter, 8.1940 (NSW. 8642), Deddick, W. Hunter, 11.1940 (MEI.).

This spring-flowering species forms quite extensive forests in East Gippsland, Victoria, whereas in New South Wales it is found in the County of Dampier and southwards towards the Boga-Brogo Pass on Prince's Highway, as well as being scattered fairly generally in Bodalla State Forest and in Crown lands west to Belowra in the Turross River basin, east of the Main Divide. It will grow on low ridges, in gullies and on steep slopes up to 1,000 ft. in altitude, but it is commonest on the hillsides of steep gullies and over the saddles of a ridge. According to Mr. Buckeridge's field notes, *A. silvestris* favours slate formations, whereas *A. mollissima* is predominant on granite country in the Bodalla State Forest. In open country scattered trees grow short trunks with plenty of limbs but generally it grows in thickets which produce tall barrels up to 60 ft. high clear of limbs. Mature trees grow to 60 or 80 ft. in height but sometimes up to 100 ft. Very heavy regeneration follows bush fires but without fires regeneration is practically nil.

\* National Herbarium, Sydney

*A. silvestris* is more closely allied to *A. dealbata* Link than to any other member of this group of bipinnate wattles. However, in *A. dealbata* the pods are quite glabrous instead of puberulous, although they are of a dark bluish colour just as in *A. silvestris*. There is a single gland at the base of each pair of pinnae in *A. dealbata*, whereas there are 2 to 3 interjugary glands as well as a small gland at the base of some of the lower pairs of pinnae in *A. silvestris*. In the latter species the pinnules are slightly larger, being 4 to 8 mm. long and 0.8 to 1.2 mm. broad, while they are mostly 1.5 to 5 mm. long and 0.2 to 0.5 mm. broad in *A. dealbata*. The markedly acute pinnules of *A. silvestris* are a diagnostic feature of this species, distinguishing it from other members of the *A. decurrens-A. mollissima* group in eastern Australia.

I wish to acknowledge with many thanks the very helpful notes on the habit and habitat of *A. silvestris* supplied by Mr. H. Buckeridge of Bodalla State Forest.

*ACACIA ROTUNDIFOLIA* Hook.

*A. rotundifolia* Hook. in *Bot. Mag.*: (1843), t. 4041

Synonym: *A. obliqua* A. Cunn. ex Benth. in *Hook. Lond. Journ.* 1: 334 (1842), non *A. obliqua* Desv. in *Journ. Bot.* 3: 67 (1814).

*A. rotundifolia* is characterized by obliquely obovate or orbicular, mucronate, 1-veined phyllodes about  $\frac{1}{2}$  to  $\frac{3}{4}$  in. long. The globular flower-heads are borne on solitary or twin peduncles which are often longer than the phyllodes. This species, which is spreading shrub about 2 to 5 ft. high, occurs in South Australia, north-western and north-eastern Victoria as well as on the tablelands and western slopes of New South Wales.

**FLORA OF VICTORIA: NEW SPECIES AND OTHER ADDITIONS—II**

By N. A. WAKEFIELD, Nubia Park

**Genus SCIRPUS: A New Species of the Section Isolepis**

**SCIRPUS VICTORIENSIS** sp. nov. Sect. *Isolepis* inserenda; plantae annuae culmis caespitosis erectis usque ad 12 cm. altis, foliis laminac usque ad 15 mm. longae vel saepe absentes; spiculae plerumque 3-4, 3-5 mm. longae, bractea usque ad 11 mm. longa; glumae ovatae, pallidae, carinatae, ad apicem paulum recurvatae; stamen 1; styli 3; nux cana, subglobosa, circiter 0.5 mm. longa, paulum 3-costata, granulosa.

**HOLOTYPE**: Wimmera, Victoria; leg. F. M. Reader, 1891 (MEL; duplicates to be sent to K, BR1, AD, NSW\*).

Erectly tufted annual, culms to 12 cm. long; leaf-blades absent, or up to 15 mm. long; spikelets usually 3 or 4, 2-5 mm. long,  $\pm$  cylindrical; subtending bract 2-11 mm. long; glumes narrow, the keel prominent, the wings always pale, the apex spreading a little, hypogynous bristles 0; stamen 1; style 3-fid; nut subglobular, 4-5 mm. long, 3-4 mm. wide, obscurely 3-ribbed, the faces very convex, pale grey, regularly granular (the comparatively large surface cells somewhat raised).

**Distribution**: Victoria—Central, northern and north-western areas of original savannah forest. The species should occur also in adjacent parts of New South Wales and perhaps of South Australia. Besides the type collection, which most likely came from near Dimboola, there are the following specimens in MEL: Richardson River (north of Stawell), leg. Dr. Curdie; Glendonald Creek, about 3 miles north of Creswick, 3/1/1953, leg. J. H. Willis &

\* MEL—National Herbarium of Victoria, Melbourne.

K—Royal Botanic Gardens, Kew, England.

NSW—National Herbarium of New South Wales, Sydney.

BR1—Botanic Museum and Herbarium, Brisbane, Queensland.

AD—State Herbarium of South Australia, Adelaide.

R. V. Smith; Gumbower Creek (near Cobuna), leg. Tietkens; Werribee, leg. Fullager; Mooroopna. 11/11/1942, leg. R. A. Black.

Most of these specimens had been confused with *S. australiensis* (Maid. & Betche) S. T. Blake. This latter has a spreading habit; far more numerous stems; spikelets fewer in each cluster, smaller, somewhat reddish; and the nut is acutely triquetrous, usually much longer than wide, and it becomes finally pale orange in colour. *S. australiensis* belongs to arid areas (north-western Victoria to south-western Queensland and Central Australia).

The Creswick collection was reported as *S. congruus* (Nees) S. T. Blake, in *Viet. Nat.* 69: 130 (Feb. 1953), which species has broad hyaline openly reticulated wings to the glumes, and an acutely triquetrous nut. This plant extends from far-western Victoria (near Mt. Arapiles and Lowan Shire), to West Australia.

In habit and the appearance of the inflorescence, *S. victoriensis* is not recognizably different from either *S. platycarpus* S. T. Blake or *S. calycarpus* S. T. Blake; both these however have 3-staminate flowers and larger, shiny black, differently marked nuts.

#### Genus PULTENAEA: Two Hitherto Unrecognized Species

*PULTENAEA PLATYPHYLLA* sp. nov.: ex affinitate *P. retusae* Sm. et *P. daphnoides* Wendl., sed ab utroque a characteribus sequentibus distinguitur: foliis ellipticis, marginibus planis (haud recurvatis), apice emarginato (nec retuso nec mucronato).

HOLOTYPE: Mt. Tarrngower, near Maldon, central Victoria: leg. Rev. W. C. Tippett, October 1921 (MEL).

Syn.: *P. daphnoides* var. *parviflora* H. B. Williamson (*Proc. roy. Soc. Vict.* 32: 212).

Tall shrub; leaves elliptical, 1-2 cm. long, 3-6 mm. wide, upper surface glabrous and concave with the midrib not visible, margins flat, apex rounded and indented, underneath with the midrib not very prominent; flowers in terminal bracteate clusters; bracts broad, entire; bracteoles high on the calyx-tube, strap-like, pubescent; calyx densely pubescent.

*Distribution*: Victoria ("Grampians": Mt. Tarrngower; Warby Ranges, F. Morley, Sept. 1945; Eldorado, H. B. Williamson, Sept. 19, 1920; Upper Murray District C. French Jnr., 1886); also New South Wales.

*P. platyphylla* is not closely related to *P. daphnoides* Wendl. The latter has the leaves cuneate, truncate, mucronate, with recurved margins, and the midrib is very prominent beneath and a little so above; the bracts are trifid at the apex with the middle lobe pubescent; and the bracteoles are lanceolate.

The new species is similar to *P. stricta* Sims; but the latter has the leaves smaller, pointed and recurved at the apex and recurved at the margins, and its bracteoles are glabrous except on the margins.

*P. platyphylla* is most closely related to *P. retusa* Sm.; the latter differing in having leaf-margins recurved, apex of leaf truncate and  $\pm$  bilobed, and the flowers and leaves of the latter are about half as big as those of the former.

*PULTENAEA AMOENAE* Sieb. ex N. A. Wakefield sp. nov.: *P. limophylla* Schrad. proxima, sed differt foliis lineari-oblongis supra glabris apice submarginatis et bracteis rufescentibus orbicularibus, affinis *P. strictae* Sm. a qua folia infra semper pubescenti apice vix decurvato et bracteis persistentibus trilobatis facile cognoscitur.

HOLOTYPE: Specimen at MEL, labelled "*Pultenaea amoena* Sieber, Sieber flora nov. Hollandiae No. 414".

*P. limphylla* var. *anaeoa* DC. (*Prod.* 2: 112) is evidently based on one of Sieber's duplicates of the same species.

Both Steudel (*Nomencl. Bot.*, ed. 2: 418) and Bentham (*Fl. Austr.* 2: 113) used Sieber's specific name in synonymy, but it has apparently not hitherto been validly published as a species.

Low, sparse shrub; branchlets shortly villose; leaves linear-oblong, about 6-12 mm. long and 2-4 mm. wide, glabrous above, margins recurved, apex short and recurved, underneath sparsely villose; flowers in terminal bracteate clusters; bracts orbicular, usually pubescent, 3-lobed (the central lobe villose), reddish-brown, persistent; calyx pubescent; bracteoles high on the calyx-tube, filiform, villose.

*Distribution*: South-eastern New South Wales and eastern Victoria. As well as Sieber's specimens from the Port Jackson area, there are in the Melbourne National Herbarium collections of *P. anaeoa* from Hazellbrook, Braidwood, Wagonga and Twofold Bay—all in New South Wales. The species was apparently first collected in Victoria by C. H. Grove, at Orhost, about sixty years ago (Melbourne Teachers' College Herbarium); and later at Welshpool (*leg.* A. K. Cameron, 27/7/1945), at Cann River (N.A.W. Nos. 3110 and 3497; about 1946/47) and Upper Genoa River (N.A.W. No. 3189; 25/9/1948).

*P. anaeoa* is similar to *P. limphylla* Schrad.; but the latter has longer, narrower leaves (1-2 cm. long, 1-2 mm. wide) which are pubescent on their upper surfaces, and its bracts are oblong, blackish and more coarsely pubescent. It has not been possible for the writer to consult either type material or the original description of *P. limphylla*; but it is assumed that Smith's interpretation of the species (in *Trans. Linn. Soc.* 9: 247) is correct.

Both these species are quite distinct from *P. retusa*, the last having glabrous leaves with the apex broad and truncated and the midrib never recurved. The allied *P. stricta* has the leaf obovate and with a strongly recurved apex, while the inner bracts (and those of *P. retusa* also) are entire and fall early leaving the flowers loose.

#### Genus SPYRIDIUM: Two New Species

*SPYRIDIUM CINEREUM* sp. nov.; *S. serpyllaceo* (Reiss.) F. Muell. affinis, sed differt foliorum apicibus latioribus, foliorum lobis latero-  
alibus obtusis (sine apice indurato), lobo medio  $\pm$  recto (non valde recurvato), pilis stellatis in superficie (non simplicis), ovario villosa (non breviter pubescenti).

*HOLOTYPE*: Coastal heathlands near Mallacoota aerodrome, far-eastern Victoria; N. A. Wakefield No. 4334; 24/1/1957 (MEL; duplicates to be sent to K and NSW).

Dwarf shrub 5-50 cm. high; leaves obovate up to 8 mm. long and 5 mm. wide, apex with large entire lateral lobes and a small  $\pm$  straight acute central lobe, margins strongly recurved, upper-surfaces densely stellate-tomentose, under-surfaces with looser tomentum and penni-costate; inflorescence terminal, cymose; floral leaves felty-white, mostly similar to the stem-leaves but a few sometimes small and entire; calyx and ovary densely villose.

*Distribution*: Victoria (Mallacoota and Grampians).

*S. cinereum* was first collected by Mueller, in September 1860, in the type locality, and was identified as *S. serpyllaceum* (*vide* "Entrance of the Genoa River, F. Mueller", in *Fl. Austr.* 1: 428). Other botanists have gathered it since at the same place, for it is very abundant there; and quite recently it was found in western Victoria (Flats N.E. of Grampians, Jan. 1937, *leg.*

A. J. Swaby). It is not known to occur outside Victoria, but it should be found in the extreme south-east of New South Wales.

*S. serpyllaceum* has leaves less broad at the apex, with lateral lobes terminated by a short callous point and the central lobe strongly recurved, and with the upper-surfaces invested with simple hairs. It is endemic in Tasmania.

**SPYRIDIMUM NITIDUM** sp. nov.: *S. spathulato* (F. Muell.) F. Muell. ex Benth. simile, sed recedit: foliis brevioribus (usque ad 5-7 mm. longis) oblanceolatis (non spathulatis) ad margines planis (non recurvatis), superficibus indumento denso appresso obtectis (non glabrescentibus), inflorescentia cymosa (non elongata).

**HOLOTYPE**: Specimen in MEL, with data "Sandy Scrub, Waterhouse", presumably from Kangaroo Island, South Australia.

Leaves oblanceolate or obovate, up to 5 mm. long and 2 mm. wide, the apex acute and  $\pm$  recurved, both surfaces invested with dense shiny appressed vestiture (shorter and tighter on upper surface); stipules lanceolate, entire, glabrous; inflorescence cymose, leafy, the individual flower-clusters 2-3 mm. in diameter; floral leaves creamy white, broader, shorter and less pointed than the normal ones and with loose vestiture; bracts broad, reddish-brown, papery, a little pubescent; calyx sparsely villose.

**Distribution**: Kangaroo Island, South Australia (*leg.* Waterhouse, Tepper); and north-western Victoria (Shire of Lowan, *leg.* St. Eloy D'Alton).

*I. nitidum* is the same as the *S. spathulatum* var. *microphyllum* Benth. (*Fl. Austr. I*: 430), the type material of which may be a duplicate of the type specimen of the former.

*S. spathulatum* has the leaves spathulate,  $\pm$  glabrous on the upper surfaces and with the margins strongly recurved, and the inflorescence is elongated along a central axis. It occurs in South Australia and possibly in Western Australia.

**Genus: HIBBERTIA: A New Species of the Section Euhibbertia, and Some Taxonomic Adjustment to *H. billfordieri* F. Muell.**

**HIBBERTIA SPATHULATA** sp. nov. Sect. *Euhibbertia* (sens. Benthani) inserenda—foliis spathulatis et carpellis 3 tomentosis—ex affinitate *H. hermannifoliae* DC., sed recedit: foliis minoribus retusis costa percrassa; indumento minuto perdenso, pilis omnibus stellatis sessilibusque; floribus minoribus subsessilibus.

**HOLOTYPE**: Towards Snowy River, east of Butchers Ridge, eastern Victoria: *leg.* N. A. Wakefield, No. 4832, September 10, 1955 (MEL: duplicates to be sent to K and NSW)

A diffuse shrub to about 4 ft. high and 4 ft. wide; vestiture (on upper stems, both leaf-surfaces, and the calyces) a dense mat of minute, sessile, stellate hairs; leaves spathulate, normally about 8 mm. long and 3 mm. wide, thick, the apex bilobed, the margins somewhat recurved, the upper surface green and with a shallow longitudinal channel, underneath whitish and the midrib green and much thickened; flowers subsessile; stamens numerous (normally about 17), surrounding the carpels, staminodes few (normally about 5); carpels 3, tomentose.

**Distribution**: Apparently endemic but locally abundant in a small area (detailed above), on a rocky slope in porphyry formation, at about 2,500 ft. elevation, associated with *H. linearis* var. *obtusifolia*, in a forest of *Eucalyptus sieberiana*, *Azaria pycnantha* and *Acaria obtusifolia*.

*H. spatulata* was originally discovered by the writer on January 22, 1954, but it was not flowering at the time. A second visit was made to the same area on September 10, 1955, to collect flowering specimens, and though it was somewhat early in the season, a few precocious flowers were found and their characters ascertained.

The species is most closely allied to *H. hermansifolia* DC. of eastern New South Wales. The latter has leaves much larger (up to 24 mm.  $\times$  8 mm.), rounded at the apex, the midrib thinner; the flowers are larger and stalked (peduncles up to 15 mm. long); and the vestiture is looser and of larger somewhat different hairs (some simple, some of the stellate ones stalked).

Two species are involved in the material classified as *H. billardieri* F. Muell. by Bentham (*Fl. Austr. 1*: 28). These are as follows

**HIBBERTIA ASPERA** DC. *Syst. Veg.* 1: 430 (1818)

Bushy shrub, upper stems densely stellate and somewhat long-pilose; leaves from narrow to broadly obovate, apex rounded, margins normally only a little recurved, upper surfaces asperous with small tubercles and small stout stellate hairs mixed with a few long simple ones, underneath usually whitish and densely stellate-tomentose; flowers on slender peduncles usually with one reduced leaf or bract under the calyx; sepals about 4 mm. long, invested with both stellate and simple hairs.

*Distribution*: Widespread in south-eastern Australia, from south-eastern Queensland to Tasmania and South Australia. In south-western Victoria and South Australia, the species lacks the usual long pilae, and the common form in Tasmania has larger leaves and less pubescence.

Both *Pleurandra cinerea* and *P. parviflora*, both of R.Br. ex DC. (*l.c.*: 417, 418 respectively), are apparently synonyms of *H. aspera*.

**HIBBERTIA ASTEROTRICHA** (Sieb. ex Spreng.) comb. nov.

Basic Synonym: *Pleurandra asterotricha* Sieb. ex Spreng. *Syst. Carr. Post.*: 191 (1827).

Equivalent Synonyms: *Pleurandra ovata* Labill. *Nov. Holl. Pl. Sp. 2*: 5 t. 143 (1806), *Pleurandra scabra* R.Br. ex DC. *l.c.*: 418 (Both these specific epithets are pre-occupied in *Hibbertia*.)

Sprawling, long-branched shrub; upper branches reddish, bearing fine stellate hairs and longer setae; leaves obovate to elliptical, usually  $\pm$ -acute, the margins a little recurved, upper surfaces scabrous with pale tubercles and long setae (but no stellate hairs), underneath glabrous or with tiny hooked hairs on the lamina (but none stellate) and the midribs bearing stellate hairs and bristles; flowers on long slender peduncles; calyx setiferous.

*H. asterotricha* is almost co-extensive with *H. aspera*, but it does not occur in western Victoria or South Australia.

**Genus TIEGHEMOPANAX: A New Species Allied to *T. sambucifolius***

**TIEGHEMOPANAX MULTIFIDUS** sp. nov. ob inflorescentiam *T. sambucifolia* (Sieb. ex DC.) Viguier affinis, sed differt: foliis bipinnatis vel tripinnatis; pinnis ultimis circiter 2 mm. latis, plerumque punctatis; pinnulis atque lobis acuminatis, marginibus integris.

**HOLOTYPE**: W. Tree, 16 m. north of Buchan, Victoria; N.A.W. No. 4833, 23/1/1957 (MEL. duplicates to be sent to K, NSW).

Rushy shrub, usually low, rarely to several feet high; leaves bi- to tripinnate, the pinnae (secondary and tertiary) mostly irregularly pinnatifid; the ultimate pinnules and lobes about 2 mm. wide, acuminate, with entire margins; flowers and fruit as in *T. sambucifolius* (Sieb. ex DC.) Viguier.

*Distribution:* Eastern Victoria (Mt. Little Dick, near Bruthen; Little River Falls, Wulgulmerang; Mt. Tara, near Buchan; Nowa Nowa; Mt. Buck, near Orhost; etc.); also in south-eastern New South Wales.

Typical *T. sambucifolius* has the leaves once pinnate; the pinnae are lanceolate to ovate, acuminate, and with margins regularly denticulate, not pinnatifid or lobed. This occurs in New South Wales, from the Sydney-Blue Mountains area to New England.

What is regarded as belonging to *T. sambucifolius* in Victoria, differs from the typical plant in having the leaf-margins entire, not denticulate, and the leaflets are obtuse or  $\pm$  acute but not acuminate. This ranges from central districts (Mt. Disappointment, Dandenong Ranges, etc.) eastwards (Delatite River, Wilson's Promontory, Mt. St. Bernard, Cann River, etc.) into New South Wales. In the alps and subalps the plant has primary pinnae usually linear and obtuse, occasionally only 2-3 cm. long and 2-3 mm. wide. This development occurs also at lower elevations, where it grades into the typical lowland form which has lanceolate to ovate leaflets (occasionally even as large as 18 x 13 cm.). F. Mueller applied the names *Panax angustifolius* and *P. dendroides* respectively to these two forms. The broad form is occasionally bipinnate, with up to about twenty lanceolate pinnae each 3-4 cm. long; but such secondary pinnae are not narrow-linear, pinnatifid or lobed as are those of *T. multifidus*.

All leaf characters mentioned above apply to the foliage of mature (flowering) branches. Leaves of juvenile growths are less dissected and their leaflets may be irregularly lobed or coarsely toothed or  $\pm$  regularly denticulate.

In south-eastern New South Wales and eastern Gippsland, where *T. sambucifolius* (forma) and *T. multifidus* both occur abundantly, extensive field observation over a period of many years has failed to reveal to the writer any intermediate states or connecting links between the two.

#### Genus *ASTROTRICHA*: A New Species, and Comments on Its Allies

*ASTROTRICHA PARVIFOLIA* sp. nov. ob flores socio *A. ledifoliae* DC. confertans, sed jam distinguitur foliis perbrevibus; angustis (6-15 x 1-2 mm.) sessilibus nitidis reflexis haud asperis (tuberculi pauci magni adsunt).

**HOLOTYPE:** Near Providence Ponds, eastern Victoria; leg. T. S. Hart, 15/11/1919 (MEL; duplicates to be sent to K and NSW).

A small, erectly branched shrub; leaves crowded and almost all reflexed, sessile, 6-15 mm. long, 1-2 mm. wide, obtuse, the margins somewhat recurved, upper surface shiny and smooth except for several large tubercles; vestiture very sparse and loose, soon disappearing from the upper stems and the branches of the inflorescence; flowers and fruit as in the *A. ledifolia* group.

*Distribution:* Apparently endemic in the dry sandy country of east-central Gippsland. F. Mueller collected it "between Latrobe and Merrimans Creek", both on April 26, 1853 and in November 1854; there is a further specimen from the type locality (Providence Ponds, leg. Ruth Clarke, 4/11/1951); and a third area for the plant is indicated by a small specimen labelled "Avon Country, June 1955" (leg. W. Cane).

This species belongs to a group of closely related forms which have usually been regarded as the one species. The other Victorian representatives of the group are as follows:

*A. ledifolia* DC.—Leaves flat short and oblong to long and narrow-lanceolate, 3 mm. or more wide, the margins hardly recurved, the upper surface dull and minutely scabrous; vestiture a light or loose mat of very

small hairs. It grows about the eastern highlands (from the Dandenong Ranges to Mount Buffalo and Mount Ellery) and in New South Wales.

*A. linearis* A. Cunn. ex Benth.—Leaves narrow-linear, mostly 3-8 cm. long, 1-1.5 mm. wide, the margins  $\pm$  revolute, the upper surface dull and minutely scabrous; vestiture a dense mat of minute hairs. This species is recorded from Mount Macedon, Ovens River and Mitchell River, and it is found in New South Wales.

*A. asperifolia* F. Muell. ex Klatt.—Leaves linear, 2-6 mm. wide, the margins strongly recurved, the upper surfaces asperous with numerous large and small tubercles; vestiture a loose mass of comparatively large hairs. It is widespread in the State, being plentiful in the Grampians area, in the mountains of central Victoria and in East Gippsland.

*A. crassifolia* W. F. Blakely.—Leaves 2-3 cm. long and about 1.5 mm. wide, narrow-linear, the margins revolute, the upper surface shiny and completely smooth; the vestiture a tight felty mat. It is restricted in this State to the Snowy River valley (Suggan Buggan and the gorges east of Burchers Ridge). This Victorian occurrence of the species has smaller leaves than does the type form from New South Wales.

(I wish to thank Mr. J. H. Willis of the National Herbarium of Victoria for his interest in this research and for his preparation of the Latin diagnoses in the paper.)

## A NEW COMBINATION IN PLEUROSORUS

By MARY D. TINDALE\*

### *PLEUROSORUS SUBGLANDULOSUS*

(Hook. et Grev.) Tindale n. comb.

As pointed out to me some years ago by Dr. R. Pichi-Sermoli, there are two species of *Pleurosorus* in Australia, namely the common *P. rutifolius* (R. Br.) Fee and another species which appears to have been generally overlooked in Australian fern literature. Hooker and Greville in their *Icones Filicum*: (1827), t. 90, described *Gymnogramma subglandulosa* from a specimen collected by D. Fraser in Australia (without specific locality). It is usually a larger fern than *P. rutifolius* which is characterized by finer, longer, ferruginous, non-glandular-tipped hairs on the lamina, rachis and stipes. In *P. subglandulosus* these hairs are ferruginous but glandular-tipped. Both species have a wide distribution in Australia, being found under rocks and in rock crevices. *P. rutifolius* occurs in the drier parts of Victoria, New South Wales, Queensland, Tasmania, South Australia, Western Australia and the Northern Territory, whereas I have examined specimens of *P. subglandulosus* from all of these States except Tasmania.

I have not seen the type of *P. subglandulosus*, but the illustrations of both species (especially the laminal hairs) in Hooker and Greville's *Icones Filicum*, Plates 90 and 91, are excellent. I have examined the holotype of *P. rutifolius*, namely "Derwent, Risden (Lorr), Tasmania, R. Brown No. 7, 1802-05" (BM.) which has two specimens with glandular tipped hairs mounted by mistake on the same sheet. In the isotype at the Kew Herbarium the laminal hairs are non-glandular. A typical specimen of *P. rutifolius* was collected by J. A. S. Johnson and E. F. Constable at Beaumont Hill, 36 miles west of Cobar, N.S.W., on June 26, 1955 (NSW. P7230; K; US.; UC; L., BM.). The only Victorian specimens of this species which I have seen, were collected at Europa, Leneva and Mt. Wycheproof.

Representative specimens of *P. subglandulosus* are as follows: New South Wales—Slopes of Mt. Naman, Warrumbungle Mts., 2,300 ft. alt., under

\* National Herbarium of New South Wales.

moist rocks, Johnson and Constable, 18.4.1952 (NSW, P2776); Pinnacle Mountain, 8 mls. north-north-west of Grenfell, 750 ft. alt., in rock crevices, Constable, 21.3.1956 (NSW, P7475); Jewolan Caves, W. F. Blakey, 8.1900 (NSW, P4578); Broken Hill, A. Morris, 5.7.1920 (NSW, P4583). Victoria—Chiltern, H. B. Williamson, 12.1900 (NSW, P588). Queensland—Wallangarra, J. L. Boorman, 4.1914 (NSW, P4597). Western Australia—Gooseberry Hill, Darling Range, A. Morrison, 16.7.1904 (NSW, P7526). Northern Territory—Standley Chasm, D. Symon, No. 60, 5.6.1953.

I wish to thank the Keepers of Botany at the Kew Herbarium and the British Museum of Natural History for enabling me to examine the specimens of *Pleurozozus* in their collections.

## SURVIVAL OF NATIVE PLANTS

By EUGALIE BENNETT

In these days of disappearing native flora, it is heartening to discover that the "will to live" persists in a remarkable manner even in spots where the annual burning-off might be expected to destroy most living things. The places in mind are suburban railway cuttings, particularly those on the line from Sandringham to Melbourne. For years it has been a delight to see old favourites flower as usual each spring, and to notice how much of the indigenous growth manages to survive. These include Tea-trees (*Leptospermum*), Wattles (*Acacia longifolia*, *A. ornata*), and others. A beautiful specimen of Correa, the so-called "Native Fuchsia", about three feet high, still flourishes near Bridge Street. Sheoaks (*Casuarina*) and Boobyalla (*Myoporum*) grow freely near Brighton Beach, while at Middle Brighton and at Prahran a pleasant surprise is our Common Maidenhair (*Adiantum aethiopicum*) growing beneath the coping-stone at the edge of the platform.

Various eucalypts, pittosporums and bracken may be seen as far in as Gardenvale. From Ripponlea towards Elsternwick is a very interesting patch, where Sweet Bursaria (*B. spinosa*) and Running Postman (*Koomekia prostrata*) are to be seen. Immediately around Elsternwick station, on both sides of the line, is worth a study in itself. Some specimens gathered there were sent to Mr. T. S. Hart for identification; he replied:

"The Elsternwick plants are a reminder of the old days when we would occasionally take a walk, on the way home from a school at Balaclava, to Brighton. The hill at the railway station cutting may be regarded as quite typical of the soils resting direct on the red beds. A tree on the opposite side which I have not viewed at close quarters is apparently *Aracia implem* by its summer flowering.

"Pimeleas—*P. curviflora*, with alternate leaves and small curved yellowish flowers—is quite typical of this class of country. Dr. Sutton did not have it on his first list of Sandringham flowers, but I mentioned it to him, probably from the path at the top of the big cutting at Brighton Beach station. Besides the Elsternwick cutting I think you would find it at the cutting between Hotham Street bridge and Ripponlea station. The pimeleas survive well, partly because the bark is so tough and not readily eaten off by stock in the paddocks, and because the railway conditions suit anything which will stand burning off and will shoot again from tubers or rhizomes or a woody rootstock. The shorter pimelea is *P. humilis*, rather squat, bracts larger than the leaves and stem hairy behind the flowers. It is possible that *P. curviflora* is actually becoming more prominent, but it could easily have been overlooked as that class of country was worth clearing for cultivation and was little seen on our usual routes from Cheltenham to Sandringham.

"The everlasting seems definitely *Helichrysum apiculatum*. The very slender plants, stems scabrous and square, seems to be *Nataragis*, species uncertain; *Autoragis* is best called Raspwort.

"The little cutting half a mile S.E. from Elsternwick was different—bracken and *Basmaea cinerea*—and more sandy."

After Elaterrivick and Ripponica the natives begin to disappear and except for an occasional eucalypt, a bank on the Windsor side of Balaciyava shows shrubs of various kinds, but evidently mostly escapees from the gardens and parklands above.

This list is of course incomplete, as it is difficult to recognize all species from a moving train, but what are in evidence are sufficient to raise hopes that all the natives which were once widespread in the district may not disappear entirely.

One wonders if it would be possible to persuade the Railway Department to maintain and plant more indigenous species which were characteristic of the districts through which the lines run. Such plants rarely require any attention when once established, except to be left alone!

## A REMARKABLE NEW ACACIA FOR VICTORIA

(The "Jumping-Jack" Wattle)

By R. V. SMITH, National Herbarium of Victoria

### ACACIA ENTEROCARPA R. V. Smith,

species nova insignis ob phyllodia rigida subteretia prominenter nervata pungentiaque *A. collettioidem* Benth. perfunctorie simulans, sed in characteribus sequentibus facile distinguitur: habitu depresso late diffuso (usque ad 2 m.); costulis (caulis atque phyllodiorum) scabridis; phyllodii articulo (sine pulvino manifesto ad caulem decurrenti) et apice pungenti subito et oblique contracto; fructibus crassioribus et dense pilosis; floribus majoribus, sepalis latioribus, petalis acutioribus, filamentis multo longioribus et densius intricatis; fructu intestiniformi sed complanato, in plano uno iterum atque iterum rursus-prorsum ad se flexo plicatoque (in modo mirabili "jumping-jack cracker" persimulans), si extendatur  $\pm 30-40 \times 1.5-2$  mm. metienti, marginibus perincurvatis pallidioribus; semine sine funiculo evidenti.

*Populatio*: VICTORIA—regio West Wimmera, in tractibus desertis inter Nhill et Serviceton.

*TYPI* in Herb. MEL: "Buck-shot gravel soils of railway reserve about 2 miles west of Diapur, where line passes through Lawlet Range" (*Eric Muir*—HOLOTYPE cum fructibus Dec. 1950; PARATYPE Dec. 1950, et cum floribus Sept. 1950).

A low sprawling bush up to 2 ft. high, but spreading to 6 or 7 ft. in diameter, with balsamic aroma. *Phyllodes* rigid, spreading, narrow-linear to almost terete, up to 4 cm. long and about 1 mm. wide with elliptical cross-section, articulated at stem by a small rough thickening, the apex contracting suddenly and obliquely into a rigid pungent point. *Nerves* raised and prominent (some broader than others), 5 to each face, with 1 on each side forming edge of phyllode, strongly marked with asperities and bearing lines of minute intervening glandular projections. *Stems* strongly ribbed, the ribs marked with closely spaced asperities. *Flower-heads* globular, in axillary clusters of 2 or 3, with rather prominently projecting buds. *Peduncles* about 4 mm. long, rather thick, densely silky-hairy. *Flowers* about 20 per head, 5-partite. *Stamens* numerous, much longer than flowers, densely intricate. *Petals* broad-lanceolate and pointed. *Sepals* broadly spatulate, with ciliate-roughened tips. *Pods* are the most striking feature of the plant, bearing a remarkable resemblance to an intestine (hence the specific epithet), also to a fire-cracker of the "jumping-jack" sort; they are narrow (about 1.5-2 mm. wide), somewhat flattened, compactly folded backwards and forwards (in one plane) about five times, slightly constricted between the seeds, with scattered surface hairs and a prominently thickened pale-yellow margin; total length of the folded fruit is about 15-20 mm., but, if extended, the actual length would be 30-40 mm. (each

U-shaped fold is 5-6 mm. wide). *Seeds* dark-brown to black, dull, smooth, about 3 mm. long, with large caruncle; they lie longitudinally in the pod and occupy each of its horizontal folds, the funicle appears to be extremely minute and inconspicuous (never with a folded aril).

#### Discussion

In its rigid, nearly terete, strongly nerved and pungent phyllodes, this plant resembles *A. colletioides* Benth., but it differs markedly from this in a number of important characters, contrasted as follows:

1. In *A. colletioides* the phyllodes are prominently articulated to a decurrent "shoulder" which projects boldly from the stem, the nerves extending right down to this clear-cut articulation; in *A. enterocarpa* the articulation is obscure and almost right against the stem, from which the nerves are separated by a somewhat thickened base (but there is no prominent "shoulder").

2. The nerves in *A. colletioides* are smooth and 3 to each face, whereas in *A. enterocarpa* they are scabrid and 5 to each face.

[*Note*—The var. *nyssophylla* of *A. colletioides* has numerous fine nerves on each face, but exactly the same curious articulation as in typical *colletioides*. Further investigation may justify its recognition as a distinct species; but it is no more connected with *A. enterocarpa* than is *A. colletioides* itself.]

3. The tip of the phyllode in *A. colletioides* contracts gradually, and is almost straight, whereas in the new species it contracts quite suddenly and tends to be oblique.

4. In between the nerves of *A. colletioides* are short papillate hairs, while in *A. enterocarpa* there are minute glands.

5. Stems of the former species are almost smooth, or at most very obscurely ribbed, while in the new one they are strongly ribbed and scabrid.

6. The pods are astonishingly different: in *A. colletioides* broadly flattened, slightly constricted between the seeds, only gently curved and twisted, but distinctly reticulate-veined on the surface; in *A. enterocarpa* they show the unique and extraordinary folded structure already described.

7. Seed of *A. colletioides* is similar to that of *A. enterocarpa*, with a prominent caruncle, but differs in having a long funicle (doubly folded beneath the caruncle).

8. Peduncles of the flower-heads in *A. colletioides* are slender and almost glabrous, while in *A. enterocarpa* they are thicker and densely hairy.

9. In the former plant, the petals are spatulate and blunt, sepals with narrow claws and spatulate hooded laminae, while the stamens are neither dense nor much longer than the petals; in *A. enterocarpa* the flowers are larger with lanceolate pointed petals, broader sepals and the densely intricate staminal filaments far exceeding the petals.

10. The habit of the two species is different, *A. colletioides* being a small, erect, densely branched tree, while the other is only a low widely sprawling bush.

Although Mr. Eric Muir's very complete and excellent suite of type material (from near Diapur) first drew my attention to this remarkable wattle, he was not the first to collect it. A number of earlier collections had reached the Melbourne Herbarium where they were wrongly determined as "*A. colletioides*"—none of these examples are in fruit, so the error is understandable. Following are details of these previous collections:

1. Selveceton (Miss Turner, 1882—small fragment).
2. Nhili (St. Eloy D'Alton, 31/3/1897—pod flowering material).
3. Yanac, about 19 miles N.W. of Nhili (P. E. Gordon, July 1943—flowering fragment).
4. Diapur, on gravelly northern extension of Lawloit Range (*A. ?*—Hicks, Sept. 1949—fragments).

CHANGES IN THE NOMENCLATURE OF SOME VICTORIAN  
DICOTYLEDONS

By A. B. COURT\*

## Mimosaceæ

*ACACIA ULICIFOLIA* (Salisb.) Court, combinatio nova.*Mimosa ulcifolia* Salisb. *Prodr. Stirp.* 324 (1796);*M. juniperina* Vent. *Jard. Malin.* 2: t. 64 (1804);*Acacia juniperina* (Vent.) Willd. *Sp. Plaut.* 4: 1049 (1806).

An examination of Salisbury's original description of *Mimosa ulcifolia* and his manuscript notes [Salisbury Drawings and Manuscripts Vol. 2, p. 143] kindly transcribed by the British Museum of Natural History supports the contention by Benham and others that *Mimosa ulcifolia* and *Acacia juniperina* are conspecific. Since the former of the two names is the older and since it was validly described by Salisbury the new combination, as indicated, must be made under Art. 65 of the International Code of Botanical Nomenclature (Stockholm, 1950). Unfortunately, no Salisbury specimen of *Mimosa ulcifolia* has been located, but he gave as the type locality and collector "Sponte nascentim juxta Port Jackson, solo arenosa legit. Dav. Burton."

*ACACIA BROWNI* Steud. ex DC. *Prodr.* 2: 449 (1825).

Benham [*Flor. Aust.* 2: 332 (1864)] reduced *A. brownii* Steud. ex DC. [*Prodr.* 2: 449 (1825)] to a variety of *A. juniperina* and cited the following as synonyms: *A. acicularis* R.Br. in Ait. f. [*Hort. Kew.* ed. 2 5: 466 (1813)], non Willd.; *A. pugioniformis* H. Wendl. ? [in *Flora* 1819: 139 (1819), non *A. pugioniformis* H. Wendl. [*Comment. Acac.* 38 t. 9 (1820)]: *A. brownii* Steud. ex DC. [*Prodr.* 2: 449 (1825)]; *A. arcutulos* Spreng. [*Syst. Veg.* 3: 134 (1826)].

McCandolle cites Sieber n. 463 as the type of *A. brownii*, and a duplicate of this type is in the Melbourne Herbarium. The differences between *A. ulcifolia* and *A. juniperina* var. *brownii* are sufficient to regard them as different species and, accordingly, *A. brownii* will be restored as distinct specifically from *A. ulcifolia*.

If *A. pugioniformis* H. Wendl. *Flora* 1819: 139 (1819) proves to be conspecific with *A. brownii* Steud. ex DC., then the former name, being the older of the two, must be resurrected; but, for the time being, *A. brownii* will be the name used for the low sprawling plant which hitherto has been called a variety of *A. juniperina*.

Brief notes on these two species follow:

*A. brownii* Steud. ex DC.—Low sprawling shrub, rarely more than 18 inches high; branches glabrous; phyllodes quadrangular-terete, distant, spreading, stipules small and deciduous; flower-heads solitary, deep orange-yellow, appearing September-November.

*A. ulcifolia* (Salisb.) Court.—Rigid shrub 3-6 feet high; branches pubescent (at least towards their extremities); phyllodes distinctly flattened vertically, often crowded; stipules small and persistent. Flower heads solitary, creamy yellow, appearing as early as March and persisting as late as September.

## Papilionaceæ

*EUTAXIA MICROPHYLLA* (R.Br.) J. M. Black, var. *DIFFUSA* (F. Muell.) Court, status novus et combinatio nova.*Sclerothamnus diffusus* F. Muell. *Pirat. Gen. Rep. Govt. Bot.* 12 (1853), nomen.*Entola diffusa* F. Muell. *Froym. Phys.* 3: 7 (1858).

\* National Herbarium of Victoria.

In his original description F. Mueller gave as the distribution of *Eutasia diffusa* "from the Flinders Range and St. Vincent's Gulf towards the Murray River and in the region of Bacchus Marsh." Several sheets of specimens of this variety from these localities bear Mueller's writing, but he did not cite any particular specimen as the type. Accordingly, the specimen in Melbourne Herbarium with label "collected on the journey through interior regions of South Australia as far as Mt. Remarkable" [translated Latin] by Mueller is chosen as the lectotype for this variety. *Eutasia microphylla* var. *diffusa* differs from the typical form in the following features: non-spinescent and erect habit (usually 3-4 feet); more distant leaves, which are oblong-lanceolate to rhomboid; much paler yellow flowers, which do not show obvious red veins.

**LOTUS CRUENTUS** *Cont.*, nomen novum

*Lotus coccineus* Schlechtendal in *Linnæa* 21: 452 (1848), non *L. coccineus* Vellozo *Flor. Flum.* 315 (1825) & 2: L. 135 (1827); nec. *L. coccineus* Fisch. et al. *Ind. Semiv. Petrop.* 10: 59 (1835-46).

As a later homonym Schlechtendal's name *Lotus coccineus* must be rejected and replaced by a new name. The epithet *cruentus* is here given for this small plant, which is found in most temperate inland parts of Australia (except Tasmania), in allusion to the colour of its flowers—the keels are almost dark red.

**Rutaceæ**

**PHIBALIUM GLANDULOSUM** Hook., var. **BULLATUM** (J. M. Black)

*Cont.*, status novus et combinatio nova.

*Phibaliun bullatum* J. M. Black in *Trans. Roy. Soc. S. Aust.* 102: 460, L. 47 (1916)

Several species of *Phibaliun*, including *P. glandulosum* Hook., *P. obcordatum* A. Cunn. ex Benth., *P. squamulosum*, Vent. and *P. stenophyllum* (Benth.) F. Muell. are often difficult to distinguish and some authors, particularly F. Mueller and Bentham, have expressed doubts about the specific merit of some of these. Although leaf characters are the chief criteria used in defining most species of *Euphebiun*, *P. bullatum* J. M. Black is here reduced to a variety of *P. glandulosum* Hook. The leaves of the variety are usually very deeply channelled, prominently keeled and without revolute margins; those of the typical form are neither channelled above nor prominently keeled below, but have leaf-margins which are sometimes so revolute that the lower surfaces of the leaves are almost completely hidden. Apart from these differences the two varieties cannot be separated from one another by any characters, except perhaps in the degree of hairiness on the lower part of the style (which is stellate-hairy in *bullatum* but usually glabrous in the typical form). There are no apparent differences between the vestitures of the two varieties.

**CORREA REFLEXA** (Labill.) Vent. *Jard. Malm.* 1: sub t. 13 (1803).

This species, with truncate almost toothless calyx, was based on *Moscatoxeron reflexum* Labill. [*Voy.* 2: 46 t. 19 (1799)—page 70 in the English Edition of this work]. It is one of the most complex in the whole of the *Rutaceæ*, having been treated in various floras as *C. rubra* Sm., *C. speciosa* Andr. or *C. reflexa*, and has always been a very difficult species to study. So far as Victorian specimens are concerned, it would seem convenient to recognize four varieties, including the typical form. Three new combinations are necessary and will here be made for three of these, viz.:

**C. REFLEXA** (Labill.) Vent., var. **CARDINALIS** (F. Muell. ex Hook.) *Cont.*  
status novus et combinatio nova

*C. cardinalis* F. Muell. ex Hook. in *Curtis's Bot. Mag.* 82: t. 4912 (1856).

*C. REFLEXA* (Labill.) Vent., var. *GLABRA* (Lindl.) Court, status novus et combinatio nova.

*C. glabra* Lindl. in Mitch. *Three Exped. E. Aust.* 2: 48 (1838).

*C. REFLEXA* (Labill.) Vent., var. *PULCHELLA* (Mackay ex Sweet) Court, status novus et combinatio nova.

*C. pulchella* Mackay ex Sweet *Flor. Aust.* 1: 1 (1822-28).

The four varieties may be briefly described as follows:

Var. *REFLEXA*—Leaves ovate-elliptic, often obscurely indented, frequently reflexed, stellate-hairy at least on the lower surface; corolla usually more than twice as long as broad, yellow or greenish, pink or bicolorous. [*C. rubra* Sm. *Frol. Bot.* 2: 26 (1805-7), *C. viridis* Sm. *l.c.* 25, t. 72; *C. speciosa* Andr. *Bot. Repos.* 10: t. 653 (1811), teste Ait. *f. Epit. Hort. Kew.* 366 (1814)].

Var. *CARDINALIS* (F. Muell. ex Hook.) Court—Leaves in isolated pairs, narrow-elliptic with revolute margins, entire, seldom reflexed, coarsely stellate-hairy, at least on the lower surface, and often rugose; corolla usually more than twice as long as broad, vivid scarlet with yellow-green tips.

Var. *GLABRA* (Lindl.) Court—Rather tall shrubs of rocky declivities (sometimes riparian); leaves elliptical, almost glabrous on both surfaces; corolla about twice as long as broad or less, greenish-yellow.

Var. *PULCHELLA* (Mackay ex Sweet) Court—Low shrubs of western heaths or limestone tracts (sometimes in arid country); leaves usually broadly ovate, almost glabrous on both surfaces; corolla about twice as long as broad or less, rosy pink.

The difficulties facing systematists in dealing with this species arise from several sources. Many garden varieties and crosses have been introduced by horticulturists, particularly in England, and some of these were described as distinct species early last century. The species itself, as indicated above, is highly variable and shows great diversity of form and colour. It must be remembered that the four varieties, distinguished above, are only the more important ones occurring in Victoria. There are some forms of *C. reflexa* which cannot be assigned to any one variety satisfactorily. Perhaps a general approach to a study of this species, and indeed to the genus *Correa* in general, would yield worthwhile results.

#### Trogonaceae

*TETRATHECA GLANDULOSA* Labill., var. *ORBIFOLIA* W. P. Blakey ms.

A forma typica speciei (ex Tasmania) folio subrotundo—quantum lato duplo longiore perraro superanti—atque paene integro (praeter ciliis marginibus) recedit.

*HOLOTYPE*: VICTORIA—"Grampians" (Herb. MEL—C. Walter, Oct. 1888).

This new variety departs from the typical Tasmanian form of the species in having almost round leaves—seldom more than twice as long as broad—with almost entire margins (except for the cilia).

The typical form of *T. glandulosa* occurs only in Tasmania, and can be separated easily from mainland specimens on leaf-shape alone; it was first described by Labillardiere in 1806 from specimens collected in Tasmania.

#### Myrtaceae

*CALLESTEMON MACROPUNCTATUS* (DunM. Cours.) Court, combinatio nova.

*Metrosideros macropunctata* DunM. *Cours. Bot. Cult.* ed. 2: 277 (1814).

*M. rugulosa* Willd. *Kuon. Plant. Hort. Berol. Suppl.* 31 (1813), nomen  
*M. rugulosa* Willd. ex Link *Kuon. Plant. Hort. Berol.* 2: 27 (1822).  
*Callistemon rugulosus* (Willd. ex Link) DC. *Prodr.* 3: 223 (1828)

Modern systematists working on the genus *Callistemon* have overlooked the fact that *Metrosideros rugulosa* was not validly described until 1822, in assuming that the date of valid publication was 1813, they ignored *M. macropunctata*. The description, kindly transcribed by the Director of the Royal Botanic Gardens, Kew, fits material identified here as *C. rugulosus*. DeCandolle (*Prodr.* 3: 223 (1828)) indicates quite plainly that *C. rugulosus* and *M. macropunctata* are conspecific and this is taken as sufficient evidence to justify the new combination.

**CALYTRIX ALPESTRIS** (Lindl.) Court, *combinatio nova*

*Geoxylis alpestris* Lindl. in *Mitch. Three Exped. Fl. Aust.* 2: 128 (1838).  
*Lhotskya alpestris* (Lindl.) Druce in *Rep. Bot. (Soc.) Eresh. Ct. Manchr.*  
 1916: 633 (1917).

There are no constant differences between *Lhotskya* Schauer and *Calytrix* Labill. and it seems most desirable to unite these two genera. Accordingly *L. alpestris* (Lindl.) Druce is here transferred to the genus *Calytrix*. The main distinction between the two genera has been the absence of awns at the apices of the sepals in *Lhotskya*. In Victoria, at least, this distinction breaks down completely, there being no awns in some desert forms of *C. tetragona* Labill. In the Big Desert, and near Lake Hattah also, there is a complete gradation—from specimens which have long fine awns to some without any awns at all (F. M. Reader's ms. variety "inermis").

**Goodeniaceæ**

**DAMPIERA PURPUREA** R.Br. *Prodr. Flor. Nov. Holl.* 588 (1810).

*Dampiera undulata* R. Br. l.c. 587.  
*D. rotundifolia* R. Br. l.c. 587.  
*D. ovalifolia* R. Br. l.c. 588.  
*D. brazenii* F. Muell. *Frugm. Phyt. Aust.* 6: 29 (1867).

Krause in *Pflanzenreich* 4277: 187 (1912) placed *D. undulata* R.Br., *D. rotundifolia* R.Br., *D. ovalifolia* R.Br. and *D. purpurea* R.Br. under *D. brazenii* F. Muell. as synonyms. According to Art. 16 of the International Code (Stockholm, 1950) the oldest name must be retained, provided it is validly published. Since Brown described the four species listed above at the one time, *D. purpurea* is chosen as the most appropriate epithet under Art. 67 of the Code, the other three of his species being reduced to synonymy therewith.

**MICROSCOPICAL GROUP**

Mr. A. Tennant was guest speaker at the November meeting, and took as his subject "The microscope in Metallurgy". In a lucid manner he explained the various mixtures of the components which go to make up those numerous metals used in industry, affecting as they do the tensile strength, hardness, and brittleness. Unfortunately the epidiroscope was not available for use so we missed seeing illustrations relating to the micro "make-up" of prepared specimens. Mr. Tennant was accorded a hearty vote of thanks, and, in reply, invited the Club members to his laboratory at Ruwols to see a more comprehensive display at some future date.

The subject for the January meeting was "Entomostraca", the speakers delivering their lecture in a novel and unusual manner. The subject matter was recorded on a tape machine during the holidays at home. Mr. D. McInnes was the main lecturer, ably assisted by Mr. W. Evans, the delivery being synchronized with a 35 mm. projector showing photos of drawings of the water-flea and cyclops.

The lecture for the February meeting is entitled "Marine Life under the Microscope" and will be a combined effort of Club members. All are asked to bring their microscopes, as slides will be provided for exhibition. The Marine Biology Group is specially invited to be present. Several speakers, including marine specialists Mrs. Freame and Mr. R. Luky, will briefly introduce the numerous exhibits.

The March meeting will take the form of a demonstration outlining technique in the preparation of rock sections for the microscope, by Mr. D. McInnes.

## NATURALISTS' NOTEBOOK

(Reserved for your Notes, Observations and Queries)

### CAMOUFLAGE AND BLUFF

Protective coloration has been recognized by naturalists the world over for a very long time. Two striking examples were brought to my notice not long ago.

On a visit to "The Shack" indications pointed to the fact that a pair of Spur-winged Plovers were nesting in a swampy flat about one hundred yards away. This marshy tract was much frequented by cattle and its surface was deeply pock-marked by their hooves. The nest was just a slight depression on a low grassy mound and contained three eggs.

Investigations on a later trip disclosed that incubation had been recently completed, as only empty broken shells remained. As the parent birds were still confining their activities to a rather limited area, the inference was that the young were not far away. Binoculars enabled us to pick them out in their dark dull attire—so different from that of the adults, but it was soon obvious that only "two little nigger-boys were left out of three".

Being anxious to have a really close-up view of the new arrivals we decided to adopt a special form of campaign. Waiting patiently until the family of four had worked their way to a convenient position on the edge of the bog, while I kept an eye on proceedings, another of our party moved our suddenly from cover. Instantly the old couple exploded into the air uttering their alarm notes. I fondly imagined that, with the visual aids I was using, I had accurately pin-pointed the location of one of the babies; nevertheless, keen eyesight plus some little time were required to detect its hiding-place. Words are inadequate to describe how well the colour and even the shape of that immature plover blended into its surroundings. It was crouched flat with head and neck outstretched and eyes tightly closed in a moist depression against a background of dark, sandy loam. So effectively did its plumage match the damp ground that it was indeed difficult to see it even after one realized that it was there. The camouflage was to all intents and purposes perfect. I should like to record also that even when placed on the palm of one's hand the baby continued to maintain that "dead" attitude.

In the second case I should like to mention, concealment was not attempted and in place of sombre tones, loud colours were used purely to frighten or to bluff. Out on a hike someone exclaimed "What's that?" "That" happened to be a wingless female of a Mountain Grasshopper, a hunch-backed ugly insect about an inch long and the colour of old straw, which, when annoyed (and she certainly was) raises her elytron to display an abdomen brightly banded in rings of blue, red, white and black. In addition, to increase her repulsiveness, she protrudes a brilliant orange collar round her head. I am sure the stomach of any respectable, even if hungry, bird would "turn" at the mere sight of her.

—R. M. WISHART.

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

Monday, March 18—"The Colourful Port Campbell Coastline", by Dr. George Baker. (NOTE: Normal General Meeting date changed owing to Labour Day holiday.)

**F.N.C.V. Excursions:**

Sunday, February 24—Parlour-coach excursion to Sorrento. Leader. Mr. Strong. Subjects: Marine Biology and General. Coach leaves Batman Avenue 9 a.m., returns approximately 8.30 p.m. Bring two meals. Bookings with Excursions Secretary.

Saturday, March 2—Botany Group excursion to Maranoa Gardens. Take Mount Albert tram to Stop 54. Meet 2.30 p.m. at main gate.

**Group Meetings:**

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

Wednesday, February 20—Microscopical Group.

Wednesday, February 27—Botany Group. Subject: Heathland Flora.

Wednesday, March 6—Geology Group.

Monday, March 4—Marine Biology and Entomology Group at Parliament House. Meet 7.30 p.m. at private entrance at south end of Parliament House.

**Preliminary Notices:**

Sunday, March 24—Parlour-coach excursion to Lal Lal and Moorabool Falls. Leader: Mr. R. Hemmy. Fare, 22/-. Coach leaves Batman Avenue 9 a.m. Bring two meals. Bookings with Excursions Secretary.

Thursday, April 18 to Monday, April 22 (Easter)—Excursion to Dimboola under the leadership of the Wimmera F.N.C. Hotel accommodation is available and bookings, with £2 deposit, should be made with the Excursions Secretary by February 25. Train leaves Spencer Street at 8 p.m. Fare £4 (Second return).

**Native Plants Preservation Society:**

Tuesday, March 5—Professor J. S. Turner will show selected colour slides at M.C.E.G.S., Anderson Street, South Yarra, commencing 8 p.m. Admission 2/-. Secretary, Miss W. Waddell, 3 Denham Place, Toorak.

**Victorian National Parks Association:**

March 4 to March 22—About thirty members of the National Parks Association of Queensland, and members of the V.N.P.A., will arrive at Mount Buffalo on March 4 and camp at the Catani Camping Ground. On March 12 they will travel to Wilson's Promontory, where they will stay until March 22. F.N.C.V. members are invited to join the party either at Mount Buffalo or at the Promontory; those wishing to do so should make travel and camping or accommodation arrangements as soon as possible with Mr. M. J. Harkins, 1 Howitt Street, Glen Iris.

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

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## PROCEEDINGS

GENERAL MEETING, FEBRUARY 11, 1957

*Subject of the Evening.*—This Meeting was very well attended, and a varied programme of members' coloured slides was shown—travel scenes from Central Australia, flower studies, insects, toads, a series showing a nesting reed-warbler taken on Dudley Flats, between Melbourne and Footscray, and others. The evening was voted most enjoyable, and we hope for further efforts from the exhibitors. These were Misses Watson, Carberry, Elder and Woolford, and Messrs. Sarovich, Harwood, Mollison, Jennison, Atkins and Curtis.

*Cultural Centre.*—The Secretary reported that he had spoken to the Chief Secretary, Mr. Rylah, about this, and would write to the Trustees of the Centre when they were appointed in the near future.

*Bendigo F.N.C.*—It is hoped to invite this Club, which has been so good to us in the past, to visit us towards the end of the year.

*Forthcoming Show.*—The President announced that Prahran Town Hall had been booked for a show from October 9 to 12. Mr. Court had promised to help organize this, but many willing helpers will be required. What about you?

*Other Help Needed.*—The President also mentioned that both Messrs. Wakefield and Atkins were entering on further studies this year, and would not be able to give as much service as in the past. This would leave a number of jobs for those willing to assist.

*Floral Emblem.*—The Secretary stated that he had sent a letter to the Premier pointing out that the Common Heath (*Epacris impressa*) had been recommended as the floral emblem of the State, and suggesting that the recommendation be implemented.

*Other Matters.*—A new book on birds of New Guinea was mentioned, also functions being held early in March by the National Parks Association, Gould League and Growers of Australian Plants. Mr. Garnet spoke on the Library, appealing for the return of books borrowed and asking borrowers to sign the Borrowers' Book.

*Honorary Membership.*—Honorary Members' Certificates were presented to the Treasurer, Mr. Hooke, and Mr. A. N. Burns. The Editor has also been awarded a certificate, but could not be present. It will be presented to him at a later date.

*Bank of New South Wales.*—The Bank of New South Wales wrote thanking members, especially Mr. Rayment, for helping to

set up the wildflower display during the Olympic period. Coloured slides of this display were among those shown during the evening.

*New Member.*—Miss Elsie Baines, 33 Lansell Road, Toorak, was elected on the nomination of Messrs. Hooke and Swaby and welcomed by the President.

*Exhibits.*—Mr. McInnes showed microscope slides of Bryozoa and of cross-sections of a sea urchin's spines. Miss Raff showed garden-grown kangaroo-paw, and seeds of *Gomphocarpus*; and Miss Boddy showed variations in eucalypts.

#### MICROSCOPICAL GROUP

The meeting of February 20 was a well-attended and most instructive one. The subject was "Marine Biology Under the Microscope" and the discussion was opened by Mr. R. Lukey, who covered the items of recent and fossil Floraminifera, Polyzoa, Hydrozoa, and the red Sea-weeds. Mrs. Bream spoke on Marine worms, Clabs, Brittle Stars, Fish skins, Sponges, Holothurians and Sea Urchins.

For the March 20 meeting, Mr. D. McInnes will lead a discussion on grinding and mounting of rock sections, and members are requested to bring their microscopes and an appropriate slide.

#### A PRELIMINARY REVISION OF THE GENUS *LASTREOPSIS* CHING

By MARY D. TINDALE<sup>†</sup>

At the suggestion of Prof. R. E. Holttum several years ago I undertook a revision of the principally tropical and sub-tropical fern genus *Lastreopsis*. Ching ascribed only four species to this genus but Holttum in his *Ferns of Malaya* (1954), page 498, stated that many more species especially from Australia should be transferred to it. Below I have given a much amended description of *Lastreopsis*, as well as making 25 new combinations. Most of these species were previously placed in *Dryopteris*, then in *Cicutist* or *Rumohra* by later authors.

*LASTREOPSIS* Ching in *Bull. Fan Mem. Inst. Biol., Bot. Ser.*, 8 (4): 157 (1938); amended by Holttum in *Ferns of Malaya*: 498 (1954).

*Synonymy*: *Polystichum* section *Parapolystichum* Keyserling, *Pol. Cyath. Burg.*: 11 (1873). *Dryopteris* subgenus *Parapolystichum* (Keyserling) C. Chr. in *Vid. Selsk. Skr.*, ser. 8, 4: 93 (1920). *Parapolystichum* (Keyserling) Ching in *Soyuztssenia* 5 (4): 239 (1940).

Terrestrial ferns, *Rhizome* long-creeping, shortly creeping or rarely erect, scales thin, narrowly lanceolate to narrowly ovate, brown or rarely castaneous or almost black, the apex acute or acuminate, the cells thick-walled, rectangular or hexagonal, the lamina red or yellow, the margin entire, slightly denticulate (rarely markedly denticulate) or with a few fimbriate or glandular-headed processes, never clathrate nor iridescent. *Fronde* large, decomposed, quinqueangular, with the lowest pair of primary pinnae strongly basiscopically produced, catadromous throughout or more often anadromous in the upper segments, rarely anadromous throughout, viviparous by scaly buds in some non-Australian species. *Leaf-margin* thickened and decurrent along the costae. *Main rachis* bordered above by two prominent ridges which are continuations of the thickened leaf-margin of the pinnae, the intervening, broad,

<sup>†</sup> National Herbarium, Sydney.

<sup>†</sup> See Copeland, *Genera Filicum* 123-5 (1947)

shallow channel is rarely glabrous but mostly clothed with *Ctenitis*-hairs (short, articulated, unbranched, reddish hairs) or in other species with much longer, finer, articulated, unbranched hairs or rarely glanduloso-pubescent. Costae raised *Venus* free, the minor veinlets simple or forked, reaching the margin of the leaf-segments in some species, in others ending close to the margin, or of both types. *Sori* orbicular, small, terminal or medial on the simple minor veinlets or their acroscopic branches, indusiate or rarely exandusiate. *Sporangia* naked, with an annulus composed of 13 to 16 thick-walled cells and 8 to 9 thin-walled cells, the pedicel long and narrow, usually with one or more rarely two, oblong or capitate, red or yellow, stalked glands. *Indusia* brown (or rarely black), glabrous or villous, reniform-orbicular or rarely peltate, the margin crenate, entire or glandular-fimbriate. *Spores* globose-ellipsoidal, bilateral, with a perispore which is crested and with a broken or rarely uninterrupted wing, or more usually covered with balloon-like wings over the whole surface of the spore, rarely black and echinate. *Glandular hairs*\* cylindrical or more rarely rounded, bright yellow, orange or red, scattered over the surface of the lamina, costae, costules and sometimes on the indusia.

All of the species listed below have the thickened leaf-edge (even if it is not very prominent as in one of the New Zealand species†), but the major diagnostic feature of *Lastreopsis* is the configuration of the upper surface of the main rhachis. Each of the two prominent ridges of the main rhachis is continuous with the leaf-edge, whereas in the closely allied genera *Polystichopsis* and *Ctenitis*, each ridge, if present, is not continuous with the leaf-edge but in some cases either runs towards the centre of the pinnae or bypasses the leaf-segment altogether.

#### 1. *LASTREOPSIS TENERA* (R. Br.) Tindale n. comb. (Type species.)

*Basic synonym*: *Nephrodium tenerum* R. Br., *Prodr. Fl. N. Holl.*: 149 (1810). *Holotype*: Broad Sound (Queensland), picked (on) west hill in shady woods, R. Brown No. 23, Iter Austr., 1802-05 (BM., examined). *Other synonyms*: *Lastrea recedens* J. Sm. ex T. Moore in *Gard. Chron.*: 708 (1855) *Holotype* 2 sheets at the Kew Herbarium, the first labelled "Cuning No. 96. Thomas Moore's Fern Herbarium" and the second "Luzon (Philippines), Cuning No. 96" (examined). *Lastreopsis recedens* (J. Sm.) Ching in *Bull. Fan Mem. Inst., Biol.*, 5 (1): 161 (1938). *Ctenitis recedens* (J. Sm. ex T. Moore) Copel., *Gen. Fil.*: 124 (1947). *C. tenera* (R. Br.) Copel., *l.c.*: 125.

*Distribution*: Australia (eastern Queensland), Ceylon, the Philippines, southern India, Fiji, Sumatra and New Caledonia.

#### 2. *LASTREOPSIS MICROSORA* (Endl.) Tindale n. comb.

*Basic synonym*: *Nephrodium microsorum* Endl., *Prodr. Fl. Norflk.*: 9 (1833). *Isotype*: Sieber Syn. Fil. No. 101, Nova Hollandia, Herb. Lugd. Bat. No. 908, 335 . . . 846 (L.), examined. *Other synonyms*: *Nephrodium pentagonalum* Colenso in *Trans. Journ. Nat. Sci.* 2: 169 (1846), a New Zealand form with slightly smaller ultimate segments of the fronds. *Aspidium quinqueangulare* Kze. in *Linnaea* 23: 302 (1850). *Isotype*: Herb. Lugd. Bat. No. 908, 335 . . . 852, labelled "*Asp. quinqueangulare* Kze. (*A. oemulium* Belg.) Patria? H. Van Houtte, H. Lips 1843", (L.), examined. *Aspidium acuminatum* Lowe var. *villosum* F. M. Bail. in *Rep. Gov. Sci. Exped. Bellenden-Ker*: 78 (1889). *Holotype*: Top Camp (Bellenden-Ker), Queensland. F. M. Bailey (BR1.) and isotype (BM.), examined. *Dryopteris baileyana* Domin in *Bibl. Bot.* 85: 37 (1914), holotype as in *A. acuminatum* var. *villosum*. *Dryopteris albobilliosa* W. W. Watts in *Proc. Linn. Soc. N.S.W.* 59:

\* Glandulose forms are recorded in two species.

† See species No. 12.

771, 1914 (1915), pl. 88, f. 8. *Holotype* Stonely Creek, near Cairns, Queensland, W. W. Watts, 71913 (NSW. P4678), examined, a very villous form.

*Distribution*: Australia (Queensland to Victoria) and New Zealand.

Two different species were grouped together by Endlicher under his *Nephrodium microsorum* in *Prodr. Fl. Norfolk*. As he specifically refers to "Sieber's Syn. Fil. No. 101, *Aspidium microsorum*" nomen nudum, it was preferred to take this specimen which was collected in Australia, as the type of *N. microsorum*. The other specimen to which Endlicher refers, was collected by F. Bauer in Norfolk Island and is now located in the Natural History Museum, Vienna. It is the same specifically as *L. calantha* which appears to be restricted to Norfolk Island. I have not seen any material similar to Sieber's Syn. Fil. No. 101 except from the mainland of Australia.

*L. microsora* and *L. tenera* have been much confused, although the margin of the ultimate segments of the lamina is sharply crenate in *L. microsora* and entire, obtusely toothed or minutely serrulate in *L. tenera*. The rhizome of *L. tenera* is 12 to 15 mm. in diam., shortly creeping and very densely scaly, whereas in *L. microsora* it is 2 to 5 mm. in diam., long-creeping and clothed with very fugacious scales. The indusia of these two species are distinct. In *L. tenera* they are dark brown or black, glabrous and mostly 0.2 to 0.5 mm. broad. The oblong, dark red, red-brown or yellow glands occur chiefly along the margin of the indusium. *L. microsora* is characterized by much larger indusia which are 0.5 to 1 mm. broad. They are fawn, with a red-brown centre around which the oblong glands are usually clustered. Marginal glands are more uncommon on the indusia of *L. microsora* but sometimes a few, long, needle-like, whitish, simple, septate hairs are present, although they are often glabrous and occasionally non-glandular.

*Nephrodium fraserianum* Gaud. in *Freyc. Voy. Bot.*: 339 (1828), may be a synonym of *L. microsora* but the holotype collected by Fraser at Port Jackson, N.S.W., cannot be found.

### 3. *LASTREOPSIS SHEPHERDII* (Kze. ex Mett.) Tindale n. comb.

*Basic synonym*: *Aspidium shepherdii* in *Linnaea* 23: 230 (1850), nomen nudum; Mett., *Fil. Hort. Lips.*: 94 (1856), with description. *Other synonyms*: *Lastrea atrocirens* J. Sm., *Cat. Cult. Ferns*: 59 (1857). *Dryopteris shepherdii* (Kze. ex Mett.) C. Chr. in *Viet. Nat.*: 60: 155 (1944). *Cicentis lovei* Copel., *Gen. Fil.*: 124 (1947).

*Distribution*: Australia (south-eastern Queensland, New South Wales, Victoria, Tasmania and South Australia).

### 4. *LASTREOPSIS MARGINANS* (F. Muell.) D. A. Smith and Tindale comb. et stat. nov.

*Basic synonym*: *Aspidium decompositum* (R. Br.) Spreng var. *marginans* F. Muell., *Fromm. Phyt. Austr.*: 3: 137 (1866). *Syntypes*: Clarence River, Beckler; Richmond River, C. Moore and Moreton Bay, F. Mueller (MEL). The specimen collected by Beckler at the Clarence River is the best, so I am designating it as the *lectotype*.

*Distribution*: Australia (south-eastern Queensland and the North Coast of New South Wales).

This species is more closely allied to *L. tenera* than to any other member of this genus. Like *L. tenera* it is characterized by a thick, shortly creeping rhizome, dark brown or black, glabrous, glandular indusia, sori forming an almost marginal line around the ultimate segments and globose-ellipsoidal, bilateral spores with perispores bearing rounded protuberances. The two species may be readily distinguished, since the lamina of *L. marginans* is dark green, leathery and very glossy above, whereas in *L. tenera* it is a lighter green, dull on the upper surface, herbaceous and flaccid. In *L. tenera* there

are soft, short, white hairs scattered on the lamina between the minor venulets, whereas in *L. marginans* the lamina is glabrous. The ultimate segments of the frond in *L. marginans* are ovate-deltoid with a tendency to be dilated towards the centre and each has one sharp, apical tooth. In *L. tenera* they are oblong, acute or with several, rather obtuse or sharp teeth. The fronds of *L. marginans* are usually 4-pinnate (or 3-pinnate when young) but in *L. tenera* they are often 4-pinnate-pinnatifid.

5. *LASTREOPSIS HISPIDA* (Sw.) Tindale n. comb.

*Basic synonym*: *Aspidium hispidum* Sw. in *Schrad Journ.* 2: 39 (1800), 1801. *Other synonyms*: *Polystichum hispidum* (Sw.) J. Sm. in *Hook. Journ. Bot.* 4: 195 (1841). *Ranohra hispida* (Sw.) Copel., *Gen. Fil.* 114 (1947).

*Distribution*: Australia (New South Wales, Victoria, Tasmania), New Zealand and the Chatham Islands.

6. *LASTREOPSIS DECOMPOSITA* (R. Br.) Tindale n. comb.

*Basic synonym*: *Nephrodium decompositum* R. Br., *Prodr. Fl. N. Holl.*: 149 (1810). *Other synonyms*: *Dryopteris decomposita* (R. Br.) O. Ktze., *Rev. Gen. Pl.* 2: 812 (1891). *Ctenitis decomposita* (R. Br.) Copel., *Gen. Fil.* 124 (1947). *Parapolytaichium decompositum* (R. Br.) Chung in *Suoyatsenia* 5 (4): 239 (1940).

*Distribution*: Australia (south-eastern Queensland, New South Wales and eastern Victoria).

7. *LASTREOPSIS WURUNURAN* (Domin) Tindale n. comb.

*Basic synonym*: *Dryopteris wurunuran* Domin in *Bibl. Bot.* 85: 45 (1914).

*Distribution*: Australia (north-eastern Queensland).

8. *LASTREOPSIS MUNITA* (Mett.) Tindale n. comb.

*Basic synonym*: *Phegopteris munita* Mett., *Phyc. and Asp.* 14 (1858). *Other synonyms*: *Polypodium aspidioides* F. M. Bail. in *Proc. Linn. Soc. N.S.W.* 5: 32 (1880). *Dryopteris queenslandica* Domin in *Bibl. Bot.* 85: 44 (1914). *Dryopteris boileyi* Maiden et Betche, *Cens. N.S.W. Pl.* 2 (1916).

*Distribution*: Australia (north-eastern New South Wales and south-eastern Queensland).

As Mettenius' type specimens at the University of Leipzig are said to have been destroyed in World War II, I have chosen a lectotype for *Phegopteris munita*, namely, New Holland (Australia), Sieber Syn. Fil. No. 102, Herb. Lugd. Bat. 908,338 . . . 422 (L.), which is a good specimen. There is also an isotype which I examined at the Natural History Museum, Paris.

9. *LASTREOPSIS VIEILLARDII* (Mett.) Tindale n. comb.

*Basic synonym*: *Aspidium vieillardii* Mett. in *Ann. Sc. Nat. ser. 4*, 15: 75 (1861).

*Distribution*: New Caledonia.

10. *LASTREOPSIS SUBSERICEA* (Mett.) Tindale n. comb.

*Basic synonym*: *Aspidium subsericum* Mett. in *Ann. Sc. Nat. ser. 4*, 15: 74 (1861). *Other synonym*: *Ctenitis subsericum* (Mett.) Copel., *Gen. Fil.* 125 (1947).

*Distribution*: New Caledonia.

11. *LASTREOPSIS GLABELLA* (A. Cunn.) Tindale n. comb.

*Basic synonym*: *Nephrodium glabellum* A. Cunn. in *Hook. Comp. Bot. Man.* 2: 367 (1836). *Other synonym*: *Ctenitis glabella* (A. Cunn.) Copel., *Gen. Fil.* 124 (1947).

*Distribution*: New Zealand, Kermadec Islands and Polynesia.

12. *LASTREOPSIS VELUTINA* (A. Rich.) Tindale n. comb.  
*Basic synonym:* *Aspidium velutinum* A. Rich., *Voy. l'Astrolabe*: 70 (1832).  
*Other synonym:* *Ctenitis velutina* (A. Rich.) Copel., *Gen. Fil.*: 124 (1947).  
*Distribution:* New Zealand.
13. *LASTREOPSIS DAVALLIODES* (Brack.) Tindale n. comb.  
*Basic synonym:* *Lastrea davallioides* Brack., *U.S. Expl. Exped. 1838-42 16*: 202 (1854). *Other synonym:* *Parapolydicticum davallioides* (Brack.) Ching in *Sunyatsenia* 5 (4): 239 (1940).  
*Distribution:* Samoa, Fiji, Tahiti and the New Hebrides.
14. *LASTREOPSIS NEPHRODIOIDES* (Bak.) Tindale n. comb.  
*Basic synonym:* *Deparia nephrodioides* Bak. in *Gard. Chron.*: 253 (1872).  
*Other synonym:* *Ctenitis nephrodioides* (Bak.) Ballard in *Kew Bull.*: 559, 1954 (1955).  
*Distribution:* Lord Howe Island.
15. *LASTREOPSIS CALANTHA* (Endl.) Tindale n. comb.  
*Basic synonym:* *Nephrodium calanthum* Endl., *Prodr. Fl. Norfolk.*: 9 (1833).  
*Distribution:* Norfolk Island.
16. *LASTREOPSIS SUBSPARSA* (v.A.v.R.) Tindale n. comb.  
*Basic synonym:* *Dryopteris subsparsa* v.A.v.R. in *Bull. Jard. Bot. Bukit., ser. 2*, 20: 14 (1915).  
*Distribution:* Java and Timor.
17. *LASTREOPSIS RUFESCENS* (Bl.) Ching in *Bull. Fun. Mem. Inst. Biol., Bot. Ser.*, 8 (4): 160 (1938).  
*Basic synonym:* *Aspidium rufescens* Bl., *Enum.*: 168 (1828). *Holotype:* Java, Blume, *Herb. Lugd. Bat.* No. 908,338 . . . 446 (L.), examined. *Other synonyms:* *Polypodium aspidioides* F. M. Bail. var. *tropica* F. M. Bail. in *Proc. Linn. Soc. N.S.W.*, 5: 32 (1880). *Holotype:* Trinity Bay, Queensland, F. M. Bailey (BRI), examined. *Dryopteris tropica* (F. M. Bail.) Donn in *Bibl. Bot.* 85: 44 (1914).  
*Distribution:* Java, Ceylon, New Caledonia and Australia (Queensland).
18. *LASTREOPSIS HORNEI* (Bak.) Tindale n. comb.  
*Basic synonym:* *Nephrodium hornei* Bak. in *Hook. and Bak., Syn. Fil.*, ed. 2: 500 (1874).  
*Distribution:* Seychelles.  
 As suggested by C. Christensen in *Bonap., Notes Plér.* 16: 165 (1925) and in *Dansk Bot. Ark.* 7: 62 (1932), it is probable that *Dryopteris boizimii* (Bak.) O. Ktze., of Madagascar, is a synonym of *L. hornei*. Admittedly the fronds are very similar but without specimens with rhizomes, it would be difficult to be certain that these two species are identical.
19. *LASTREOPSIS CURRORI* (Mett.) Tindale n. comb.  
*Basic synonym:* *Aspidium currori* Mett. in *Kuhn, Fil. Afr.*: 130 (1868).  
*Other synonym:* *Ctenitis currori* (Mett.) Tard. in *Not. Syst.* 14 (4): 342 (1952).  
*Distribution:* Tropical West Africa.
20. *LASTREOPSIS EFFUSA* (Sw.) Tindale n. comb.  
*Basic synonym:* *Polypodium effusum* Sw., *Prodr.*: 134 (1788). *Other synonyms:* *Dryopteris effusa* (Sw.) Urban, *Symb. Ant.* 4: 16 (1903); C

Christensen in *Vid. Selsk. Skr.*, ser. 8, 6: 97 (1920). *Parapolydicticum effusum* (Sw.) Ching in *Suoyatsenia* 5 (4): 239 (1940).

*Distribution*: Tropical America.

21. *LASTREOPSIS ENCULTA* (Mett.) Tindale n. comb

*Basic synonym*: *Aspidium excavatum* Mett., *Phyc. and Asp.*: 69 (1858), t. 17, f. 9.

*Distribution*: Ecuador to Mexico.

22. *LASTREOPSIS AMPLISSIMA* (Pr.) Tindale n. comb

*Basic synonym*: *Polystichum amplissimum* Pr., *Epim. Bot.* 58 (1851).  
*Other synonym*: *Rumohra amplissima* (Pr.) Ching in *Sinensia* 5 (1-2): 35 (1934).

*Distribution*: British Guiana, Brazil, Paraguay and Bolivia.

23. *LASTREOPSIS KILLIPII* (C. Chr. and Maxon) Tindale n. comb.

*Basic synonym*: *Dryopteris killipii* C. Chr. and Maxon in *Amer. Fern Journ.* 18: 4 (1928). *Other synonym*: *Parapolydicticum killipii* (C. Chr. and Maxon) Ching in *Suoyatsenia* 5 (4): 239 (1940).

*Distribution*: Panama and Costa Rica.

24. *LASTREOPSIS CHACROPHYILLOIDES* (Poir.) Tindale n. comb

*Basic synonym*: *Polypodium chacrophyloides* Poir., *Ency.* 5: 542 (1804).  
*Other synonym*: *Rumohra chacrophyloides* (Poir.) Ching in *Sinensia* 5 (1-2): 35 (1934).

*Distribution*: Greater Antilles

25. *LASTREOPSIS PUBESCENS* (L.) Tindale n. comb

*Basic synonym*: *Polypodium pubescens* L., *Syst. Nat.*, ed. 10, 2: 1327 (1759).  
*Other synonym*: *Rumohra pubescens* (L.) Ching in *Sinensia* 5 (1-2): 35 (1934).

*Distribution*: West Indies and Venezuela.

26. *LASTREOPSIS LURIDA* (Underwood and Maxon) Tindale n. comb.

*Basic synonym*: *Dryopteris lurida* Underwood and Maxon in *Slosson in Bull. Torr. Bot. Club* 40: 183 (1913), pl. 3, f. 1. *Other synonym*: *Rumohra lurida* (Underwood and Maxon) Ching in *Sinensia* 5 (1-2): 35 (1934).

*Distribution*: Jamaica:

In *L. lurida* and *L. pubescens* the ridges on the upper surface of the rachis are less marked and the glands of the frond are capitate and stalked, instead of oblong as in most species of this genus.

I have been unable to examine any specimens of *L. subrecedens* Ching or *L. simasavae* (Tag.) Tag., both of which doubtless belong to *Lastreopsis* according to their descriptions.

#### ACKNOWLEDGMENTS

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## FLORA OF VICTORIA: NEW SPECIES AND OTHER ADDITIONS—12

By N. A. WAKEFIELD, Noble Park

### Genus *CRASSULA*: A Northern Victorian Species Hitherto Undescribed

*CRASSULA TRIPARTITA* sp. nov. inter congeneras Australienses unica: caules caespitiosi, erecti, 2-3 cm. alti; folia circiter 2.5 mm. longa, perfoliata; flores solitarii, axillares, subsessiles, *tripartiti*.

HOLOTYPE: Rutherglen, N.E. Victoria, *leg.* G. A. Morrow, 14/9/1939 (MEL.; duplicates to be sent to K and NSW<sup>o</sup>).

Plant densely tufted, 2-3 cm. high, the erect stems unbranched, leaves perfoliate,  $\pm$  triangular, about 1.5 mm. long, obtuse, the base broadly winged and this the widest part of the leaf; internodes 1-2 mm. long; flowers solitary in the upper axils (rarely with a second abortive one), sessile or almost so, each subtended by one or two much reduced leaves or bracts; sepals 3, acuminate, about 1 mm. long; petals 3, acuminate, hyaline, shorter than the sepals; stamens 3, staminodes 3, linear with dilated apex, almost as long as the stamens; carpels truncate with a short point; seeds 1 (rarely 2) in each carpel, light brown, longitudinally-costate.

*Distribution*: Northern Victoria. As well as the type locality (Rutherglen), the species occurs at Grayton (between Nagambie and Heathcote). It was noted in the latter locality by the writer in 1939, on moist flats in open grazing land; and the only specimen preserved (which differs from type by its somewhat branched stems) was lodged in the North Queensland Herbarium, Cairns. *C. tripartita* is not closely related to any other Australian species of the genus.

### Genus *WESTRINGIA*: Two New Species Endemic in Victoria

*WESTRINGIA CREMNOPHILA* sp. nov. valde distincta: frutex dense ramosus, usque ad 60 cm. latus, in rimis murorum rupum crescens, basi versus a cortice suberoso profunde fissurato praeditus; verticilli trifolii; folia linearia, marginibus revolutis; ramuli floriferi (caulis foliis calycibusque) ubique albo-tomentosi; calycis lobi acuti quam tubus duplo breviores.

HOLOTYPE: Porphyry cliffs above Snowy River, east of Butchers Ridge; N. A. Wakefield, No. 4772, about 21/1/1953 (MEL.; paratypes, No. 4774, to be donated to K and NSW).

Much-branched shrub, growing in crevices of rock cliffs; bark of larger stems thick, corky, furrowed, leaves in whorls of 3 (rarely 4), 1-2 cm. long, 1-2 mm. wide, margins revolute, apex obtuse but  $\pm$  mucronate; flowers solitary in the axils, subsessile; calyx-lobes acute, about half as long as the tube; corolla mauve, about 1 cm. long, densely hispid on the outside, villose in the throat, all five lobes indented at the apex with the lowest one more so (quite bilobed) and longer than the others; flowering branchlets 2-4 cm. long, universally invested (on stems, leaves and calyxes) with dense,  $\pm$  appressed, whitish tomentum.

*Distribution*: Abundant but very localized, on several of the many porphyry cliffs overlooking the Snowy River, east of Butchers Ridge, eastern Victoria.

*W. cremnophila* was discovered in about 1950, by Mr. Leo Hodge of W Tree, and he cultivated it quite effectively in his native-flower garden. The writer collected some material of it at Hodge's "Westringia Cliff" on August 31, 1952 (N. A. Wakefield, No. 4687); and Dr. R. Melville took ample material from the same spot at the time of the collection of the type

<sup>o</sup> MEL—National Herbarium of Victoria, Melbourne.

K—Royal Botanic Gardens, Kew, England.

NSW—National Herbarium of New South Wales, Sydney.

specimens (listed above), and this is located at Kew, England. On January 20, 1954, this cliff-loving plant was observed, with binoculars, to be growing too on the inaccessible precipices on the opposite (eastern) side of the Snowy River.

The species is remarkable for its ability to grow on vertical cliffs, in small crevices seemingly devoid of soil.

**WESTRINGIA CRASSIFOLIA** sp. nov. valde distincta: frutex erectus; verticilli trifolii; folia angusto-elliptica, crassa, obtusa, super concava, subter demum rugosa, utrinque minute tuberculata, costa obscura, marginibus haud recurvis; flores subsessiles, purpurei; calyx 4.5 mm. longus, lobis crassis acutis 1.5-2 mm. longis; corollae lobi nunquam retusi.

**HOLOTYPE**: Junction of the Parish boundaries of Hunley, Neilborough and Whirrakee (Bendigo Whipstick), about 10 miles north of Bendigo, Victoria; leg. John W. Kellam, Sept. 16, 1956; "plants up to 7 ft. high and very spindly, growing among *Melaleuca uncinata* mainly" [MEL; duplicates to be sent to K. and NSW.]

Erect shrub; branchlets longitudinally costate, slightly pubescent; leaves in whorls of 3, shortly petiolate, narrow elliptical, 5-15 mm. long, 1.5-2.5 mm. wide, thick, upper-surfaces concave, underneath becoming wrinkled, both surfaces minutely tuberculate and slightly pubescent, margins minutely denticulate not recurved, apex obtuse but with a slight callose point, the midrib not apparent except as an indefinite thickening on the under-surface; flowers subsessile, calyx 4.5 mm. long, scaly-pubescent, scarcely ribbed, the lobes triangular thick acute and 1.5-2 mm. long; corolla purple, scaly-pubescent outside, sparsely villous inside, the lobes not at all bifid or retuse (the central lower one truncate, the others rounded).

**Distribution**: Apparently confined to the Bendigo Whipstick Scrub in the vicinity of "Westringia Ridge". [See *Vict. Nat.* 37: 95 and *Vict. Nat.* 40: 195 and 203, under the name "*Westringia rigida* var. *gracillima*".]

The leaves of *W. crassifolia* suggest its affinities with a group of four northern species: *W. parvifolia* White and Francis and *W. rolandii* B. Boivan—each of which has leaves obovate and much shorter, and corollas more bristly inside and with retuse lobes—, *W. tenuicordis* White and Francis—which has slender unbranched stems about 1 ft. high, acute (pungent) leaves and acuminate calyx-lobes—, and *W. cheelii* Maid. and Betche, having acute leaves with ± definitely recurved margins, flowers in terminal leafy clusters and the calyx glabrous.

#### Genus GNAPHALIUM: Specific Status for an Alpine Plant

**GNAPHALIUM ARGENTIFOLIUM** nom. et stat. nov.

Basic Synonym: *G. collinum* var. ? *radicans* F. Muell. ex Benth. *Fl. Austr.* 3: 654.

**LECTOTYPE** "Summits of the Australian Alps" leg. F. Mueller, [This material—seen by Bentham and now in MEL—appears to be part of a suite of specimens, now in various herbarium folders, collected under the original label:

In pratis alioribus montium Murrumbidgee Mountains, altitudinum altitudinum 5600 ft. Jan. '53. Dr. Ferd. Mueller.

Stems ascending, 7-5 cm. long, arising from a much-branched rhizomic system; leaves disposed along the stems, usually crowded but not or hardly forming basal tufts, densely cottony (silvery) on both surfaces; flower-heads sessile, solitary or few together in an irregular leafy corymb; involucrel bracts up to about 4 mm. long, obtuse, achenes glabrous.

**Distribution**: Australian Alps of Victoria and New South Wales. Besides the type material (from New South Wales), there are at MEL specimens

from "Towards Mt. Hotham" (leg. A. J. Tadjell, Dec. 14, 1914) and Bogong High Plains (S. M. Fawcett, 8/1/1945; J. H. Willis, 15/1/1946; F. Robbins, 23/1/1951). No Tasmanian material of the species has been seen by the writer.

*G. argentifolium* is distinguished from *G. japonicum* Thunb. (Syn. *G. collinum* Labill.) by its dense growth—often almost cushion-like, dense leaves which do not form basal rosettes and which do not become glabrous on the upper surfaces, and by its fewer and broader flower heads. The species is superficially similar to *G. traversii* Hook. f., but the latter has definite rosettes of basal leaves, the flower heads are always solitary and pedunculate, and the achenes pubescent.

Some variation is noted in *G. argentifolium*—the Bogong material is taller (up to 13 cm. high), the involueral bracts longer (to 6 mm.), and the achenes sometimes a little pubescent.

## VASCULAR FLORA OF VICTORIA AND SOUTH AUSTRALIA

(Sundry New Species, Varieties, Combinations, Records  
and Synonymies)

By J. H. WILLIS, National Herbarium of Victoria

[Continued from page 167 of February issue]

### Winteraceae

*DRIMYS XEROPHILA* Parmentier in Bull. sci. Fr. Belg. 27: 225-'6, 299-300 (1896).

*D. aromatica* sens. Parm. (l.c.: 298 (1896)), non *aromatica* F. Muell. *Plants*

*india. Col. Vict. 1: 20-21 (1862)*, nec *D. lanceolata* (Poir.) Baill.:

*D. vickeriana* A. C. Smith in *J. Arnold Arboret.* 24: 139-'6 (1943);

*D. lanceolata* (Poir.) Baill.,\* var. *parvifolia* J. W. Vickery in *Proc. Linn. Soc.*

*N.S.W.* 62: 85 (1937);

*D. xerophila* Parm., var. *alpina* F. Muell. ex Parm. l.c.: 226 (1896).

Following her description of *Drimys lanceolata* var. *parvifolia*, Miss J. W. Vickery (l.c.) lists as "imperfectly known species" P. Parmentier's *D. xerophila* (thought to be probably synonymous with *D. lanceolata*), *D. muelleri* (doubtfully a *Drimys* at all) and *D. intermedia* (also probably synonymous with *D. lanceolata*). The last name, *D. intermedia*, may be dismissed at once as a *nomen nudum*, but not so the other two—detailed descriptions of their foliar and stem anatomies were published by Parmentier, and his types are still available for inspection in the Museum of Natural History (Phanerogamic Herbarium) at Paris. By courtesy of the Director of this Parisian repository, I have been enabled to examine the type specimens of *D. xerophila*, its two varieties *alpina* and *aromatica*, *D. muelleri* and what Parmentier considered as typical *D. aromatica*. Such a study was illuminating and has resulted in the synonymy set out above.

The unusually thick cuticle (to 15  $\mu$ c) in *D. xerophila* inspired its epithet and prompted its author to write (l.c. pp. 225-'6):

Les cuticules épidermiques offrent une épaisseur considérable; l'épaisseur est d'épaisseur très inégale; les stomates sont immergés. Tous caractères indiquent une *hélo-xerophilie* très accentuée.

Although the types of *D. xerophila* (from "Australian Alps") and its var. *alpina* (from Baw Baws) are barren, they are undoubtedly referable to the same species, and even the varietal distinction is hardly warranted. It is equally obvious that *D. lanceolata* var. *parvifolia* J. W. Vickery (l.c.) and *D. vickeriana* A. C. Smith (l.c.) are also conspecific with *D. xerophila*—the prior name for the taxon.

A. C. Smith, by his definition of *D. vickeriana* in 1943 (as a compact alpine shrub with 2-petalous flowers, cf. 4-9 much longer petals in *D. lanceolata*), focused attention on the existence of two distinct species of the genus in

\* Name erroneously attributed to Druce by the author of var. *parvifolia*.

Victoria. But the only material he examined (from the Raw Baw mountains) had leaves not exceeding 15 mm. in length and is referable to an unusually small-leaved, small-flowered state (Parmentier's var. *alpina*) of *D. serophylla*; so that Smith's definition of the species is both inadequate and misleading.

This dipetalous high-mountain species ranges widely throughout eastern Victoria, the Australian Capital Territory and south-eastern New South Wales, with a curious northern outlier on the Barrington Tops, N.S.W. (between Gloucester and Scone, at 5,100 ft. altitude). Its leaves vary from a minimum of 10 x 2.5 mm. on the Raw Baws, Vic., to a maximum (at least in all the material so far examined by me) of 100 x 25 mm. on Mt. Ellery, Vic. Corresponding differences occur in number of stamens per flower—4-6 only on the Raw Baws to 25 on Mt. Ellery. In between these extremes, I have observed every possible gradation on various Victorian mountain peaks.

Smith specifies solitary carpels for his type of *D. richardsonii*; but within the type area (Raw Baws) it is not unusual to find fringing specimens with two or even three carpels per pedicel. In this region, and also on Mt. Ellery, *D. serophylla* and *D. lanceolata* (Poir.) Baill. occur in close proximity, the latter in shaded gully-heads; but no intermediates or suspected hybrids have been noted. What Smith failed to point out were the really important characters of leaf-texture and anatomy which, in the absence of flowers, will always serve to distinguish any form of *D. serophylla* from *D. lanceolata*—sole representative of this genus in Tasmania.

Leaves of *D. lanceolata* are usually *acute* at the tip, of *thin* texture, and they remain *olive-greenish* in the dried state; those of *D. serophylla*, by contrast, are always *obtus*, of *thick rigid* texture (the veins usually obscured) and they become characteristically *rusticent*—often with a glaucous appearance as well—when dry. The branchlets of the latter species are consistently *rugher* (finely *tuberculate*) than in *D. lanceolata*.

Microscopically, *D. lanceolata* has the upper epidermis of the leaf nearly *twice* as thick as the lower, with the cuticle comparatively thin (5-10 mic.)—less than a quarter the total thickness of cuticle and epidermal cells combined—, and uniform rectangular palisade cells in 2-3 rows are *well developed* under the upper epidermis; whereas *D. serophylla* has the upper and lower epidermis approximately the *same* thickness, the cuticles *very thick* (10-20 mic.)—almost half the total epidermis—, palisade cells *absent* or irregular and very indistinct, and the epidermal cells less than 20 mic. wide (consistently smaller than in *D. lanceolata*).

Parmentier was justified in establishing the species *D. serophylla*, but he erred unaccountably in his delimitation of this and of *D. lanceolata* (which he calls "*D. aromatica*") For instance, the statements that *serophylla* has well-defined palisade cells in its foliage and that *lanceolata* lacks them should be reversed! The specimen (in Paris—"Victorian Alps", leg. C. Walter) that he pronounced as typical *D. aromatica* is actually identical with type *D. serophylla* ("Australian Alps", leg. F. Mueller), while his *D. serophylla* var. *aromatica* (Mt. Bischoff, Tas.) is certainly referable to the true *D. lanceolata*!

Such anomalies have rendered Parmentier's anatomical diagnoses useless for purposes of accurate species-identification, and could only have been rectified by recourse to his actual type materials. Comparable flowering specimens (in Melbourne Herbarium) from the same localities confirm the conclusions now drawn from an independent study of these types.

#### DRIMYS LANCEOLATA (Poir.) Baill. Hist. Plant. 1: 159 (1868)

*Winterania lanceolata* Poir. Encycl. méth. Bot. 8: 499 (1808);

*Tasmania aromatica* R. Br. ex DC. Rep. Voy. Syst. nat. 1: 445 (1817);

*Drimys aromatica* (R. Br. ex DC.) F. Muell. Plant. Indop. Col. Vind. \*

20-21 (1862);

*D. serophylla* Parlat., var. *aromatica* Parlat. in Bull. sci. Fr. Belg. 27: 226 (1896).

\* Name incorrectly spelt "*D. serophylla*" by A. C. Smith in *J. Arnold Arb. 24: 128 (1943)*.

Haplotypes of *Winterania lanceolata* (leg. Labillardiere) and *Tasmannia aromatica* (leg. R. Brown)—both from southern Tasmania—are in Melbourne Herbarium and are certainly conspecific. True *Drimyis lanceolata* ranges over the whole of Tasmania (where no other member of the genus has been collected) and occurs also on Strzelecki Peak, Flinders Island, in Bass Strait. In Victoria it is to be found almost throughout the mountain fern-gullies of the eastern highlands, with isolated western occurrences in the Otways, on Mt Macedon and the highest peaks of the Grampians. It is known from Nungatta Mountain (near the Victorian border), Braidwood district and parts of the Blue Mountains in New South Wales.

*D. lanceolata* is usually a larger plant than *D. xerophila*—sometimes a tree to 30 ft—and, as already indicated under the latter species, the leaves are of much thinner texture (with less thickened cuticles), apically more acute and remaining olive greenish in the dried state. The flowers have 4-9 long, strap-shaped petals. Reduced forms with very small obtusish leaves occur on some Tasmanian mountain-tops (e.g. Mt. Wellington); but the petals are never less than 4 [c.f. 2 in *D. xerophila*, or very rarely 3 in the robust Mt. Ellery condition], and the leaves have all the anatomical features that distinguish this species from *D. xerophila*.

**DRIMYIS MUELLERI** *Parmentier* in *Bull. sci. Fr. Belg.* 27: 226-7. 300 (1896)

— *Persoonia gunnii* Hook. f. in *Lindl. J. Bot.* 6: 283 (1847)

P. *Parmentier* remarks [l.c. 227]:

Le plant ligneux de la tige est en complète contradiction avec celui observé chez les autres *Drimyis*. Il possède de véritables vaisseaux — —

As pointed out by Vickery [*Proc. Linn. Soc. N.S.W.* 62: 83 (1937)] doubt concerning the generic status of *D. muelleri* had been raised by van Tieghem [*J. Bot., Paris* 14: 283 '4 (1900)]. My recent examination of the type proves its identity with *Persoonia gunnii* Hook. f. in the *Proteaceae*—an undetermined duplicate of this type collection (Mt. Victoria, Tas. leg. C. Glover) was found in Melbourne Herbarium and it bears a few very immature fruits.

#### Papilionaceæ

**DAVIESIA CORYMBOSA** Sm. var. **LAXIFLORA** J. H. Willis:

varietas nova a planta typica discriminatur habitu subarborico, foliis latioribus (1-2.5 cm.) subglaucescentibus tenuiter textis, racemo elongato lato (sepe quam folio longiore) et floribus pene omnino flavis.

**LAGATIO: VICTORIA** (montibus).—"Slopes of Mt. Mallock toward Woods Point, at about 4000 ft. [ $\pm$  1230 m. alt]" (**HOLOTYPUS** in Herb. MEL.—J. H. Willis, 2 Nov. 1940): Lake Mountain, circ. 1230 m. (MEL.—P. F. Morris & F. J. Ray, Nov. 1928) Upper Thompson River (MEL.—A. W. Howitt No. 236, 1882); "In *Eucalyptus delegatensis* forest along Fry's track, 4 miles S.E. of Wren's Flat on Upper Jamieson River, i.e. on slopes leading to Mt. Skene" (MEL., cum floribus et fructibus—J. H. Willis, 24 Feb. 1949); "Grampians", sine locis definitis (MEL.—D. Sullivan; C. Walter, Oct. 1888; D. J. Paton, Oct.-Nov. 1919).

This is the montane plant recorded for Victoria by A. J. Ewart [*Flora Vict.* 6:1 (1930)] as "*D. corymbosa* var. *arborica* Maiden", but his opinion that it was identical with the variety *arborica* cannot be upheld. The latter, first published as a species, *D. arborica*, by F. Mueller and B. Scortechini [*Proc. Linn. Soc. N.S.W.* 7: 221 (1882)], and subsequently reduced to varietal rank by J. H. Maiden [l.c. 23: 25 (1898)], is restricted to south-eastern Queensland and New England, N.S.W.—from the Glasshouse Mountains south to the Hastings River. It is distinguished by its much larger

size (to 50 ft., with trunks 1 ft. or more wide), long narrow leaves with fine almost parallel venation, and short corymbose inflorescences. The new variety *latiflora* is a tall shrub (at most 15-20 ft. high), with long broad (to 1") rather glaucous leaves showing a manifestly *reticulate* venation—although not as wholly netted as in *Doronicum latifolia* R.Br. Its most distinctive feature, however, is the *loose and racemose* inflorescence which varies from less than half as long to longer than the subtending leaf; individual flowers and fruits are quite comparable with those of the typical, corymbose form of the species (Port Jackson area), but the former are almost wholly yellow and without conspicuous red-brown markings on the corolla.

In its reticulate foliage and racemes of flowers, var. *latiflora* would seem to approach *D. latifolia*, but the large persistent floral bracts (2-7 mm. long) of that species immediately separate it. At present the new variety is known only from *Eucalyptus delegatensis* forest between the Taggerty and Macalister Rivers (including Lake Mountain, Mt. Macleod, the Kaw Baws and Mt. Skene), with isolated occurrences in the Grampians—racemes there are shorter and denser than in the major eastern habitat.

### PHYLLOTA REMOTA J. H. Willis;

species nova ab foliis *remota* valde distincta. *P. pleurandra* L. Muell. affinis sed differt: foliis latioribus rectis (haud recurvatis), floribus axillaribus, bracteolis subsarcinosis ovatis multo longioribus (calycem æquantibus).

*Fruticulus gracilis* = procumbens, ramis numerosis minute pubescentibus leniter angulatis. *Folia* *remota*, interdum falso opposita vel verticillata, 5-10 mm. longa, linearia, recta, acie revoluta, breviter petiolata, nitida, scabrida a pilis tuberculatis, subobtusis (vs. mucronatis). *Flores* sessiles, in axillis superioribus solitarii, tubuli. *Calyx* sericeo-pubescentissimus glaber, circiter 3 mm. longus, bilabialis; lobis duobus superioribus (quos tres inferiores sat latiores et paulum longiores, parve apicem tenuis curvati); bracteolæ magnæ, calycem æquantibus et complerent, oblongo-ovate, eximie mucronatæ, marginibus fatis subsarcinosis transimbricatis. *Corollæ* quam calyx duplo longior, segmentis omnibus breviter unguiculatis; vexilli lamina rhomboidalis, obtusa, subnervellata, circ. 5 x 4 mm.; alac 5-6 x 1.5 mm.; carinae segmenta semilunata, obtusa, circ. 6 x 2 mm. *Ovarium* villosissimum; stylus glaber, brevis uncinatus. *Stamina* in angulis petalorum = coherentia.

**VAGATIO:** AUSTRALIA MERIDIONALIS—Keith, "sandy flats between sand ridges in mallee-heath formation" (**HOLOTYPE** in Herb.

MEL.—R. L. Specht & P. Rayson, 1954); Boston Point, Spencer Gulf, "about 6 miles north-east of Port Lincoln" (MEL.—C. Wilhelm, 1851 vel 1854).

This new South Australian plant differs from all its congeners in the scattered, remote leaves (never crowded along the branches). The second collection, cited above, had been fixed for a century in Melbourne Herbarium under the name "*Phyllota pleurandra*" (in F. Mueller's handwriting); but it departs from all forms of that species in having *distant*, comparatively broader leaves which are never recurved mucronate at the tips, conspicuous axillary flowers and *very large papery bracteoles* which almost envelop the calyx. *P. pleurandra* has paler flowers, almost hidden among the numerous dense fascicles of leaves, and minute bracteoles at the base of the calyx. The recent (type) collection is identical in all respects with that from Spencer Gulf (Port Lincoln area), and I am indebted for this material to Mrs. End L. Robertson (formerly of the Waite Institute, Adelaide) who supplied the following important field note:

The two forms [i.e. *P. pleurandra* and *P. remota*] are quite distinct, and nothing in the way of intermediates has been collected. They are readily distinguishable in the field, not only by general appearance but also from the fact that typical *P. pleurandra* occurs on deep sand on the ridges (with 20-30 ft. of sand), and is invariably suckers profusely; the other form occurs only on sand flats between the ridges (over sand 4 ft. or so deep)—this form is tap-rooted and does not sucker.

Since Keith is only 34 miles from the Victorian border, it is most probable that the novelty, *P. remota*, will be found to extend into the Big or Little Deserts of Victoria, where *P. pleurodroides* is very widespread.

#### DILLWYNIA CAPITATA J. H. Willis;

species nova Sectionis *Xeropetalum* juxta *D. brunoides* Meisn. ponenda, a qua foliis glabris gracilioribus, alabastris nunquam dense tomentoso-pilosis, bracteolis multo brevioribus, floribus minoribus pallidioribus (haud saturate rubris), corollae carina perobtusae (haud acutae) facile distinguitur.

*Fruticulus* gracilis saltem 50 cm. altus, ramis longis gracilibus subvirgatis minute pubescentibus. *Folia* 8-10 mm. longa, erecta, glabra, subcircularia (sed non pungentia), rete involuta. *Flores* capitatae, usque ad 13 in *acrostio* *ditinse* quae ramum terminat. *Calycis* bilobatus circiter 4 mm. longus, in pedicellam (2 mm. longam) ± raptim contractus, rufus, leviter pubescens; lobi duo superiores lati subobtusius connati (paucis apicibus tentis), lobi tres inferiores angusti lineari-lanceolati, omnes circ. 2 mm. longi; bracteolae (in pedicello) lineari-subulatae, usque ad 2 mm. longae, villosae, calycis tubi basin paulum excedentes. *Corollae* vexillum 6-7 mm. longum (una cum unguis 2 mm.), lamina circ. 2.5 longa x 5-6 mm. lata orbiculata-reisiformi emarginata flava et medium versus a rubore nervato suffusae; carina et alae circ. 5 mm. longae, prior perobtusae graciliter angulicollatae glabrae ± corrugatae. *Ovarium* sericeo-pilum; stylus glaber.

**LOCUS:** VICTORIA (boreali-orientalis)—“Cranky Charlie’s Turntable on S.E.C. mountain road near Clover Dam, between Tawonga and Bogong townships” (*HOLOTYPE* in Herb. MEL.—Jean Gableuth, 4 Nov. 1949).

A very distinctive species by virtue of its erect, straight, glabrous, arborescent leaves and the small flowers densely clustered in heads (with up to 12 flowers) at the ends of long, very slender branches—hence the epithet. It belongs to the Section *Xeropetalum* (having a corolla standard not twice as broad as long and only slightly exceeding the wings), but the corolla is hardly “persistent” in the single collection known. *D. brunoides* Meisn. in Lehmann, of sandstone tablelands in southern New South Wales, would seem to be most closely related, but that species departs in having shorter, broader, usually scabrous leaves, woolly-hairy buds, much darker larger flowers (standard about 10 mm. wide) and larger, broader, deciduous bracteoles. Mr. R. H. Anderson (Chief Botanist and Curator at Sydney Botanic Gardens), who examined a specimen of *D. capitata*, wrote to the author (13/3/1956): “We can not match this *Dillwynia* with anything in this herbarium.”

#### Rutaceae

#### BORONIA LATIPINNA J. H. Willis.

species nova ex affinitate *B. pinnata* Sm., *B. thujae* Penfold & Welch, *B. muelleri* (Benth.) Cheek et *B. gunnii* Hook. f., sed differt: a prima stylo gracili, a secunda et tertia statura breviori robustiori foliis minus acutis nec serrulatis nec sparsim tuberculatis, ab ultima foliis cristantibus floribus majoribus pluribusque, et ab omnibus foliis cristantibus liliariibus (2-7 mm.) minus acutis rhachidibus manifeste alatis atque staminibus multo minus hirsutis (*ferme glabris*).

**LOCUS:** VICTORIA (occidentalis)—“Summit of Mt. William”, in montibus Grampians (*HOLOTYPE* in Herb. MEL.—H. B. Williamson, 9 Nov. 1900): loc. cit. (MEL.—F. Mueller, Nov. 1853; C. Wilhelm, Jan. 1857; D. Sullivan, Nov. 1871): specimen plures in Herb. MEL. e tracto indefinito “Grampians”, praeterea adsum.

#### Discussion

The new species departs from all other recognized taxa in the *Boronia pinnata* group by virtue of its thick and broad (to 7 mm.) leaflets, conspicuously winged rachises and very sparsely hairy stamens—often almost

glabrous; the slender style is about as long as the ovary and capped by a small swollen stigma.

It was included by Bentham in his loose circumscription of *B. pinnata* Sm. var. *muelleri* [*Flora Aust.* 1: 319 (1863)], together with elements from "sources of the Bunyip River" "near Portland Bay" and "towards the mouth of the Glenelg" all specimens collected by F. Mueller. I have not seen either syntype of var. *muelleri* from Portland or the Glenelg, but I strongly suspect that these are referable to a form of *B. pilosa* Labill., having leaflets larger than usual and completely glabrous—a familiar plant in the far south-west of the State, where no member of the *pinnata* group is at present known to occur. E. Cheel, in raising Bentham's var. *muelleri* to specific rank [*J. roy. Soc. N.S.W.* 58: 147 (1924)], clearly typifies this taxon by means of the Bunyip River material, several sheets of which are represented in Melbourne Herbarium; but he fails to indicate the identity of, or even to discuss, the remaining three syntypes of var. *muelleri*—including the Grampians plant now described as new.

*B. latipinna* has long been known in Victoria as "*B. pinnata*" (vide Ewart's *Flora Vic.*, p. 701, and books by other authors); but to continue "lumping" it under that species would logically require the similar fusion of *B. muelleri*, *B. thuyana* and *B. gunni*, which is unthinkable. Analysis of the essential oil is desirable and might well lend support to the recognition of *B. latipinna* as a specific entity. It is a robust and handsome shrub with large bright pink flowers (a white form is also known), and is apparently endemic in the Grampians; although rather widely distributed through these sandstone ranges, the species favours mountain tops—e.g. Mts. William, Rosca and Difficult.

#### BORONIA NANA Hook. Icon. Plant. T. 270 (1840),

var. PUBESCENS (Benth.) J. H. Willis, combinatio nova.

*B. polygalifolia* Sm., var. *pubescens* Benth. *Flora Aust.* 1: 321 (1863);  
*B. hispida* E. Cheel in *J. roy. Soc. N.S.W.* 62: 403 (1928).

E. Cheel raised Bentham's variety *pubescens* (l.c.) to specific rank, as *Boronia hispida*, in the belief that this endemic Grampians plant was manifestly distinct from all forms of what was then called "*B. polygalifolia*". Dr. R. Melville has recently shown [*Kew Bull.* No. 3: 461-465 (1954)] that the true, simple leaved and completely glabrous *B. polygalifolia* Sm. does not extend as far south as Victoria or Tasmania, where its place is taken by the trilobate *B. nana* Hook. and its simple-leaved, almost co-extensive variety *lyssopifolia* Melville (l.c. p. 463)—both distinguished from *B. polygalifolia* in having *hirsute* stems (with a concentration of hairs in longitudinal grooves from the decurrent leaf bases), staminal filaments *not* gradually narrowing upwards, hairy styles and less spreading stigmatic lobes.

Cheel's *B. hispida* differs from typical *B. nana* only in being *much more hairy*, the short coarse hairs (to 0.6 mm. long) are by no means confined to hands along the stem, but invest it completely and extend also over the leaves, pedicels, calyces, petals and filaments. Within the Grampians there is every gradation from densely hairy to slightly hairy plants, with leaflets varying from linear to round, and it is deemed expedient to restore Bentham's epithet *pubescens* for the more hirsute population, making the new varietal combination now called for under *Boronia nana*.

#### BORONIA ANEMONIFOLIA A. Cam. in Field, 1825.

*B. dentigera* F. Muell. in *Trans. Vict. Inst.* 32 (1855);  
*B. dentigeroides* E. Cheel in *J. roy. Soc. N.S.W.* 62: 301 (1929)

Bentham [*Flora Aust.* 1: 321 (1863)] reduced F. Mueller's *Boronia dentigera* to varietal rank under *B. anemonifolia* A. Cam. E. Cheel [*J. roy. Soc. N.S.W.* 62: 291-2 (1929)] reinstated it as a species, with the comment: "the structural character of the leaves and hispid sepals, as well as the distinct

geographical range, seems to warrant it being regarded as specifically distinct; the whole plant is decidedly more hispid than *B. anemonifolia* and the flowers are different." Throughout the range of *B. anemonifolia* and *B. dentigera*, so many variations in shape, size and dissection of leaflets occur with varying degrees of hairiness that it is impracticable to recognize *dentigera* even as a marked variety, as did Ewart [*Flora Vict.* 699 (1930)]. I have compared types of these two species and share the opinion of Dr. Melville, who wrote from Kew (23/3/1955): "There does not appear to be any constant difference between Mueller's species and *B. anemonifolia* A. Cunn. with the type of which it has been compared." In her recent *Student's Flora of Tasmania* (1956), Dr. W. M. Curtis has omitted *B. anemonifolia* altogether; but in Melbourne Herbarium there are specimens that were collected on St. Paul's Dome (just east of Avoca) by C. Stuart in 1848. This early Tasmanian material is comparable with Cunningham's Blue Mountains type (except as to larger size) and is surely conspecific.

Cheek's *B. dentigeroides*, which Dr. Melville (23/3/1955) believed worthy of specific rank was differentiated by its author with the comment: "similar in general appearance to *B. dentigera* F.v.M., but the leaves are more compound, being twice ternate, and the leaflets more or less flattened and dentate at the apex." Here again, the points of distinction from *B. anemonifolia* are just as hazy and ill-defined in the field as were those purporting to separate the latter from *B. dentigera*. Indefinable transitions occur, and the writer prefers to regard *B. dentigeroides* as another form of *B. anemonifolia*, having in general more divided and flattened leaflets: the comparatively shorter, glabrous calyx lobes (1.2 mm.) approach those of typical *anemonifolia*, but they are always longer (to 3 mm.) and hairy in the *dentigera* form. This *dentigeroides* form extends from New England mountains, south through the highlands of New South Wales to the Furcraux Group, Bass Strait, where it is luxuriant and abundant on granite peaks—called "stink-bush" by local islanders from its offensively pungent aroma.

Both Curtis and Melville regard *Boronia variabilis* Hook. as a distinct species endemic in Tasmania; but the writer would follow Bentham in relegating it to varietal rank under *B. anemonifolia* [*Flora Aust.* 1: 321 (1863)]. Curtis emphasizes that "the species is polymorphic" [*Student's Flora Tas.* 1: 101 (1956)]; and so it is, grading imperceptibly on the islands of Bass Strait into the *dentigeroides* form of *B. anemonifolia*. In general, the leaflets and their secondary divisions are quite glabrous, broad, obtuse, flat and rather distant giving an almost bipinnate appearance to the foliage. There is a specimen of *B. anemonifolia* var. *variabilis* (Hook.) Benth in Melbourne Herbarium from Portarluguen, Vic. (Dickinson, 1870), and it has also been reported from the Waratah Bay-Wilson's Promontory area.

#### BORONIA PARVIFLORA Sm. Tracts Nat. Hist 295, T.6 (1798)

*B. pilonema* Labill. Nov. Hedd. Plant. Spisimen 1: 98; T. 126 (1804);

*B. salutaris* J. H. Maiden & J. M. Black in Trans. 707, Soc. 5. Aust. 15: 1 (1913).

Bentham [*Flora Aust.* 1: 324 (1863)] synonymized the Tasmanian *Boronia pilonema* Labill. under *B. parviflora* Sm. without comment, and this opinion is now endorsed. However, Curtis [*Student's Flora Tas.* 1: 102 (1956)] restores *B. pilonema* for Tasmania and Victoria, apparently considering it to be specifically distinct from the Port Jackson *B. parviflora*. Examination of a large suite of material from the four south-eastern States, in Melbourne Herbarium, discloses no apparent line of demarcation; indeed, Smith's type illustration (1: T.6) of *B. parviflora* might well have been drawn from the Southport (Tas.) material, collected by C. Stuart in the same general region from which Labillardiere obtained his *B. pilonema*.

A problem of quite a different kind concerns the identity of *Boronia salutaris* Maiden & Black. In J. M. Black's *Flora S. Aust.* ed 2, 2: 494

(1948) the author retains both *B. parviflora* and *B. pubescens* for that State, remarking under the latter species: "Near the preceding, but the stems mostly erect, the leaves more curvate towards base, the peduncle shorter and obovate, not much exceeded by the leafy bracts, the petals obtuse and shorter than the sepals, stamens only 4" In Victoria there is no such correlation of these characters—even in a single community of plants—and it has been found quite impossible to recognize *B. pubescens* as a variety, much less a species. I am indebted to Mr. A. Cliff, Beaglehole, of Gorae West (Vic.) for an excellent piece of field research, embodied in the following report (11/12/55):

When I sent down a *Rorania* long, long ago, and you named it *R. pubescens*. I wondered if we really had *B. parviflora* as well as Portland. I searched for a long time, and one day stumbled upon plants in our place which, on the spot, I thought had 8 stamens. Later, after pressing, I had reason to check them, and imagine my surprise when I found only 4 stamens! At the back of my mind, I had thought that 4 of the 8 stamens were early deciduous. I told Percy and Eugene Finck about it, and called for a thorough investigation of the matter. This we did on Mt. Clay. We examined hundreds of flowers; the vast majority had the 8 stamens, but the balance had 5 to 3. We found that four of the stamens are early deciduous all right—these are shorter than the other persistent 4. If examining in the fresh state, you can see where these stamens fall off. . . . I have one pressed specimen which had three open flowers with the following counts: 4, 6 and 8 stamens.

**PHEBALIUM HILLEBRANDII** J. H. Willis, status novus et nomen novum.

*Eriostemon hillebrandii* F. Muell. in *Trans. phil. Soc. Vict.* 1: 10 (1855), var. *brevisfolius* F. Muell. *l.c.*.

*Phebalium bilobum* sens. J. M. Black *Flora S. Aust.* ed. 2: 2: 491 fig. 661 A & B, 499 (1948), non Lindl. (1838).

**DISTRIBUTIO:** AUSTRALIA MERIDIONALIS, ubi in montibus Lofty et Barossa solum invenitur.

**LECTOTYPUS:** In Herb. MEL. specimen hanc notulam comitans—*"Eriostemon hillebrandii* ferd. Mueller, A. *brevisfolium*, Mt. Lofty Ranges, Anthers red, Dr. ferd. Mueller" [probabiliter Aug. 1850].

F. Mueller's description of *Eriostemon hillebrandii* (*l.c.*) embraces two distinct species, viz. the Victorian *Phebalium bilobum* Lindl. (which he designates as subspecies or variety "*longifolius*") and a diffuse, much smaller-leaved South Australian plant (designated as subsp. or var. "*brevisfolius*")—unfortunately Mueller quite inadvertently assigned his *brevisfolius* element to the "Victoria Ranges" instead of the Mt. Lofty Ranges. Since the author remarked, "This highly ornamental plant . . . has been described by Dr. Lindley as a species . . . under the name of *Phebalium bilobum*", he admits that the species had a prior name, and so *E. hillebrandii* must be rejected as superfluous when published. However, it seems desirable to reinstate Mueller's epithet for the short-leaved element in his composite description, rather than choose any other, and, to do this, I have established the new name *Phebalium hillebrandii* (in accordance with Article 81 of the Stockholm Code, 1950).

Bentham [*Flora Aust.* 1: 340 (1863)] had considered that only one variable species was involved, and he synonymized *E. hillebrandii* under *P. bilobum*, misspelling the epithet as "*hillebrandii*"—a mistake perpetuated since by Ewart (1930) and Curtis (1956) in their respective floras of Victoria and Tasmania. Other writers, including J. M. Black (1948), have adopted this view. However, the differences in habit, foliage and fruit are so pronounced as to justify recognition of two specific taxa; they may be summarized as follows:

**P. BILOBUM**—Shrub erect, to 6 ft. *Inflorescence* not exceeding the last leaves. *Leaves* 1-4 cm long, at least 3 times as long as broad (usually more), oblong to linear, usually broadest toward center, glabrous and shining; margins denticulate. *Anthers* yellow. *Cues* of fruit straight, with terminal beak and obscure venation.

*P. HILLEBRANDII*—Shrub small, procumbent, 1-2 ft. high. Inflorescence far exceeding the last leaves. Leaves less than 1 cm. long, 3 times as long as broad or less, oblong-obovate or even cordate, broadest at base, usually  $\pm$  scabrid; margins entire and always revolute. Anthers red. Locs of fruit gibbous, with lateral beaks and prominent raised concentric veins.

True *Phacelium bilobum* (type from Mt. William in the Victorian Grampians) extends across Bass Strait islands to eastern Tasmania, but does not occur anywhere in South Australia; there, its place is taken by the related but smaller *P. hillebrandii* which is apparently endemic and uncommon in the Mt. Lofty and Barossa Ranges—along rocky water-courses between Mt. Lofty proper and Tanunda. The epithet honours the name of Dr. Wilhelm Hillebrand, a friend of Baron von Mueller during his early residence in Adelaide.

#### *PHEBALIUM LOWANENSE* J. H. Willis,

species nova ad *P. nuttii* (F. Muell.) Maiden & Betche [*Novae Cambriae Australis & Queenslandiae*] et *P. tuberculatum* (F. Muell.) Benth. [*Australiae Occidentalis*] evidenter proxime accedens, sed a priori differt statura parva (haud 150 cm.), foliis minoribus semper arte revolutis (nunquam planis), perianthio multo minore (nunquam 6-9 mm.) atque petalis haud minus purpureis: a *P. tuberculato* absentia tuberculorum (in ramis et foliis), petalis internis semper late luteis, staminibus et stylo quam corolla semper brevioribus (videtur), corollae squamis peltatis parvis (8-12 per petalum) multo majoribus (0.4-1.0 mm. diamet.) bene distinguitur.

*VAGATIO*: VICTORIA (occidentalis remota)—"Big Desert, on mallee sandhills along the South Australian border fence, about 11 miles north of Serviceton" (*HOLO- & PARA-TYPUS* in Herb. MEL.—J. H. Willis, 17 Sept. 1948); "Big Desert, on open mallee-heathland of Block 39, about 6 miles north-west of Yanac" (MEL, AD. K.—R. Melville No. 1088 & A. J. Hicks, 19 Sept. 1952).

A small, stiff, cricoid and non-tubercular desert shrub, 30-60 cm. [1-2 ft.] high, the smaller branches silvery from a dense indumentum of overlapping peltate scales. Leaves 5-12 x 1 mm., linear, minutely scabrous but rather shining, almost terete from the strongly revolute margins (their under silvery surface hidden), obtuse at apex, rigidly spreading at 40°-90° from branch). Flowers exceedingly sealy, 1.5 in small umbellate clusters terminating the final branches, on stout pedicels about as long as the perianth (4.5 mm.). Calyx to two-thirds the length of expanded corolla, purplish-sealy, each of the 5 prominent triangular lobes  $\pm$  2 mm. long. Petals  $\pm$  4 mm. long, elliptical, scutish, vivid chrome-yellow and glabrous within, but clothed externally with comparatively few (to 12), large (to 1 mm. wide), coppery-hued peltate scales which become torn radially. Staminal filaments 2-3 mm. long; anthers rather large, 1-1.2 x 0.8 mm. Ovary pyramidal, densely covered with silver-white lacerate squamules; style short and stout (1-2 mm.) becoming glabrous. Fruit not yet seen.

#### *Discussion*

Except for *Phacelium nuttii* (F. Muell.) Maiden & Betche—a shrub 5-10 ft. high, with broad flat leaves and larger purple corolla—, the new species is the only eastern Australian representative of the section *Euphebalium* (peltate-sealy plants) having distinct calyx teeth, at least as long as the tube. *P. lowanense* shares this feature with a group of closely related, yellowish-flowered species in Western Australia; but the only one of these approaching it at all closely is *P. tuberculatum* (F. Muell.) Benth., and that has very tubercular branches, leaves revolute but not scabrid, comparatively longer style and staminal filaments and much smaller (up to 0.3 mm. wide).

more numerous peltate scales on the backs of the petals. The epithet "*torquense*" alludes to the Victorian County of Lowan, where the species is known to occur, but it undoubtedly also ranges some distance within the adjoining South Australian County of Buckingham.

#### Tremandraceae

#### TETRATHECA STENOCARPA J. H. Willis,

species nova ad *T. ciliatam* Lindl. proxime accedens, sed differt, statura majore (usque ad 150 cm.) ramis superioribus attenuatis paucifoliatis, foliis remotis alternis (interdum basin versus paucis ternatis)  $\pm$  serratis, pedicellis a setis pilosis glandulosis prominenter munitis (similiter calyce) et praecipue capsulis magnis (usque ad 12 x 4 mm.) fusiformibus longe acuminatis.

**PACATTO VICTORIA** (australis)—a Gembrook orientem versus 1 mill., in solo ex rupe granodioritica abrasa (**HOLOTYPUS** in Herb. MEL. **PARATYPUS** in NSW—*W. Waddell*, 1 Dec. 1946); Gembrook Ranges (MEL.—*C. Walter*, Sept. 1881); Emerald (MEL.—*P. R. H. St. John*, Nov. 1903); "Junction of forest roads on Rysan's Creek, about 5½ miles north of Lahertoulie" (MEL., NSW, K.—*J. H. Willis*, 19 Dec. 1952).

A very distinctive lilac-flowered mountain-forest plant, apparently restricted to the granodiorite watershed of the Yarra, Latrobe and Bunyip Rivers, Victoria. The ultimate slender, often almost leafless branches are weak and trailing, to 150 cm. [ $\pm$  5 ft.] long, slightly scabrous but never hairy. *Leaves* are rhomboid-orbicular, 5-10 mm. long and broad, almost sessile, remote, alternate (or a few of the lowermost ternate, as in *T. ciliata* Lindl.), at least some—and often most—irregularly serrate; floral leaves or bracts narrower and much smaller. *Pedicels* both minutely pubescent and densely covered with dark erect gland-tipped bristles (up to 1.5 mm. long) which extend onto the calyx. *Fruits* flattened, fusiform, up to 12 mm. long and 4 mm. wide (at centre), tapering into the long-acuminate style, very microscopically pubescent and with scattered glandular bristles (much smaller than on calyx). *Seeds* dark brown, ellipsoid, 2.3 x 1.5 mm., almost glabrous, with prominent whitish stolid appendage at distal end (2 upper ovules abortive).

#### Discussion

*T. stenocarpa*, by virtue of its long, narrow, spindle-shaped capsules—hence the epithet—is unique in this genus, all other known species having obovate, apically flattened and bursiculate fruits. It most closely approaches *T. ciliata* Lindl., which often grows in the same locality, and a few of the lowermost leaves are often in threes (as in *T. ciliata*); but, in addition to the strikingly dissimilar fruits, the toothed foliage, long naked somewhat rush-like branches and constantly glandular-bristly pedicels amply justify recognition of this new species. Specimens in Melbourne Herbarium had been variously referred to *T. ciliata* and *T. subaphylla* Benth. The latter is entirely glabrous and almost leafless (or with very few scattered narrow leaves and bracts), having short smooth pedicels and only 2 ovules to each ovary; it was collected in the "Upper Yarra Ranges" (probably near the Baw Baws) by F. Mueller during January 1863, and is also known from Mt. Kaye and Combienbar in East Gippsland, extending across the N.S.W. border to sources of the Genoa River (type locality).

#### Myrtaceae

#### LOMASTELMA SMITHII (Poir.) J. H. Willis, combinatio nova.

*Lomastelma elliptica* Rafin., *Sylv. Tellur.* 107 (1838);  
*Eugenia elliptica* Sm. in *Trans. Linn. Soc.* 3: 281 (1797), non Lam. (1789);  
*Eugenia smithii* Poir., *Encycl. méth. Bot. Suppl.* 3: 126 (1813);  
*Acmena smithii* (Poir.) Merrill & Perry in *J. Arnold Arboret.* 19: 16 (1938).

With some 2,500 binomials, the genus *Eucalyptus* L. has become so unwieldy that modern workers tend more and more to recognize derivative genera. The difficulty is to find clear-cut criteria for these divisions; but it seems that *Eucalyptus* in the stricter sense is largely confined to America, with a few outliers in the Pacific, South-East Asian and African regions, while most of the Australian species hitherto referred to *Eucalyptus* belong either to *Syzygium* Gertn., *Acmena* sens. auct. var. (*non* DC.) or *Cleistocalyx* Bl.

In *Taxon* 56: 136 (Aug. 1956) R. McVaugh establishes that the genotype of *Acmena* DC. is *A. floribunda* (Sm.) DC., based upon *Metrosideros floribunda* Sm. which is now accepted as a species of *Angophora* Cav. [= *Angophora floribunda* (Sm.) Sweet]. This being so, *Acmena* "falls into the synonymy of *Angophora* and another generic name must be taken up for *Eucalyptus smithii*". *Lomastichia* of Rafinesque [*Sylva Telluriana* 107 (1838)], based directly upon *Eucalyptus elliptica* Sm. (i.e. upon *E. smithii* Poir.) is the earliest available generic name to replace the traditional (but not Candollean) *Acmena*. It is regrettable that such a familiar tree as the lilly-pilly should have to suffer another "nomenclatural" but the change effected above would have been inevitable, with any attempt to split up *Eucalyptus*.

#### EUCALYPTUS PILEATA W. F. Blakely, 1934.

Millewa County, on South Australian border 5 miles east of Taplan (Herb. MEL—J. H. Willis, 29 Aug. 1935).

The first record for Victoria, although this mallee species is already recorded from Berrig on the Murray River, S. Aust., only 30 miles to the north-west. It is a spectacular, very thick-leaved silver-blue tree, forming pure stands on sandy rises and extending for several miles into far north-western Victoria. At this eastern extremity of its range, the tree differs from the typical West Australian form in being glaucous, with comparatively broader fruits and rather less subulate valves; but the curious, conical, ribbed opercula (with hemispherical base often wider than the calyx tube) are characteristic.

#### EUCALYPTUS POROSA F. Muell. in Miq. in Nederl. Kruidk. Arch. 4: 132 (1856).

- E. calcicultrix* (F. Muell. ex Miq.) W. F. Blakely *Key Inc.* 224 (1934);  
*E. odorata* Behr, var. *calcicultrix* F. Muell. ex Miq. in *Nederl. Kruidk. Arch.* 4: 129 (1856);  
*E. odorata* sens. Ewart *Flora Vict.* (1930) et al., 401. Behr

N. T. Burbidge [*Trans. roy. Soc. S. Aust.* 71: 159-160 (Dec. 1947)] resolved much of the uncertainty and confusion surrounding the "odorata complex" of South Australian eucalypts. Through her research it is apparent that the tree hitherto called *E. odorata* in western Victoria is a distinct species, recognizable by its lively green leaves with intramarginal vein quite *distinct* from the edge and the buds curiously wrinkled when dry ("like a withered and shrunken apple"). Unfortunately, Miss Burbidge takes up the name *E. calcicultrix* for this plant, attributing the combination to F. Mueller and putting *E. porosa* F. Muell. as a synonym. The epithet *calcicultrix*, however, was published only as a variety (of *E. odorata* Behr), with "*E. calcicultrix* F. Muell. Herb." cited in brackets as a synonym. The International Code rules that names mentioned in synonymy are not validly published (Art. 46—Stockholm, 1950); so that W. F. Blakely (*l.c.*) was the first to validate the binomial *E. calcicultrix*, which must date from 1934. Burbidge was justified in stating that *E. porosa* "does not warrant separation"—its type in Melbourne Herbarium, from the Flinders Range, is unquestionably conspecific with *E. calcicultrix*. Since these two epithets were published simultaneously (1856) in the same work, but *E. porosa* as a species with detailed diagnosis, the latter must certainly stand as the correct name of the eucalypt concerned—with *E. calcicultrix* reduced to synonymy.

In Victoria *E. forosa* is not uncommon in depressions between Ouyen and Murrayville, extending as scattered communities across the Big Desert to as far south as the Dimboola-Kiata district. Ewart's record for Rushworth (under "*E. odorata*") is certainly open to question. In growth form, the species varies from a shapely spreading tree, with single trunk about 1 ft. in diameter, to a blackish "whipstick" mallee: the bark is rough and box-like except on the smaller, smooth, brownish-grey branches.

#### Gentianaceae

GENTIANELLA DIEMENSIS (Griseb.) J. H. Willis, *comb. n. nov.*

*Gentiana diemensis* Griseb. *Gen. Spec. Grutley*, 224 (1839);

*G. montana* sens. Benth. *Flora Aust.* 1: 171 (1809); *holc. Forst.*

The genus *Gentianella* Moench differs from *Gentiana* L. in the following significant characters: no connecting membrane between the calyx teeth, no small lobes alternating with the major corolla lobes (which are 5- to 9-veined, not 3-veined as in *Gentiana*), anthers versatile and nectaries present on the corolla (not at base of ovary). All the Australasian species (chiefly mountain plants) hitherto referred to *Gentiana* should be transferred to *Gentianella*, and the above new combination is made for the single common plant of south-eastern Australia (in four States).

#### Labiatae

PROSTANTHERA SAXICOLA R. Br. *Prodr.* 509 (1810),

var. BRACTEOLATA J. H. Willis, *stat. & nom. nov.*

*P. debilis* F. Muell. *Fragn. Phyt. Aust.* 8: 147 (Mar. 1874)

In his original diagnosis of *Prostanthera debilis* from the Victorian Grampians, F. Mueller (*l.c.*) draws attention to the plant's close relationship to *P. saxicola* R. Br.—

"*ab hac recedens foliis non du. copuliculis, bracteolis haud brevissimis, corolla maiore parvis mollisq. puberula.*"

After examining much material of *P. saxicola*—including its two varieties *major* Benth. [1870] and *montana* A. A. Hamilton [*Proc. Linn. Soc. N.S.W.* 45: 263 (1920)]—from various parts of New South Wales, I am led to the conclusion that *P. debilis* differs *only* in the constant development of floral bracteoles, which are consistently longer than in any known form of *P. saxicola* (*sens. strict.*); but this character alone cannot justify the recognition of two species.

*P. saxicola* varies greatly in size, hairiness and colour of flowers (purple to almost white), while the leaves may be narrow with closely imbricated margins or broadly elliptic and quite flat, mostly, it is a decumbent shrub of only a few inches in height. The bracteoles may be entirely absent, reduced to mere points or tubercles, or up to 1.5 mm. long (the maximum development attained in varieties *major* and *montana*). At Jervis Bay, N.S.W., Dr. E. Gauba collected (30/8/1953) a form having microscopic bracteoles but very large glabrous flowers, blue-veined at the throat as in *P. stratiiflora* F. Muell. of inland mountains.

In Victoria *P. debilis* always has bracteoles 2-4 mm. long, sometimes almost as long as the calyx itself, but they vary from setaceous (and about 3 mm.) in some Grampians collections to much broader and shorter in the Mandurang district. Comparable populations with long bracteoles are known from Capertee, Molong, Gulgong and the Warrumbungle Ranges, N.S.W.

In reducing Mueller's species to a third variety of *P. saxicola*, I have adopted the new epithet *bracteolata*, inasmuch as a variety "*debilis*" would be absurd—fine upright shrubs to 4 ft. high occur at Maryborough, Vic., and are probably as large as any form assumed by *P. saxicola* throughout its range. In addition to the Grampians, Maryborough and Mandurang records, there are Victorian occurrences of *P. saxicola* var. *bracteolata* in the Bendigo

"Whipstick Scrub" and the Mt. Wellington area (between Macallister and Avon Rivers).

**PROSTANTHERA MICROPHYLLA** *A. Cunn. in Benth.*  
forma **AERUGINOSA** *J. H. Willis;*

forma nova ob corollam cyanæo-viridam (æeruginoso-suffusam  
vel -maculatam) bene distincta.

*P. chlorantha* sens. strict. Vict., non *F. Muell.*

**HOLOTYPE**. In Herb. MEL specimen hanc novulam comitans—"Rock Holes bore, 27½ miles north of Paninya and near the South Australian border" (*J. H. Willis*, 29 Aug. 1955).

As it occurs in the desert sand-hill country throughout north-western Victoria (and adjoining parts of South Australia), *Prostanthera microphylla* is almost invariably a diminutive shrub with blue-green flowers; but in other States the colour is usually scarlet or purplish. This green form has for long been identified in Melbourne Herbarium as "*P. chlorantha* *F. Muell.*" and, as such, it appears in Ewart's *Flora of Victoria*, p. 983 (1930). The true *P. chlorantha* of South Australia (type from Mt. Barker Creek) is a very different plant, distinguished by an indumentum of spiny-branched (never simple, curled) hairs, much larger ribbed calyx (to 12 mm. long), slender pedicels about 10 mm. long and anthers without the slender appendages found in all forms of *P. microphylla*; it does not occur in Victoria, and should be deleted from the State's flora. Type of the original red-flowered *P. microphylla*, which is morphologically almost identical with the forma *aruginosa*, came from "Jurylian Scrub" in the lower Lachlan River area, N.S.W. (*A. Cunningham* No. 225, 1817).

#### Compositæ

**GNAPHALIUM UMBRICOLA** *J. H. Willis, nomen novum.*

*G. alpinum* *F. Muell. ex Hook. f. Flora Tasme. 1: 217, T. 62A (1856)*; non  
*G. alpinum* *C. Koch in Linnaea 24: 354 (1851)*.

The name *Gnaphalium alpinum* *F. Muell. ex Hook. f.*, being a later homonym for *G. alpinum* *C. Koch* (validly published, with detailed description of a Eurasian plant), must lapse and be replaced by a new name. I have chosen the epithet "*umbicola*" for this uncommon plant of south-east Australian mountains, in allusion to its habitat—always in the shade, perching on wet rock faces or ledges and usually associated with waterfalls or cascades. Mueller's epithet (*alpinum*) was a little inappropriate; for, although this most elegant of Victorian cudweeds *does* ascend into the alps, it occurs also at such comparatively low elevations as the Little River Falls near Wollemi-merang and Mason's Falls (in the Kinglake National Park—its nearest approach to Melbourne). Other occurrences in the State are at Mts. Cobbler, Buffalo, St. Bernard, Feathertop, Spion Kop, Bogong and the Cobboras; otherwise the Mountain Cudweed is found only in the Kosciuszko region of south-eastern New South Wales and, according to L. Rodway (1903), "about the summit of most mountains" in Tasmania.

**LEPTORRHYNCHUS GATESII** (*H. B. Williamson*) *J. H. Willis,*  
combinatio nova.

*Helichrysum gatesii* *H. B. Williamson in Proc. roy. Soc. Vict. n. ser. 33:*  
*24, T. 5 (1922).*

Type of this species came from a dry hill-side at Lorne, Vic. (Herb. MEL—A. C. F. Gates, 7 Dec. 1921) and no subsequent collection has ever reached the Melbourne Herbarium. In his original description, Williamson stated that the plant bears a distinct resemblance in habit and general aspect to certain species of *Leptorrhynchus*, but went on to say: "It is here placed out of *Leptorrhynchus* on account of the shortness of the florets and the

absence of distinct upward narrowing of the achenes." Neither of these features, however, is of any generic significance *per se*—the writer finds that florets in Williamson's plant are comparatively no shorter than in other quite typical members of *Leptorrhynchus*, while the achenes are scarcely less narrowed than in *L. squamatus* or *L. tenuifolius* (some *Helichrysum* species have achenes distinctly narrowed toward the apex).

Admittedly the generic boundaries between *Leptorrhynchus* and *Helichrysum* (in their present circumscription) are often hazy, as indeed they are between the latter genus and *Helipterum*; but, except for some in the scrubby, small-headed section *Ozothamnus*, species of *Helichrysum* almost invariably have long or short, spreading petaloid laminae to the inner involucrel bracts—bracts in *Leptorrhynchus* never display differentiated spreading laminae, and in most species (including *L. gatesii*) they are narrow-linear with boldly ciliate-fimbriate margins. It might be that *L. gatesii* represents an isolated inter-generic hybrid between these genera, but for the present it is more satisfactorily placed under *Leptorrhynchus*: the varying number of pappus bristles ( $\pm 20$  on disk florets and  $\pm 12$  on marginal female florets) also lends weight to this opinion.

*COTULA VULGARIS* M. R. Levyns [J. S. Afr. Bot. 7<sup>3</sup>: 133 (July 1941)],  
var. *AUSTRALASICA* J. H. Willis,

varietas nova a forma typica Capensi differt: pedunculis maioribus usitate a pilis adpersis (haud max glabris), corollis centralibus achenisque brevioribus (corolla circiter 1 mm., cf. 1.5-1.7 mm. in specimenibus Capensibus).

*C. filifolia* n. sp. auct. Anct., non Thunb.

*VAGATIO* Ferre per totum Australiæ extratropicæ dispersæ, præcipue in tractibus humidis arenosis salisque.

*HOLOTYPE* In Herb. MEL., specimenum series ex Victoria hanc notulam comitans—"Cotula filifolia Thbg. Swamps, Shire of Dimboola, 25/9/1892. Coll. F. M. Readen" [*SYTYPE*] in AD, NSW, K].

Mrs. M. R. Levyns has established (*i.e.*) that two quite distinct, but often co-extensive, species in South Africa had been called *Cotula filifolia* Thunb. Unfortunately, Thunberg's type specimen (in Uppsala University Herbarium, Sweden) is too inadequate to decide for certain which of these two plants should bear the name *C. filifolia*; but Mrs. Levyns has applied it to the slightly smaller species, distinguished by the distinctly winged and bristly achenes of its disk florets. The other plant, with much larger disk florets and almost smooth wingless disk achenes, she has described as a new species, *C. vulgaris*.

It remained to be decided which of the two—if, indeed, either—was conspecific with the plant until now called "*C. filifolia*" in Australia. The writer, having examined type material of *C. vulgaris* (Levyns' No. 6775 from Kenilworth Race-course near Cape Town), finds that our Australian plant combines the disk achene of that species with the smaller corolla of *C. filifolia*; but it is certainly much closer to the former plant. The slight differences in hairiness (typical *C. vulgaris* has peduncles quite glabrous at anthesis) and size of corollas (1.5-1.7 mm. long for *C. vulgaris*) are at the varietal, rather than specific, level; they support the diagnosis of a new variety *australasica*, as given above.

*SENECIÓ LINEARIFOLIUS* A. Rich. in Voy. Astrolabe (Bot.) 2: 129 (1834)

*S. peracifolius* A. Rich. *l.c.*: 123 (1834);

*S. emersonioides* A. Rich. *l.c.*: 128 (1834), non H. B. & K. (1820);

*S. richardsonianus* DC. *Prodr. Syst. Nat.* -6: 374 (1838);

*S. australis* sens. A. Rich. (1834), DC. (1838) et. al., non Willd. (1801);

*S. deyodens* F. Muell. *Key Syst. Vict. Plants* 1: 339 (1888).

According to the International Code of Nomenclature, the common Fireweed Groundsel may no longer bear the name *Senecio dryadens* or *S. australis*. The former binomial was adopted by Ewart [*Flora Vict.* 1176 (1930)] and attributed to Sieber, but Sieber never published a description to accompany this herbarium name—Sprengel (1826), Richard (1834), De Candolle (1838), J. D. Hooker (1856) and I. Rodway (1903) all cite "*S. dryadens* Sieb." in synonymy under *S. australis*. The first description validating *S. dryadens* would seem to be that of F. Mueller [*Key Syst. Vict. Plants* 1, 339 (1888)], and thereafter this name was taken up by Moore & Betche (1893), Black (1929) and Ewart (1930); but it had already been rendered superfluous by the existence of several prior names referring to the same taxon. *S. australis* Willd. (1803) is generally conceded as referable to one of the forms of *S. laetus* Forst. ex Willd. from New Zealand, and not to the Fireweed Groundsel of south-eastern Australia; so Sprengel, Richard, De Candolle, etc., were not justified in quoting *S. dryadens* as a synonym of this plant.

What name, then, should be applied to Sieber's "*S. dryadens*" (a duplicate specimen of which is in Melbourne Herbarium—*Pl. Urs. Nov. Holl.* No. 337)? *S. linearifolius*, published by A. Richard in 1834 (*l.c.*) undoubtedly refers to the same entity and is apparently the earliest available name; it was based upon a plant having quite glabrous, denticulate and auriculate leaves and hairy young achenes. *S. cinerarioides* A. Rich., published simultaneously, differed (but not specifically) in its entire, non-auriculate leaves with white cottony indumentum on the under-surfaces, and glabrous achenes, but the name was antedated by *S. cinerarioides* H., B. & K., and is therefore illegitimate. Even in Victoria, *S. linearifolius* varies considerably in its degree of hairiness, development of leaf-teeth and basal auricles, so much so that I find it impracticable to recognize any very clear-cut varieties. The *S. persicifolius* A. Rich. is a form having more boldly-toothed leaves, whitish beneath, and was distinguished by Bentham as "*S. australis*, var. *microdontus*"—based on *S. macrodontus* DC. (1838).

### WHAT, WHERE AND WHEN

#### F.N.C.V. Excursions:

- Sunday, March 24—Parlour-coach excursion to Lal Lal and Moorabool Falls. Leader: Mr. R. Hermy. Coach leaves Batman Avenue 9 a.m. Fare, 22/- Bring two meals. Bookings with Excursion Secretary.
- Sunday, March 31—Botany Group excursion to Kolorama. Take 9.15 a.m. train to Croydon, then bus to Five Ways, Kolorama. Leader: Mr. B. Jennison. Bring one meal and a snack.
- Sunday, April 7—Geology Group excursion to Balcombe Bay, Mornington. Travel details at Group Meeting.

#### Group Meetings:

- (8 p.m. at National Herbarium)
- Wednesday, March 20—Microscopical Group.
- Wednesday, March 27—Botany Group.
- Wednesday, April 3—Geology Group. Subject: Fossils of Balcombe Bay, Mornington. Speaker: Mr. Nielsen.
- Monday, April 1—Marine Biology and Ethnology Group at Parliament House. Meet 8 p.m. at private entrance at south end of Parliament House.

#### Preliminary Notice:

- Easter, Thursday, April 18, to Monday, April 22—Excursion to Dimboola under the leadership of the Wimmera F.N.C. Tram leaves Spencer Street at 8 p.m. Fare: £4/2/6 (second return).

MARIE ALLENDEK, Excursion Secretary  
19 Hawthorn Avenue, Caulfield.

# The Victorian Naturalist

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## PROCEEDINGS

GENERAL MEETING, MARCH 18, 1957

*Club Wedding.*—Members resolved to send best wishes to our Council Member, Mr. Arthur Court, on his marriage to another member of the staff of the National Herbarium, Miss Kath Kenna.

*Honorary Member.*—The meeting enthusiastically endorsed Council's recommendation that Honorary Life Membership should be conferred upon Mr. A. L. Scott.

*Entomology and Marine Biology.*—This group is now well launched. It meets on the first Monday in the month at Mr. Strong's rooms at Parliament House, and it is proposed that we hold field days on the preceding week-end. Mr. Strong is Group Secretary pro tem.

*Helpers Still Needed.*—The President appealed for helpers in the Club library, to clear up after meetings, to help prepare for the Annual Club Show, to assist at the Colin McKenzie Sanctuary and other spheres.

*Affiliations.*—The Secretary mentioned that he proposed to ask Council to call an Extraordinary General Meeting, probably immediately before the next General Meeting, to consider several applications for affiliation.

*The Evening's Lecture.*—Dr. George Baker gave a lecture on "The Colourful Coastline at Port Campbell", illustrated by colour slides showing the geological features, including fossils, of that picturesque locality.

*Schoolboy Impresses.*—Mr. Gabriel reported that he travelled from Lorne to Geelong with a schoolboy aged 9, and said if this lad was anything like a usual type he reflected great credit on the standard of nature study at his school (Angelsea) and in Victorian schools generally.

*New Members.*—Miss E. A. Boddy (East Geelong) and Brian A. F. Smith (Hughesdale) and David S. Woodruff (Kew) were admitted as junior members.

*Exhibits.*—Mrs. F. Lewis showed a collection of native axes, Mrs. Freame exhibited small fish (Blennies), and other exhibits included garden-grown plants and fossil whalebone.

## BENDIGO FIELD NATURALISTS CLUB

This active Club has decided formally to affiliate with the F.N.C.V. We are glad that our long and close association is to be regularized in this manner. Their Secretary, Mr. Ebdon, tells us that their local paper, the

*Advertiser*, is to publish a weekly column of nature notes, including illustrations, provided by the Club.

Their forthcoming activities are as follows:

**MEETINGS** (at the School of Mines):

April 10—Lecture on Geology (Mr. Robbins).

May 1—Committee Meeting.

May 8—Lecture on Birds (Mr. Ipson).

June 12—To be arranged.

**EXCURSIONS:**

March 24—Redesdale (Basaltic Columns).

April 14—Heathcote (Geology).

May 12—Koala Sanctuary at Castlemaine (General).

June 15—Whipstick (Wattles).

**THE BYADUK CAVES**

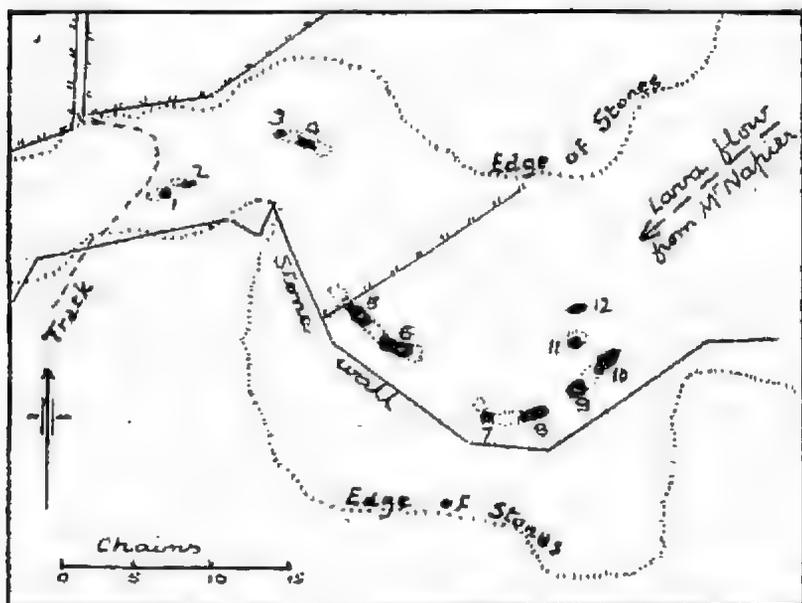
By A. C. BEAUGLEHOLE and N. F. LEARMONTH

North Byaduk and Byaduk are scattered settlements ten and fourteen miles respectively south of Hamilton on the Port Fairy road. The caves, though only two miles east of this road at North Byaduk, are seldom visited, and few local residents know much about them. However, where there are caves there are usually ferns and mosses, so during the summer of 1955-56 several members of the Portland Field Naturalists Club made four trips and thoroughly examined each cave. We were greatly assisted by Mr. Tom Power, of Byaduk, who acted as our guide throughout.

A full geographical description of the area is given by Skeats and James in *Proc. Roy. Soc. Vict.* 49: 245 (1937), but for our purpose only a few remarks are necessary so that the "layout" will be understood. When lava overflowed from Mount Napier (eight miles east) it swept down three river valleys, of which we deal with that at North Byaduk. In the first of the six lava flows, sections of the river were imprisoned and the water in places turned to steam; this raised bubbles up to sixty feet high in the viscid lava. Round these mounds later flows settled until the final one passed over the top. The weight of this was too much and the tops fell in, leaving the caves we have today. Some are open for up to 200 yards and are floored with a confusion of tremendous boulders covered with a tangle of ferns and vicious Scrub Nettles (*Urtica urens*), making progress anything but easy. Other caves are precipitous circular holes, descent of which requires ropes; and at the bottom of all are underground caves some of which are vast caverns in which an ordinary cottage would be dwarfed. The photographs give an idea of each type.

It appears that Skeats and James descended a few of the caves, and that J. H. Willis's inspection in 1950 was a very hurried one, which explains the several new finds made by us in the wake of these experienced naturalists.

There are twelve main caves in the area, some of which are connected by long dark passages which gave us the impression that connections between most of them could perhaps be found. All the caves contain ferns, though the species vary, some being in one cave only. The Church Caves are by far the largest and can be entered by a scramble down a heap of fallen boulders covered with lichens and mosses. The two long deep open holes are connected by an immense underground passage through which one must



Map of Byaduk Caves Area.

1, 2—Harmans Caves; 3, 4—Bridge Caves; 5, 6—Church Caves;  
7—The Flower Pot; 8—Tunnel Cave; 9, 10—The Turk; 11—Fern  
Cave.

proceed very cautiously amongst great rocks fallen from the roof. At both east and west ends of the long open caves are large deep cavities running for unknown distances.

In the space between the sunny outside and the limit of light inside grow masses of ferns, mosses, lichens and liverworts. They are on the cave floors, up the walls and hanging down far overhead from the roof. The west end of the Church Cave is the richest in ferns. Austral Bracken (*Pteridium esculentum*) stops abruptly where direct sunlight ends, the plants farthest in having fronds up to 11 ft. 6 in. in length, struggling up to the light, the tallest bracken yet reported. The very variable Rock Fern (*Cheilanthes tenuifolia*)

and Sickle Fern (*Pellaea falcata*) are also growing outside, and the pretty little Blanket Fern (*Pleurasorus rubifolius*) hangs to the ledges and cracks together with Necklace Fern (*Asplenium flabellifolium*). Annual Fern (*Anogramma leptophylla*) was thriving on the occasion of our first visit but it died away as summer came over the rock barriers.

Also on our first visit we had seen one plant of the rare Shredded Spleenwort (*Asplenium adiantoides*), growing on a cave wall, and we reached it with difficulty over a deep chasm. But once inside the Church Cave we saw masses of this fern on the walls and roof, both damp with soakage from the top. Readers may remember that the only known locality for this spleenwort in Victoria had been at Tyrendarra (reported by us in *Vict. Nat.* 66: 129, November 1949, and 70: 224, March 1951). Now we had found a far greater quantity at Byaduk. This find and our next in the same cave, Austral Filmy-fern (*Mecodium australe*) show that no botanist had been in there before, as this filmy-fern's westernmost record was previously the Otway Ranges.

Many ferns hang from the inaccessible roof, among them Mother Spleenwort (*Asplenium bulbiferum*) and Kangaroo Fern (*Phymatodes diversifolium*), a very beautiful effect, especially as much of the spleenwort has a profliferous growth of young plants on the tips of the drooping fronds. Shiny Shield-fern (*Lastreopsis shepherdii*) is very prolific, growing on roof, walls and floor. Outside among the Austral Bracken, Mother Shield-fern (*Polystichum proliferum*) grows to a great size, and two young plants of Soft Tree-fern (*Dicksonia antarctica*) are just beyond direct sunlight. They are all that remain in this cave of these stately ferns—decaying trunks up to 18 feet long, to show a beauty that has gone—cut down many years ago for decorating purposes. These trunks are now a mass of mosses and young ferns, among the latter another species for this prolific cave, Bat's-wing Fern (*Histiopteris incisus*). Far back in the limits of light where the walls are wet and dripping grows the last fern to be recorded from the Church Caves—Veined Bristlefern (*Polyphlebium venosum*), making a total of fifteen species from the one cave.

In and around these caves we recorded a total of twenty fern species. Others were Common Maidenhair (*Adiantum athiopicum*) in many sheltered corners under heaps of boulders and stone walls, Tender Brake (*Pteris tremula*) in several caves, and Lance Water-fern (*Blechnum lanceolatum*) which is confined to one cave—the Flower Pot. Ruddy Ground-fern (*Hypolepis rugosula*) in Fern Cave and Austral Adder's-tongue (*Ophioglossum coriaceum*) on the dry rocky flats, complete our total.

The Flower Pot cave is a dense and very beautiful fern garden, as well as one other example of man's destruction, in the shape of

rotting tree-fern trunks. Fortunately a fine group of Soft Tree-ferns still grows undisturbed in the Fern Cave where they are inaccessible except with ropes.

Special attention was paid to the moss flora. We limited our activities to two or three caves per trip so that a thorough investigation could be carried out. At the end of the first day some forty-five species had been collected. From then on nearly every cave contributed additions, and as with the ferns, certain species are apparently confined to certain caves. When the final cave was combed, the total had risen to sixty-two species. Of this pleasing tally (and we have no doubt that others exist) eight proved new to the County of Normanby. The majority of these novelties indicate



Open Church Cave, with Openings of Underground Caves.

an extension of range from the Otways; they are *Cyathophorum bulbosum*, *Distichophyllum pulchellum*, *Goniobryum subbasilare*, *Hymenodon piliferus*, *Lopidium concinnum*, *Rhychoستيgiella muriculata* had not been recorded west of Melbourne. The other two proved to be important discoveries and warrant special comment:

*Anoetangium bellii*—G. O. K. Sainsbury in his *Handbook of the New Zealand Mosses* gives as distribution: "Endemic, the distribution is perhaps confined to the South Island". Our record then is the first for Australia. It is a feature on the damp walls of several caves at Byaduk, indeed it is the commonest moss in the "Flower Pot"—forming masses up to several inches across.

*Tortella dakinii*.—This moss was known only from the single type collection, taken at Pound Bend, Warrandyte, on shaded Silurian rocks of steep cliffs along Yarra River (E. Dakin, Nov. 19, 1951); it was named by J. H. Willis in May 1955, a description with illustrations appearing in *Vict. Nat.*, 72: 6. At Byaduk it occurs on the upper surfaces of broken basaltic rocks, small heaps of which have been piled near a track in the vicinity of Harman's Caves. Our fruiting plants were noted among many barren ones. In some cases, the operculum was still intact and in others even the calyptra was still present.

In the January 1952 issue of this journal (*Vict. Nat.*, 68: 151) many new moss records for Victoria were listed. No less than eight of these have been located also at Byaduk.

Hepatics and lichens are also represented in good numbers. Of note is the hepatic *Hymenophyllum phyllanthus*, which is apparently new to our far southwest; it occurs in great masses on an eighteen-foot dead *Dicksonia* trunk in Church Cave. The lichen *Cladonia amaurocraca* forms lovely cushions on open barriers, as it does at intervals between Tyrendarra and Mt. Eccles farther south; apart from these records it is known in Victoria only from the Cobberas Mountains in the east of the State.



Descending the Fern Cave.

Amongst a wealth of native flora in and around the caves are many large bushes of Shiny Cassinia (*C. longifolia*), in full flower in mid-summer. The Tree Violet (*Hymenanthera dentata*), which we have always found associated with volcanic barriers, grows to an outstanding size on the floor of the open caves. This type of country also suits Sweet Bursaria (*B. spinosa*) and here as elsewhere its flowers attract hordes of insects. Hanging in great cur-

tains from the walls of the open caves we found Nodding Saltbush (*Rhagodia nutans*), some tresses being ten feet long. It seems a peculiar locality in which to find Derwent Speedwell (*Veronica derwentii*), yet some of these beautiful flowers grow luxuriantly on open cave ledges along with Austral Stork's-bill (*Pelargonium australe*). Variable Groundel (*Senecio luteus*) is widespread throughout the lava flow and makes the landscape a field of yellow.

Numerous alien plants abound throughout the cave area. The Clubmoss, *Selaginella tauersiana*, trails and hangs gracefully on rocks inside Harman's Cave, perhaps the moistest and coolest cave of the group. Ivy-leaf Toad-flax, *Cymbalaria muralis*, a native of southern Europe, sprawls and hangs in great lengths, with flowers here and there, on basalt rocks in the Flower Pot.

Strawberry Saxifrage, *Saxifraga sarmentosa*, native of China and Japan, covers several square feet on the floor of Church Cave with its large round leaves, green above and purple below.

Bedstraw, *Galium tenerum*, is widespread both in caves and outside and shows extreme variability in growth. Tree Tobacco, *Nicotiana glauca*, is represented by a few scattered bushes. This plant which grows in a number of places in south-western Victoria (and elsewhere) is said to have originated from cultivated crops grown by the early settlers as a source of nicotine for use as a worm-drench in sheep.

The nature of the country does not lead one to expect a large ornithological population, but we did make a few interesting records. White-backed Magpies (*Gymnorhina hypoleuca*), Ravens (*Corvus coronoides*) and Magpie Larks (*Grallina cyanoleuca*) are common, and sometimes there are immense flocks of Corellas (*Kakator tenuirostris*) and White Cockatoos (*K. galerita*). A few Eastern Rosellas (*Platycercus eximius*) flew over the Fern Cave during one visit, and there are probably several other parrot species in the surrounding eucalypti. Birds of prey are well represented, and we recorded Wedge-tailed Eagle (*Uroaetus audax*), Whistling Eagle (*Haliastur sphenurus*), Swamp Harrier (*Circus approximans*), Brown Hawk (*Falco berigora*), Nankeen Kestrel (*N. conchroides*) and Peregrine Falcon (*F. peregrinus*). A pair of the latter were nesting high up on a cave ledge and "dive-bombed" us repeatedly. Both Swallows (*Hirundo neoxena*) and Fairy Martins (*Hylchelidon arifol*) had nests on the cave roofs. Blue Wrens (*Malurus cyaneus*) were in the bracken, Yellow-tailed Thornbills (*Acanthisa chrysarrhoa*) among the Tree-Violets, and White-browed Scrub-Wren (*Sericornis frontalis*) far down in semi-darkness among the rocks. This bird list could without doubt be greatly augmented by anyone paying attention to that side of the area's wild life.

In a number of places swarms of bees have made their homes in

cracks and fissures on the cave walls, where they will certainly never be robbed or disturbed for no apiarist could tackle the job with anything less than a pneumatic drill. Tiger snakes are the chief, and none too welcome, reptile residents.

In many places on ledges of open caves we found a peculiar black substance, hard and brittle, but with handling it became sticky and gave off a heavy inoffensive smell. Sometimes it was a foot deep and covered a yard of rock ledge, from which it could be chipped off with a hammer. At one stage of its history it had been pliable and soft, as the cavities of scoriaceous basalt were filled with the material. It was invariably on the north-eastern walls of a cave, exposed to sun and rain, and there was no evidence of seepage from above or fall to a lower level. Samples were sent to the National Museum and replies received show there is still much to be learnt about this black substance.

It was suggested first that blacks used the material, then that it had come from above from injured tree-roots. Our observations indicated that neither was the explanation. On February 14, 1956, Dr. A. W. Beasley wrote:

"Mr. Willis advises that he collected samples of the black gummy material from Byaduk caves in July 1950. He has identified it as altered *bat guano*. Presumably the vegetable diet of the bats accounts in part for the pleasantly aromatic odour of the material. Mr. Willis has seen identical material in limestone caves on the Nullabor Plain. Its occurrence there suggested that it oozed along fissures and down walls at reduced viscosity, in the presence of water and vegetable matter". (This is not the case at Byaduk.) "The material is described as almost black, moist and sticky when broken, often with a smooth polished outside surface. On drying it becomes much harder and brittle." On April 23, came Dr. Beasley's final letter: "Mr. Neboiss (Assistant Curator of Insects) has identified a beetle embedded in the black altered bat's droppings as *Ptinus lectus*, and he has also found a species (as yet unidentified) of Hymenoptera (ants). In his opinion the insects will not give a clue to the age of the black material."

One of the writers of this article found a small vein of similar material in a cave on the north face of Ayers Rock in October 1952: in this instance it was quite protected from weather. So we have three occurrences in widely separated localities and in different rock formations—basalt (Byaduk), limestone (Nullabor), and conglomerate (Ayers Rock). In all three there is nothing to indicate what altered the bats' guano, or how long ago this change took place. At which rather unsatisfactory conclusion we must leave the matter.

(We are indebted to the directors and staff of the National Herbarium and National Museum for their kind assistance throughout the preparation of this article.)

## FLORA OF VICTORIA: NEW SPECIES AND OTHER ADDITIONS—13

By N. A. WAKEFIELD, Noble Park

**Genus JUNCUS: A Giant Species of the JUNCI GENUINI,  
Hitherto Undescribed, and Comments on Others of the Subgenus**

**JUNCUS INGENS** sp. nov. distinctissima Subgenus *Genuini* (insculpta ob characteres sequentes jam discriminanda; culmis altissimis (160-175 cm. in typo) percrassis (ad basis  $\pm$  10 mm. et inflorescentiam versus  $\pm$  5 mm. in diamet.), medulla interrupta; inflorescentia magna (12-20 cm. longa), perlaxa, diffusa, unisexuali; floribus sat parvis perianthis segmentis circa 1.5 mm. longis (3 interioribus perlate alatis), masculinis staminibus 6 sed ovarium nullum gerentibus, femineis staminibus 6, capsula ovoidea circa 1.5 mm. longa.

**HOLOTYPE:** Swamp between Princes Highway and Latrobe River, 1 mile west of Rosedale, Victoria; N. A. Wakefield No. 4835; 22/1/1957; female specimen; (MEL: duplicates to be sent to K and NSW\*).

Plants unisexual, forming extensive thickets in permanent shallow water; rhizomes stout, much branched; culms about 2 metres or more high, cylindrical, about 1 cm. or more in diameter at base and 5 mm. towards the inflorescence, smooth, pale, the pith almost cork-like and very much interrupted, leafless; basal sheaths up to 36 cm. long and 15 mm. wide, pale brown to straw-coloured, widely dilated; inflorescence up to 20 cm. long, diffuse, much branched, the longest branches bare for up to 8 cm., the final divisions hair-like, bearing up to 3,000 or more minute flowers, the erect floral bract 15-95 cm. long; outer perianth segments 1.5-2 mm. long, acute; inner segments about 1-1.5 mm. long, obtuse, broadly winged; stamens 6, reduced to flat staminodes in female flowers, ovary lacking in male flowers; stigmas wholly free; capsule 1-1.5 mm. long, broadly obovate, the apex truncate; seeds few.

*Juncus ingens* grows abundantly in lagoons and waterways of the upper Murray River district, in which area J. H. Willis reports plants up to 15 feet (4.5 metres) in height. In Gippsland, the species covers some acres of swamp in the type locality (near Rosedale), it fills the extensive McLeods Morass on the western fringe of Bairnsdale, and there is a minor occurrence in a tiny lagoon near the Princes Highway at Brodribb River. Besides the type material, there are in the Melbourne National Herbarium specimens as follows:

Wangaratta, 1881, collector unknown, (female); Goulburn River, W. F. Gates, 1891, (male); Bonegilla, banks of Kiewa River, Raleigh A. Black, 11/9/1940, (female); McLeods Morass, Bairnsdale, N. A. Wakefield No. 4894, 31/1/1957, (male); Brodribb River, N. A. Wakefield No. 4881, 23/1/1957, (female); Cohuna, per Australian Paper Manufacturers Ltd., 14/11/1940, (male).

*J. ingens* is evidently the largest *Juncus* in the world, and it appears also to be the only dioecious species of the genus.

**JUNCUS SUBSECUNDUS** sp. nov. affinis *J. radula* Buch. (quocum olim confusa); sed recedit: culmis haud scabridis, medulla interrupta, inflorescentiae axibus laevibus, floribus approximatis.

**HOLOTYPE:** Princes Highway, west of Providence Ponds, eastern Victoria, N. A. Wakefield No. 4873; 22/1/1957; under *Eucalyptus rostrata*, with *J. polyanthemus* Buch., *J. australis* Hk. f., *J. radula* Buch. and *J. filiculis* Buch.

Rhizomes little-branched; culms few, up to 60 cm. high, normally about 1 mm. diam. strongly striated; longest basal sheath strongly striated, dull

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

brown (sometimes shining in lower part); pith open in texture (microscopically), much interrupted; inflorescence usually 4-6 cm. long, consisting of a group of several  $\pm$  unilateral racemes (each 1-2 cm. long and several-flowered) with a second similar group terminating an elongated bare branch above it, sometimes more compound; perianth segments subequal, acute, 2-2.5 (rarely 3) mm. long, membranous-winged; stamens normally 6 (fewer in some flowers), rarely 3; capsule finally about as long as perianth, oval, not or slightly truncate, seeds very numerous (about 100).

*J. subsecundus* is widespread in lowland areas, of about 20 inches rainfall per annum in Victoria, including the Gippsland plains, and it occurs too in New South Wales and South Australia.

The distribution of the species is indicated by the following specimens in the Melbourne National Herbarium:

NEW SOUTH WALES: Armidale (Perrott); Parramatta (Woolfs); Medway and Narrai (L. Calvert); Rockton (N. A. Wakefield No. 4915, 28/1/1957); Bull Plain, Riverina (R. A. Black, 7/6/1940). VICTORIA: Kangaroo Flat, near Bendigo (A. J. Tadgell, Oct. 1934); Castlemaine (A. J. Tadgell, Nov. 1932); Moyston (D. Sullivan, Dec. 1873); near Dimboola (data?). SOUTH AUSTRALIA: Balonne (H. Wehl, 1894).

Within the range of typical *J. subsecundus*, plants vary greatly in size; those from Balonne have stems about 10 cm. high and 0.5 mm. diam., while the inflorescence is about 15 mm. long; those from Castlemaine have the inflorescence up to 16 cm. long (but extremely sparse) with the ultimate branches up to 5 cm. long.

*J. subsecundus* is closely allied to *J. radula*; but in the latter the pith of the culm is invariably continuous, certain parts (upper culms, branches of inflorescence and backs of perianth segments) are scabrous, and the flowers are more distant from each other.

Note. Besides the unique *J. ingens*, there are 9 species of the *Junci genuini* in Victoria. Each shows major variation in development of inflorescence and in size. Extensive field observation indicates that, though various groupings of species occur in many places, suites of intermediate forms are not to be found. There are however occasional plants which are evidently hybrids between pairs of species with which they occur. It is the intention of the writer to enlarge upon these statements at some future date, and to tabulate data pertaining to them, in a survey of the local species of the group.

#### Genus PIMELEA: A New Species from the Australian Alps

*PIMELEA BIFLORA* sp. nov. alpina distinctissima: suffrutex omnino prostratus, valde ramosus, folia ovata, 5-9 mm. longa, subtus strigosohirsuta, super glabra; inflorescentiae terminales, quisque biflora, foliis involucrali 4, demum proflerae; corollae tubus gracilis, villosus, inter ruber, lobis brevibus.

**HOLOTYPE**: Specimen in MEL., with original label, "Humifusa in montium Munday Mountains grassimosis, altitudinum 4-5,000 ft., Jan. '55, Dr. Ferd. Mueller". Some specimens, apparently from the same plant, were placed by Mueller, together with some of rather different appearance, in a different folder, and labelled "Mt. Cuskiusko".

Stems prostrate, stout, rough, much branched, several inches to over a foot long; foliage very dense, usually forming a mat; leaves all opposite, subsessile, ovate, 5-9 mm. long, under-surfaces strigose, upper-surfaces glabrous; inflorescences terminal, consisting of 2 flowers subtended by 2 pairs of normal (or slightly larger) leaves and with also 2 vegetative buds one or both of which later develop into new branchlets; corolla shortly villose, the tube about 5 mm. long, the lobes about 1.5 mm. long, the interior red.

*Distribution:* Australian Alps, *New South Wales:* As well as the type collection, there is another from the Kosciusko Plateau (*leg.* Alec. R. Costlin, April 1947), *Victoria:* Cobbaras Mountains (*leg.* F. Mueller; also N. A. Wakefield, No. 2582, 12/1/1947, alt. 5,900 ft.). Pretty Valley, Bogong High Plains (*leg.* J. H. Willis, 19/1/1947).

The specimens collected by Mueller and cited above are duplicates of syntypes of *P. curviflora* var. *alpina* F. Muell. ex Benth. (*Fl. Austr.* 6: 32). In the Australian Alps (exact locality unknown), Mueller collected also some specimens of *P. curviflora* which his annotations on herbarium labels show that he considered to be the same as his material of the present *P. biflora*.

*P. curviflora* R.Br. is readily distinguished by its erect habit,  $\pm$  alternate foliage, and by its inflorescences being multiflowered and mostly axillary. The inflorescence of *P. biflora* indicates its affinities, not with *P. curviflora*, but with the *P. flava*-*P. dichotoma* group.

#### MICROSCOPICAL GROUP

Mr. D. McLimes was the lecturer at the March meeting of the group, his subject being "The Grinding and Mounting of Rock Sections". Mr. McLimes, as usual, put a great deal of time and thought into his presentation, with the result of keeping his listeners interested in the technique of the preparation, grinding, and subsequent mounting in this interesting branch of microscopy. The dozen microscopes on the bench all showed specimens of rock sections. The subject for the 17th April meeting is entitled, "The Microscope with Camera-Lucida in Entomology" and the speaker is Mr. Burns of the National Museum. All interested are cordially invited to be present.

#### LETTERS TO EDITOR

Hon. Editor, *Victorian Naturalist*,

Dear Sir,

Since the publication of the tribute to the late Rev. H. M. R. Rupp ("The Passing of a Great Orchidologist" by J. H. Willis, *Vict. Nat.* 73: 105-10) a number of inquiries have been received concerning the reference on page 110 to data on the life of Ronald Campbell Gunn which was gathered by Rev. Rupp and "believed to have been sent for publication to the Royal Society of Tasmania, Northern Branch, about 1952".

In 1951, at the request of this Branch, Mr. W. Baulch, one of our members, undertook to prepare material for a biography of R. C. Gunn. Mr. Rupp corresponded with and sent some notes to Mr. Baulch who informs me that these notes were returned to Rev. Rupp by the beginning of 1953. Mr. Baulch hopes to complete his work early in 1957.

Yours faithfully

FRANK ELLES, Hon. Secretary

Northern Branch, Royal Society of Tasmania

November 26, 1956.

Hon. Editor, *Victorian Naturalist*,

Dear Sir,

I wish to draw attention to the report of Proceedings of the General Meeting, December 16, 1956, where it is stated (lines 21-23) "that Australian occurrences (of dolomite) were fresh-water sedimentary rocks and not marine deposits as in Europe and elsewhere."<sup>\*</sup>

This is incorrect, as extensive deposits of dolomite of marine origin occur at Smithton, Tasmania; Cudjogong, New South Wales; and Ardrossan, South

<sup>\*</sup> This was recorded as Mr. Baker's own statement. Actually, the word "some" was inadvertently omitted, and the report should have read "that some Australian occurrences . . ."—Editor.

Australia; as well as many other places in Australia. That these were so derived is proved by marine fossils in the un-dolomitized portions of the limestones.

Other deposits of dolomites, namely, at Mt. Bischoff, Tasmania; and Broken Hill, New South Wales; resulted from alteration of basic and ultrabasic intrusions by mineralizing solutions during deposition of the ores lead, copper, zinc, etc.

Only one important deposit of dolomite, as a freshwater sedimentary rock, occurs. This is at Comadai, Victoria, where it is considered that thermal springs, occurring during lake formation, provided the necessary proportion of magnesium carbonate to form a dolomitic rock.

Yours faithfully

ALFRED A. BAKER

Geology Department, University of Melbourne.

## NATURALISTS' NOTEBOOK

(Reserved for your Notes, Observations and Queries)

### SWALLOW AND MOTOR-BOAT

During an enjoyable visit to Mr. and Mrs. Barton of Spermwhale Head in October, I saw the nest of a Welcome Swallow on a ledge under the canopy of their motor-boat. There were eggs in it at the time, but no bird was on it. "What happens when you leave home when the bird is not on the nest?" I asked. "She waits for us to come back," was the reply, "or if we are too long she flies across to Paynesville and finds the boat and settles down on the nest." Paynesville is four miles from the boat's usual anchorage at Spermwhale Head and there are many boats there. I do not know whether the swallow has any difficulty in finding her own boat, but I hope her family is now hatched, in the nest lined with guinea-fowl feathers.

—JESAN GALBRAITH, Tyers

[Did the eggs hatch?—Editor.]

### WHAT, WHERE AND WHEN

#### F.N.C.V. Excursions:

Easter (April 18 to April 22)—Dimboola, under the leadership of the Wimmera Field Naturalists Club. Train leaves Spencer Street at 6.35 p.m.  
NOTE ALTERED TIME. Other details in last month's *Naturalist* or from Excursion Secretary.

Sunday, May 5—Botany Group excursion to Emerald. Subject: Fungi. Take 8.55 a.m. train to Upper Ferntree Gully, then bus to Emerald.

#### Group Meetings:

(8 p.m. at National Herbarium)

Wednesday, April 17—Microscopical Group.

Wednesday, April 24—Botany Group. Subject: Trees of Port Phillip Area.  
Speaker: Mr. W. L. Williams.

Wednesday, May 1—Geology Group. Subject: What is Gemmology?  
Speaker: Mr. Davidson.

Monday, May 6—Marine Biology and Entomology Group. Meet 8 p.m. at private entrance at south end of Parliament House.

#### Preliminary Notice:

Saturday, June 1—Mystery Excursion: Rosebud area. Leader: Mr. C. Lewis. Parlour coach will leave Batman Avenue at 9 a.m. Fare 16/. Bring two meals.

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