

The South Australian NATURALIST

A Quarterly Journal of Natural History
published by
THE FIELD NATURALISTS' SECTION
of the
ROYAL SOCIETY OF SOUTH AUSTRALIA (INC.)

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Hon. Editor - - - NOEL LOTHIAN

Club founded 1883 — S.A. Naturalist 1919

The author is responsible for the facts recorded.

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GENERAL INFORMATION

No special knowledge necessary to become a member, only a keen interest in natural history and a willingness to further the aims of the Section.

This Section was founded in 1883 for the purpose of affording observers and lovers of natural history regular and frequent opportunities for discussing those special subjects in which they are mutually interested; for the exhibiting of specimens; and for promoting observations in the field by means of excursions to various collecting grounds in and around the metropolitan area.

The Monthly Meetings of the Section for lectures, reading of papers, and exhibition of specimens are held on the third Tuesday, at 8 p.m. at the Royal Society's Rooms, Institute Buildings, North Terrace, Adelaide.

Visitors are welcome

Subscriptions—

Life Membership	£7/7/-
Ordinary Members ..	10/- per annum
Student Members	
18—21 years	5/- per annum
Junior Members	
under 18 years ..	2/6 per annum
Corresponding Mem-	
bers	5/- per annum

Excursions—

For excursions by train meet on train after obtaining ticket.

For excursions by tram meet at T. & G. corner.

Bus Trips (unless otherwise stated) leave from the corner of Kintore Avenue and North Terrace; at 8.30 a.m. for all-day trips, and 1 p.m. for afternoon trips. Persons desiring to attend should contact the Treasurer, Miss G. L. Gregor, at the School of Mines (W1771) at least seven days ahead.

Members can take receptacles for the carrying of specimens, for at each outing members may desire to make collections of items for further study.

Committee Meetings are held on the second Tuesday of each month.

Postal address of the Section—

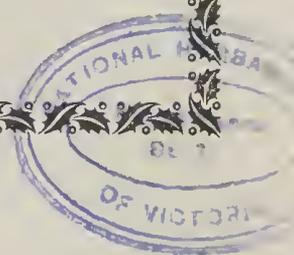
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"The South Australian Naturalist" — The Journal of the Section. Free to members. Exchanges may be arranged. Extra copies 2/6 each. Address communications to Hon. Editor, T. R. N. Lothian, c/o. Botanic Garden, Adelaide.

The Chairman extends his sincere wishes to all members for a Happy Christmas. He hopes that the prevailing goodwill and co-operation within the Section, which has produced such a momentous past year, will bring an even more successful New Year.



PROCEEDINGS

SEPTEMBER MEETING

The monthly meeting for September was in the form of prize-giving when the Field Naturalists' Natural History Award was given to Mr. R. White. Last year the Field Naturalists' Section decided to award a £5/5/- prize annually to the most promising student studying one of the natural sciences at the University.

The Chairman outlined the history of the award and stated that he was delighted that Mr. White had been awarded the prize and offered the Section's congratulations to him. Mr. White thanked the Section for the prize and gave an address entitled "Geology and Scenery." This was very much appreciated by the large audience.

Final details concerning the Wild Flower and Nature Show were announced and matters relating to the next number of the Naturalist were discussed.

OCTOBER MEETING

On 21st October members of the Section were addressed by Mr. Love, his subject being "Radio Active Minerals." Mr. Love spoke very clearly and explained in detail, firstly, the types of radio-active minerals which were available in Australia and, secondly, on the various equipment which was necessary to successfully locate them. Members not only saw but had the intricacies of the Geiger Counter explained to them, and were astounded as well as enthralled with the brilliant, colourful effects of an ultra violet light when played on radio active rocks. Distribution, properties and methods of mining such minerals as wolfram, scheelite and uranium bearing rocks were given.

These and other radio active minerals brought from different localities in Australia seem to fluoresce in a different colour for the similar mineral when subjected to

ultra-violet light. The element radium throwing off radio active emanations for countless ages then exhausts itself and has changed to another element — lead. The speaker speculated on what Broken Hill — the largest known lead deposit in the world — had been hundreds of millions years ago when it was a vast radio active area. As a final note, the lecturer told us of the grotesque effects that radio activity was producing in the laboratory.

The Chairman, on behalf of the large number of members and friends present, thanked the lecturer for what must be regarded as one of the outstanding lectures the Section has had presented to it.

Thirty new members were elected. Nearly all of these were introduced to the Section by the holding of the Wildflower and Nature Show just concluded. They are:—

Life Member.—Mrs. H. H. Dutton, Anlaby Station, Kapunda.

Ordinary Members.—Miss Ruth Altmann, 28 Dequetteville Tce., Kent Town; Mrs. Baxter, Baroota Ave., Rostrevor Park; Mr. & Mrs. F. V. Bond, 14 Jasper St., Hyde Park; Mrs. L. L. Bowden, 11 Gurney St., Edwardstown; Prof. D. G. Catcheside, 12 View St., Unley Park; Mr. Harold Caulfield, c/o. Botanic Garden, Adelaide; Mr. R. S. Cichon, Verdun; Mr. Chas. E. Clark, 11 Carrington St., Adelaide; Mr. Frank L. Collie, 16 Clifton St., Maylands; Dr. R. A. Durie, 44 Dee St., Woodville South; Mr. N. A. Ford, 4 East Parkway, Reade Park; Miss Pat Green, St. Ann's College, Brougham Place, North Adelaide; Mrs. A. W. Hancock, Modbury; Miss Leslie Hughes, 25 Russell

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Corresponding Members.— Mr. and Mrs. E. L. Beck, Poochera, West Coast; Mr. J. B. Hood, Private Mail Bag 26, Joanna, via Naracoorte.

Juvenile Members.—Master Desmond Cossey, 3 Foote Ave., Kilburn; Master L. L. G. Palmer, 206 Childers St., North Adelaide; Master Peter Rogers, 6 Foote Ave., Kilburn; Master John Shelton (address as above).

Those present at the meeting were welcomed by the Chairman.

The Show Convenor reported on the Wild Flower Show, a full report of which is given elsewhere in this issue. Further details were given concerning the Christmas and Easter camps.

Some beautiful specimens of *Callistemon* and *Boronia* were discussed by Mr. Pritchard who had grown the specimens.

18th November, 1952

In the absence of the Chairman one of our Vice-Chairmen, Miss C. M. Eardley, chaired the meeting. In doing so she made history for this is the first time a meeting of our Section has been chaired by one of our women members—in fact Miss Eardley created a record when she was elected to the position of Vice-Chairman. Over 60 members and friends attended and the seating accommodation was severely taxed. The Committee is delighted to see the increased attendances at the monthly meetings over the past three to four months.

The following new ordinary members were elected and the Madam Chairman welcomed them to the Section:—

Mr. Bernd au - Hedenstroem,
Waterfall Gully Road, Burnside.

Miss N. Tootell, 11 Victoria Avenue, Rose Park.

Mr. W. S. Gray, Halidon, S.A.

Miss Eardley introduced Mr. Keith Ashby who was our speaker for the evening. By using a wonderful collection of coloured slides Mr. Ashby took members on a visual visit to Scotland, England, Wales, France, Switzerland and back to Australia. It was an outstanding evening for those who

had not had the opportunity to travel overseas and the views brought back memories to those who had. Mr. Ashby was accorded a very warm and spontaneous vote of thanks which was carried by acclamation.

The Editor reported on the forthcoming issue of the South Australian Naturalist, and the Treasurer gave the following statement of accounts:—

Current Account ..	£346	7	10
Life Membership Fund	£76	12	2
Conservation Fund	£41	15	7
Colourplate Fund	£11	11	2

At the suggestion of Mrs. Norton, members unanimously decided to hold an OPEN MEETING AND SOCIAL in the Botanic Garden on Saturday, 31st January, 1953 at 2.30 p.m. Members considered that this meeting would allow all members both new and old to meet and get to know each other better and it is hoped that country members in Adelaide on that date will attend. Members are asked to meet at the northern side of the Simpson Kiosk at approximately 2.30 p.m. on the above date. The charge will be approximately 2/6 and members are asked to advise the Hon. Treasurer, Secretary or Editor if they propose to be present.

The meeting closed at 9.55 p.m.

EASTER CAMP, 1953

Quite a number have already booked for the Camp at Aldinga. If you wish to attend, you are advised to contact the Treasurer at an early date, as accommodation is limited.

COLEOPTERA (BEETLE) COLLECTORS

Mr. E. Sutton, P.O. Box 1, Fletcher, South Queensland, is interested in collecting these insects and would welcome exchange of specimens with other collectors.

METEORIC CRATER-NATIVE LEGEND

Professor Cleland has forwarded the following extract from "Nom-enclature of South Australia" by Rodney Cockburn (1908), p. 66 It is part of a letter to the Editor of the "Adelaide Register, Observer and Evening Journal," under the title, "Marvels of Euphony." In view of the hypothesis it is a pity that no one has followed up the suggestion made therein.

"In times gone by an old woman (Uryoola) indulged rather freely in 'bilta,' the fruit of the mesembryanthemum. In consequence she had a pain in her 'pinnie.' She climbed to the top of a prominent hill, and relief came to her in a great effort of Nature. The mighty blast rent a great semi-circular gap in the northern aspect of the hill, sending great boulders and lumps of chalk and gypsum to the plain in a mixed up head of desolation, and the place is known unto this

day as Uryloo-labaldion-ganoo. How startled the old lady must have been. Conceive the 'There-i've-been-and-gone-and-done-it' sort of feeling with which she must have regarded the stupendous catastrophe, the result of her over-indulgence in bilta. Yet all this interesting if primitive piece of geological tradition, with its excellent moral inculcating abstemiousness, is lost under a small triangle with a dot in the centre, branded on our plans Mount Purvis, in memory no doubt of some estimable but probably prosaic gentleman.

I am, Sir, etc.,
MOODLOOWARDOO."

(Editor's note: The Surveyor-general has kindly supplied the following information. Mt. Purvis is situated on the Anna Creek Pastoral Run which is approximately 120 miles south of Oodnadatta. The mountain is approximately 50 miles due west of Coward Spring Railway station.

WEeping FORM OF EUCALYPTUS SPECIES

A glance through overseas horticultural literature usually reveals that plant spp. long cultivated have produced numerous "sports." These are vegetatively propagated and grown in gardens. A genus which immediately comes to mind is *Chamaecyparis Lawsoniana* — the common Lawson Cypress, of which there are innumerable habit and foliage forms.

Over the years a number of weeping forms of various *Eucalyptus* species have been noted, and it is a pity that more efforts have not been made to perpetuate these

"witches brooms;" for *Eucalyptus* is notoriously difficult to propagate vegetatively. In Victoria *E. polyanthemos* and *E. obliqua* frequently produce limbs which are pendulous, looking very much like mistletoe growths.

In South Australia, *E. camauldensis* (*E. rostrata*), River Red Gum, sometimes shows this variant, the most notable being seen in a tree alongside the dairy factory at Gumeracha. This tree is over 70 feet high and has the typical umbrageous spread of this species.

Continued on page 30.

DESERT INSECTS

G. F. Gross, Assist. Entomologist, S.A. Museum.

When the term desert is mentioned, many people will probably visualize long rows of parallel sandridges without a trace of vegetation, others will allow this vision to include perhaps an occasional cactus or similar plant. Areas such as this are only met with occasionally in the large deserts of the world, the American deserts are fairly lavishly equipped with cacti and leguminous plants, and similar conditions obtain in the deserts of South Africa and Asia Minor. Even our own Arunta or Simpson Deserts and the Western Desert are fairly well clothed with porcupine grass (*Triodia* spp.) and sandhill cane grass (*Spinifex paradoxa*).

However, so far as insects are concerned the so called "arid" regions outside of the 8 in. annual rainfall line, provide an environment which most of the time is every bit as harsh as that of the Australian deserts listed above, and as the communities of the two do not differ essentially, these arid regions have also been included in this discussion. But we must remember that when rain does fall in the arid regions, especially those bordering on the mallee, then their insect communities are temporarily strongly augmented by many species with a distinctly "wetter" or more Southern look. This phase of the insect life of the arid environments however is not dealt with here.

Actually the insects of the desert are not necessarily subjected to the full rigors of their environment as perhaps a person walking through

would think. For example, many of the insects in these regions (bugs, certain beetles, thrips, witchety grubs, etc.) are plant feeders, and spend their time easily in the shade amongst the leaves or inside the stems or roots, with the (for them) unlimited water supply of their hosts at their disposal, others spend most of their life permanently underground, e.g. chafers, cicadas, ant-lions (all as "grubs"). Others seen walking on the blazing surface like ants and certain wasps, can retreat underground, others like grasshoppers, stick insects, certain flies and wasps can retreat into the cool of a handy bush. Still another group are nocturnal, spending their days under stones (beetles of the *Cubicorrhynchus* group, ants and the occasional silver-fish), or in shady bushes (cockroaches, some stick insects). Therefore collecting at night with a light yields a great variety of insects scarcely seen during the day, e.g. Rutherglen bug, (*Nysius vinitor*), various Neuroptera and chafer beetles.

We can say very little at this stage about the individual habits and preferences, the distribution and community structure of the insects of the "desert" (or for that matter any other region of South Australia).

We are sadly in need of very much larger collections than we have at present. Each insect caught, preferably with exact data recorded on the place and position of capture (e.g. 5 miles north of Hawker, on underside of leaf of bullock bush, 5 feet above ground in the

shade; or under stone; or in soil; or on bark 2 ft. 6 in. up a red gum; etc.), together with the nature of the environment (mulga scrub, red gum creek, *Atriplex vesicarium* steppe, etc.), altitude, wet and dry bulb temperatures, wind, weather, time and date, is urgently needed.

I intend now to discuss a broad classification of the environments of the desert insects, naming tentatively only those formations which are very distinct as regards their insect communities and known personally, and retaining the recognised botanical association groupings for complex environments or ones which shade into each other in a patchwork pattern, such as occurs in the Northern Flinders Ranges. What little we do know about the insect species present is included in the relevant section. As a major separation we might use soil type, although it must be stressed that it is by no means absolute. For example one can find often on sandhills associations of mulga (*Acacia aneura* and related species), or black oak (*Casuarina lepidophloia*), yet in places associations of each of these species can occur on clay soils or talus slopes.

Sandy Formations (soft country).

Almost invariably stones with their attendant insects, are absent, but one finds here those insects more specially able to burrow (various wasps, including the bembecid wasp [*Bembex variabilis*], chafers, etc.) and of course the usual plant feeders. Many of the shrubs of this environment have a characteristic dome shape with dense outer covering. The parallel sand-ridges of the Arunta, the Great Western or Victoria Deserts with their covering of porcupine grass and in the former cane grass,

fall into this category as does the *Schoberian* (a formation of nitre bush, *Nitraria Schoberi*, with occasional needle bushes (*Hakea* spp. and *Cassia desolata* and *C. eremophila*), south of Lake Eyre North and north of Muloorina Station. Characteristic insects of this latter formation are a silverfish (*Acrotelsella* sp.) the ant *Pheidole tasmaniensis*, the thynnid wasp *Thynnus zonatus*, and predatory wasps of the Larridae, Sphecidae and Psammocharidae. Along the shores of Lake Eyre the Cicindelid beetle *Megacephala australis* is common.

Many sandhill formations are dominated by mulga, for example between Lake Torrens and the section of the North-South Railway line between Mern Merna and Parachilna, others by black oak, as the south shores of Lake Torrens and in the east of the State, while south of Lake Frome is a formation dominated by *Hakea leucoptera*. In the mulga formation the mulga thrip *Plaeothrips tepperi* is present, and near local swamps the Rutherglen bug and large Sphecid wasps are found. The "Casuarina mirid" (Genus and species unknown) and the lerp insect *Trioza casuarinae* probably occur in the black oak regions. Often this country supports literally myriads of bush fly (*Musca vetutissima*).

Loam Soil Formations. Here again stones are rarely present and curiously enough the burrowing insects seem to be somewhat reduced. The *Sowdenian* is a formation dominated by the myall (*Acacia Sowdenii*) with *Atriplex vesicarium*, *A. stipitatum* and the two blue bushes *Koehia sedifolia* and *K. pyramidita* and occasionally sandalwoods (*Myop-*



Fig. 1. Scene from portion of the Gawler Ranges looking west over the south-west gulf of Lake Gairdner, showing in the foreground the *Gamblerian* with steel-bush (*Acacia turculensis*) and porcupine grass (*Triodia irritans*) developed on granite porphyry and in the middle ground a formation of the *Sowdenian* with the my all (*Acacia Sowdenii*) developed on a sandy loam, in this case without any development of *Atriplex* and *Kochia* spp.

orum platycarpum) and native apricot (*Pittosporum phillyraeoides*) occurring west of Port Augusta up to the South shores of Lake Torrens, through the flats between the Gawler Ranges right down to Ceduna. The blue butterfly *Ogyris meridionalis* (whose larvae feed on the mistletoe on the myalls and are conducted up and down by ants from the mistletoe to the ground) is the commonest insect. Also present are the cricket *Endacusta australis* and where the formation abuts on the Gawlerian the beetle *Penthea picta* and the mutillid wasp *Ephutomorpha rugicollis*.

North of Peterborough is a similar formation dominated by *Myoporum platycarpum* and a dryer aspect of this group, is a shrub steppe of *Atriplex vesicarium* and *Kochia sedifolia*, the largest development of this latter being the Nullarbor Plain. None of the plants appear to be very rich in insects, saltbushes and blue bushes being particularly disappointing.

Clay Soil Formations. Where few stones are present these support very few insects, but where stones become more plentiful, insects also increase in numbers. As mentioned before, black oak can occur on this formation as can mulla (parts of the Flinders Ranges, North Tent Hill) each with their attendant insects. In other parts of the Flinders Ranges communities of *Cassia eremophila*, Bullock Bush (*Heterodendron oleifolium*), native pine, etc. occur. The formation of gums and native pines inside and just outside of Wilpena Pound is a northern extension of a higher rainfall formation than those which we are discussing. Both in these and the loam formations the bug *Leptocoris mitellus*

and the butterfly *Precis villida* are fairly common.

Stony and Sheet-rock Formations. These are best treated together as they are usually present together, the sheet rock needless to say being the more sterile. Beneath the stones are to be found quite an assemblage of ants, *Cubicorhynchus* beetles, etc. The *Ankamookan* is developed on and between certain quartzite plateaux particularly along the western shores of Lake Torrens and on isolated areas near Lake McFarlane, and varies from almost bare stony gibber plains to *Atriplex vesicarium* steppe (particularly on top of the hills). (Fig. 1).

The *Gawlerian* is developed on the granite domes of the Gawler Ranges comprising stunted mallees, *Triodia* sp., steel bush (*Acacia tarculensis*) etc. The porcupine grass here is very rich in insects (and lizards), which can easily be obtained by burning the clumps of this grass. Insects present include the cockroaches *Zonioploca alutacea*, *Anamesia punctata* and *Platyzosteria zebra*.

In some stony formations in the Flinders Ranges (e.g. near the Leigh Creek reservoir at Aroona Springs) porcupine grass (*Triodia* sp.) is also very common, but does not yield much of interest.

The *Wilpenan*, an association of stunted mallees, *Dodonaea* spp., *Casuarina distyla*, *Xanthorrhoea quadrangulata* and *Triodia* sp. developed on the Mountains of the Wilpena Pound and perhaps in part on the Eastern face of Mt. Remarkable, and other formations of similar nature on Elders Range and the highest hills near Quorn, are partly semiarid and partly derived from wetter elements, supporting in the main a few Collembola

bola, etc., in winter, but practically only a very few ants on the lower levels in the summer. The cockroach *Zonioploca alutacea* has been taken in this formation from over 3,500 feet. The Casuarina mirid bug and lerp are also present.

Intrusions, Creek Beds, etc. In any of the above formations one is liable to find small inliers of different formations on some local variation in soil or rainfall; mulga communities on sand are common in the *Sowdenian* and the Southern derived inlier of Gums and *Callitris* near and in Wipena Pound amongst the *Cassia*, *Dodonaea*, *Eremophila* Zone of wood has already been mentioned.

However, the most conspicuous perhaps, the most agreeable and the richest environment falls into this class, that of the large creek bed. At its southern limit in the arid and semiarid communities some mallees may be present, as near Carriewerloo; at its northern extremity in this State around Lake Eyre we find Coolabahs (*Eucalyptus coolabah*), but between these extremes are found the magnificent red gum creeks, such beautiful examples as may be seen on the beaten track in the Flinders Ranges like Moralana, Ilka, Wil-

pena or some of the creeks near Wilmington are typical examples. The red gum is a veritable Mecca in these parts for all sorts of insects. (e.g. leaf insects, cicadas, braconid wasps, beetles, bugs, false scorpions and ants), while the undersides of the stones in the creek with their moist undersides yield large quantities of insects. In the tussocks and sedges in the creek bed may occasionally be found an as yet unidentified Tingitid bug.

Another important type of inlier is the salt pan, salina or large salt lake. These support only very few insects which forage on the surface for insects either blown out or deceived during the night into thinking the salt to be water. Lake Gairdner supports an unnamed Cecindelid beetle and a Reduviid bug.

Excluding the tiny primitive wingless insects, it is possible that a given area of medium vegetated arid or semiarid country maintains a greater population of insects throughout the year than does a similar area of mallee or even sclerophyll and heathland.

[This paper is an amplification of a lecture which the author gave before the Section on June 17, 1952.—Ed.]

Wild Flower and Nature Show

On Friday and Saturday, 3rd and 4th of October, the Section held its Wild Flower and Nature Show, the theme of it being "Australian plants under cultivation." Because of the early and continued enthusiasm displayed by members it was obvious that it would be a first-class Show and results showed this to be the case. The results astounded all, not only in the ex-

cellence of the flowers displayed or the variety of other exhibits and the remarkable sales obtained from the novelties and flower stall, but in the maintained attendances and the record number of new members obtained. The Section, therefore, can congratulate itself for not only providing a Show which the public enjoyed but because the proceeds will actively

assist in fostering a love for, and protect our native flora and fauna.

Whilst a large band of members worked ceaselessly from 8.30 a.m. on Thursday until 10.30 p.m. on Saturday, the Section would like to acknowledge the assistance given by many outside organisations, institutions and individuals. T.A.A. again carried free of charge a large number of our interstate exhibits while all sections of the press and radio co-operated in bringing the Show to the notice of the public. The S.A. Museum displayed a most interesting exhibit showing the comparison in size between the leg bones of a Blue Wren, Emu the largest flightless Australian bird, the extinct New Zealand Moa. The Geology Department of the University of Adelaide showed an excellent exhibit of fossil plant remains whilst the Botanic Garden exhibited various epiphytal Orchids, *Myrmecodia*, *Cephalotus* and *Macrozamia*.

As his sister (Miss Ashby) was in Western Australia on another collecting trip, Mr. K. Ashby kindly supplied a magnificent collection of cultivated wild flowers which, together with the spectacular display from Miss Burdett's garden, comprised the general exhibit "Australian plants which can be cultivated in the Adelaide Hills."

The Zinc Corporation (Broken Hill) again forwarded a beautiful collection of *Eucalyptus* species (their form of *E. torquata* must be one of the finest available), as well as *Callistemon*, *Acacias*, *Geijera* and others. This collection, together with other selected species, formed the exhibit "Australian plants for the drier districts." A further exhibit, "Australian plants to grow in Adelaide" comprised a

selection of species, flowers of which had been obtained principally from Adelaide grown plants. This included *Melaleuca radula*, *M. pubescens*, *Callistemon phoenicis*, *C. rugulosa*, *Chorizema cordata*, *Pittosporum undulatum*, *Banksia ericifolia*, *Brachysema lanceolata*, *Prostanthera rotundifolia rosea*, etc.

Mr. V. F. McDougall (Nyabing W.A.) forwarded a first-class collection of flower from the Albany district, including *Verticordia* species, and members and the public alike were delighted to know that seed could be obtained from this source. Messrs. Hammett and Savage (Melbourne), Singleton (Sydney), D'Alton (Hall's Gap Progress Association) all forwarded excellent collections of cultivated wild flowers. Sydney and Brisbane Botanic Gardens kindly sent most interesting collections. Our interstate member, Mr. F. Swan, was able to forward some Tasmanian wild flowers while the Barrier Field Naturalists (Broken Hill) sent a large and varied collection of most interesting species, as did Mr. van Senden (Alice Springs).

The large number of consignments of Sturt's Desert Pea gladdened the eye of the Show Committee. These consignments came, principally, from Radium Hill and Broken Hill and were used to great advantage. Considerable interest centred around an exhibit forwarded by Mr. K. Dunn, Melbourne, of flowers from plants of the only South Australian occurrence of *Eriostemon obovalis*, the "Fairy or Bendigo wax flower." Owing to the enterprise of Miss Waite over £6 was collected to assist fencing this most interesting plant. Messrs. D. Kelly and Andrews sent over large collections of

Kangaroo Island flowers, including many orchids.

Messrs. A. and W. Blizzard again kindly brought in their most interesting collection of Semaphore shells and other marine items (and installed additional lighting for the cases), whilst Mr. and Mrs. Turnbull displayed a most colourful collection of Australian and exotic shells. Mr. F. M. Angel showed part of his collection of moths and butterflies and the Avicultural Society introduced a new set of exhibits to our Show by displaying a small mounted collection of typical South Australian birds. Mrs. Filsel staged the only "economic exhibit" which dealt with the produce of the "Native Currant" (*Acrotiche depressa*). The crowds which surrounded the exhibit indicated the interest it aroused.

Mr. Goldsack once again undertook to arrange and name the display of orchids which, as usual, proved very popular. Members will be interested to learn that he has promised to try and find time to re-write the very popular articles on Orchids which were produced some years ago. When completed these could be very well and fittingly dedicated to our late member, James Ferres.

The talent of the Section was undoubtedly displayed in the novelty stands. Robins, blackbirds, bluebirds, mice, rats and snails, painted and ornamented shells, bookends, "old Zulu men and women," nut baskets beautifully made with woven reeds, as well as collections of shells for the novice all sold rapidly and considerably augmented the Show receipts. The Show Committee would like to record its appreciation to all such

members who spent much time and labour in making these items (and merely hint that the production line should be started at an early date for the next Show!).

Mr. and Mrs. Hergstrom again decorated the stage to make it the brilliant centre piece of the Show, while Mrs. Norton and her band of willing workers did wonders at the flower stall as well as arranging the beautiful sheaf of flowers presented to Lady Bonython.

The magazine stall was always busy, as were those stalwarts who manned the door, and it must be most gratifying to those who "merely walked about" to know that their efforts resulted in over 30 new members (including one life member) being brought into the Section.

Lady Bonython, who was introduced by the Show Convenor, and thanked by our Chairman, opened the Show. At the same time she announced the purchase of approximately 500 acres of land near Monarto South, this purchase being made possible by the bequest of the late James Ferres. She also announced that the Section was endeavouring to undertake the erection of a stock and vermin-proof fence to safeguard the only occurrence of *Eriostemon obovalis* in South Australia. The Section would like to record its thanks to Mr. K. Dunn the owner of the land for his sympathetic view in this matter, and because of this the fencing will do doubt be carried out.

Financially the Show was a great success but its greatest use has been in bringing the work of this Section before the public and, if for no other reason, every endeavour should be made to hold a Show next year.

Some Natural Factors Affecting Rabbit Populations in Australia

E. W. L. Lines, B.Sc.

"The rabbit has a pleasant face
Its private life is a disgrace . . ."

The rabbit and the rat are examples of the few mammals that succeed in maintaining large populations in the face of the efforts of civilised man to exterminate them. The rabbit competes directly with the cow and the sheep for fodder, and in spite of a much lower digestive efficiency it occupies large areas of grass lands to the almost complete exclusion of domesticated ruminants. It has been estimated that in its absence from 25 to 40 per cent more sheep and/or cattle could be depastured in Australia.

The adaptations the rabbit has made to achieve this success in the Australian environment are extremely interesting. The basis of its success lies in its rapid occupation of any expanding food situation in the face of natural and even of such artificial controls as are economic and practicable. To achieve this, it conserves through adverse times a breeding stock capable both of multiple births at short intervals and of gathering and processing the large amounts of nutrients needed for successful lactation. Conservation of breeding stock is effected by confining reproduction to times of favourable food conditions and by an ability of at least a portion of the adults to survive on fodder of very poor quality. Evans and Bishop⁽¹⁾ showed that in the absence of adequate vitamin E the pregnant rabbit resorbed the foeti. As vita-

min E is derived mainly from green grass, in its absence pregnancy goes into reverse and young are not born when they cannot be suckled. Dennis Page⁽²⁾ has shown that if insufficient food is available to provide milk for all the litter, the doe just produces as much milk as the diet affords above her maintenance and the excess young die of starvation. This behaviour contrasts with that of the cow which will use its own tissues to provide milk for its young. As a rough estimate a rabbit would need to get the equivalent of first grade dairy pasture in order to rear a litter of six young, so that anything that interferes with her food supply at that time will rapidly reduce the number weaned. The nutritional demands of lactation probably account for the comparatively small size of kittens when they start to graze.

These factors also tend to maintain stabilised populations in localities where the food supply is reasonably steady, for the more adults there are, the more intense the competition for good grade food and the smaller the number reared per litter. The proportion of young and old rabbits, in those trapped after the breeding season, suggests that in fairly stable populations, the average annual crop raised per doe is about four. Reduction in number of breeders in the winter, e.g. by trapping for sale, probably raised the reproductive rate of the survivors several times, because reduced competition for high grade food enables large

litters to be raised. Reducing competition for food by selective trapping of bucks, will have a similar effect and this may be the basis of the limited success of Rodier's proposal to release the bucks and kill the does only. It seems reasonable to conclude that the rapid build up of the rabbit populations after commercial trapping is due, more to the above factors than to deliberate preservation of breeding stock as so often alleged against the trappers.

The sheep and the cow digest poorer pastures much more efficiently than do rabbits, and to meet this situation it has evolved several interesting adaptations. In the ruminant, otherwise undigestible plant material (e.g. cellulose) is made available by fermentation in the paunch before digestion. The rabbit lacks an anterior fermenting sac but has a very large caecum, where analogous processes go on, however to reclaim the nutrients set free there, this material must be returned for digestion, which the rabbit does by swallowing the fermented material again. This phenomenon was discovered and investigated by A. Eden in England in 1940⁽³⁾. He found that the rabbit produces alternate batches of "hard" and "soft" faeces, the former contain much undigested fibrous material and constitute the ordinary dung, whilst the latter are swallowed whole as excreted. Eden showed that this practice improved the digestibility of both energy and protein to a useful extent, and that the soft faeces originated from the caecal contents. Up to half the stomach contents may be faecal pellets and some evidence suggests that the amount of faeces eaten is limited only by the total bulk which the gut can handle.

Apparently the undigested residues from the small gut are sorted into two fractions as they reach the colon, a fibrous fraction which passes downwards whilst the fines and part of the fluid are squeezed out and shunted into the caecum. Where the small gut joins the colon, there is a muscular sac—the sacculus—which may be concerned in this sorting. Even with this mechanism in action the rabbit still loses about 50 per cent more of the fodder in the faeces than does the ruminant. This becomes important on poorer grade pastures for whilst digestion of 60 per cent of an *ad lib.* diet will fatten a sheep, recovery of only 40 per cent from the same material would prevent a rabbit from processing enough fodder to get its maintenance. In order to get enough nutrients from poorer pastures the rabbit selects the more digestible parts of the pasture particularly the growing points of perennial grasses and digs up their roots to get at the juicy underground storage organs. Such selection reduces the nett nutrients in the pasture more than it does the bulk and also seriously reduces the productivity of the perennials, which may be the explanation of the farmers' lore that "rabbits spoil more than they eat." From the nutritional difficulties experienced by ruminants on most of our tropical pastures during the dry season it well may be a nutritional barrier which has prevented the rabbit occupying them as it has those of our wheat belt.

Another animal which apparently depends on caecal fermentation to make nutrients available is the Koala, which Minchen⁽⁴⁾ showed feeds its young on the ejected content of that organ.

When selective grazing fails to afford normal maintenance the rabbit falls back on two further lines of defence. The first is reduction in energy used for maintenance⁽⁵⁾ without reduction in the size and capacity of the digestive tract; in this stage the bodies of rabbits recede almost to skeletons, activity is kept at a minimum and anything affording nutrients is eaten—bark of living trees, fallen leaves, roots, etc. Finally, as F. N. Ratcliffe⁽⁶⁾ has pointed out, most, but never all, die, the survivors probably maintaining themselves on the minimal vegetative production which occurs even under the worst of drought conditions. From this residue a new population will arise rapidly as soon as fodder suitable for breeding becomes available over the necessary number of generations.

The general picture is that the rabbit has fitted its reproduction successfully to the pattern of pas-

ture growth in our Mediterranean type of climate; where an intense flush of spring growth is followed by a summer drought which reduces the pastures to little but standing straw. Each spring large numbers of young can be raised, sufficient to replace any severe depletion caused by environment and its natural enemies including man, and to recolonise promptly any accessible areas from which it has been eliminated.

References.

- (¹) Evans & Bishop, J. Amer. Med. Assoc., 81; 889 (1923).
- (²) Page, Dennis. Emp. J. Exptl. Agric. 10; 103 (1942).
- (³) Eden, A. Nature. 145: 36 (1940).
- (⁴) Minchin, A. K., Records of South Australian Museum, 6: 1 (1937).
- (⁵) Hellberg, A. Kg Landbrukahad Veternskajo No. 5, Almquist and Wiksells, Uppsala, 1949.
- (⁶) Ratcliffe, F. N., "Flying Fox and Drifting Sand," Melbourne, 1938.

WEeping FORM OF EUCALYPTUS SPECIES

Continued from page 20.

All the lower branches have produced numerous vertically pendulous limbs which now form a "skirt" around the tree. On examination, other trees in the same valley show the same variation, which is amongst the most remarkable seen. It is to be hoped that these trees, the writer's attention to which was drawn by Mr. H. A. Lindsay, will be preserved under such legislation as has been en-

visaged by the National Trust Bill, introduced into Parliament last year.

In addition to these habit forms, various other species have produced variegated forms. In rare instances these have been propagated successfully by budding, but seedlings raised from seed produced by these plants have all resulted in green plants.—T.R.N.L.

A NEW BUTTERFLY OF THE GENUS OGYRIS (Lepidoptera Rhopalocera) FROM WHYALLA, S. AUST.

By Norman B. Tindale, B. Sc.

SUMMARY

A new race of *Ogyris barnardi* Miskin, named *delphis*, is described from Whyalla, South Australia, adding another to the short list of butterflies living in the arid regions of Australia.

INTRODUCTION.

Mr. F. Erasmus Wilson of Melbourne recently sent me a series of five examples of an interesting new race of the rather rare Barnard's Azure Butterfly (*Ogyris barnardi* Miskin 1890).

Existence of subspecific modifications previously had not been noticed in this species, of which the type example was taken on the Dawson River in East Central Queensland some time prior to 1890. It was later taken at Emerald, at Milmerran, and at Clermont, all places in the same general area of Queensland; it also occurs on Stradbroke Island, off Brisbane.

There are specimens before me from Clermont dated 10th and 24th September, 1922.

A male and female taken at Brewarrina in Western New South Wales between 21st September and 7th October, 1925, are also available but these prove to be different and seem to be related to the form about to be described from Whyalla, South Australia.

OGYRIS BARNARDI DELPHIS subsp. nov.

Male. Wings above very dull purple, with relatively wide black outer margin, widest near apex of

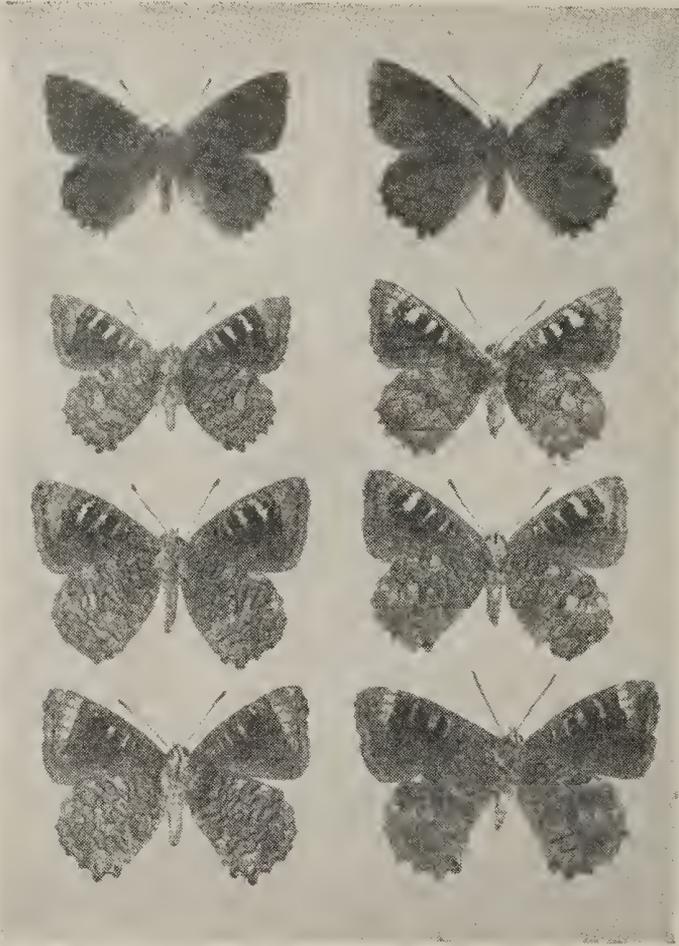
forewing; inner margin of hindwing gray with scattered white scales; and a few bright blue ones; forewings below grayish-black, broadly suffused with grayish-white scales at the base of cell, along costa, and on apical fourth of wing; five blue-tinged white transverse bars in cell; a line of black bars separating dark basal from light apical, portion of wing at three-fourths; these show a sinuate arrangement; hindwings grayish-white with narrow black margined brown markings; ciliae alternately white with black scales, and black. Length of forewing 16 mm; expanse 34 mm.

Female. Wings above dull bluish-purple with broad black margins; a particularly dark patch of scales on forewing near costa at three-fourths, extending to vein M.; wings below similar to male, the outermost white bar on forewing relatively large. Length of forewing 17 mm; expanse 37 mm.

Locality, South Australia: Whyalla, November 4, 1951, taken by Mr. E. T. Smith (Holotype, a male, and three paratype males in collection of F. E. Wilson; allotype I.19098 in South Australia Museum presented by F. E. Wilson). New South Wales: Brewarrina 21 Sept.-7 Oct. 1925, two paratypes, in South Australian Museum, 5 males 2 females examined.

The type pair were taken together at Whyalla, in company with *Ogyris hewitsoni meridionalis*, flying near mistletoes growing on mulga (*Acacia aneura*).

This race is small (males expanding 34-38 mm.) and distinctive



Top row:—*Ogyris b. delphis* Tindale. Whyalla, South Australia, 4 November, 1951; left male, right female; upper side of type pair.

Second row:—*Ogyris b. delphis* undersides.

Third row:—*Ogyris b. delphis* Tindale, Brewarrina, New South Wales, September 1 to October 7, 1925; left male, right female; undersides.

Fourth row:—*Ogyris b. barnardi* Miskin, Clermont, Queensland; left, male, September 10, 1922, and right, female, September 24, 1922; undersides.

because of its dark purple colour; I was at first inclined to consider it a species separate from *O. barnardi*. However it is allopatric; it has many features in common with typical *barnardi*; and specimens from Brewarrina, an intermediate locality, which I identify with the new race, show a slight trend towards *O. barnardi* in such characters as size, and wing colour.

In *O. b. delphis* the black margins of the wings in the male are wider, and in the female slightly narrower than in *O. b. barnardi*; because of the darker purple colour of the rest of the wings the black is less conspicuous. The forewings beneath have the series of short white-margined black bars extending from costa at three-fourths towards tornus crenellated or stag-

gered, whereas in *O. b. barnardi* they tend to run in a virtually straight line with, at most, a single departure from regularity at about the middle of the length in the female. The silvery-white bars of the forewings below are much larger in the new race than in *O. b. barnardi*. In the female of the last named the dark patch at apex of cell on forewing above extends to vein Cu_{1a} with a few traces only of purple scales between it and vein M_3 , whereas in *O. b. delphis* female the dark patch does not go below vein M_3 . In the single Brewarrina female the purple extends to vein M_1 .

On the indications available the probable distribution of the race *Ogyris b. barnardi* is along the eastern side of the Great Dividing Range from Central Queensland south to Stradbroke Island.

The race *O. b. delphis* ranges from New South Wales west of the Dividing Range to near the

Head of Spencer Gulf in South Australia.

The nymotypic race is taken in savannah woodland country which has a rainfall of between 20 and 40 inches. It has been reported as feeding on a mistletoe parasitic upon wattles (*Acacia*).

Annual rainfall in the areas where *O. b. delphis* has been taken lies between 10 and 15 inches; both Whyalla and Brewarrina lie on the southern and wetter fringe of the great mulga scrub formation of our arid central deserts. Since the mulga scrub areas extend across to Western Australia the species should be searched for also in parts of Western Australia, such as near the Murchison River and the Fraser Range, where occur similar environmental conditions.

The present discovery adds another to the short but growing list of butterflies found to be living in the more arid portions of Australia.

EXCURSION TO HENLEY SOUTH

23rd August, 1952.

Despite rough weather a small party of Naturalists spent an interesting afternoon amongst sandhills near West Beach.

New records for the locality included the ornamental Castor Oil Plant, *Ricinus communis* L., and the ephemeral *Periaria debilis* G. Forst. (under bushes), while a clump of some bulbous plant in the locality suggested *Homeria collina* Vent. but this requires confirmation. A solitary specimen of the Buckthorn, *Rhamnus alaternus* L., was found in scrub there—the writer was interested to hear the name "Blowfly Tree" applied to this old hedge plant. Members of the party collected, in flower, specimens of *Leucopogon parviflorus*, *Senecio lautus*,

Arctotis stoechadifolia and *Acacia sophorae*—the latter shrub dominated the more windswept dunes in the area.

L. D. Williaums.

ERRATA

Vol. 26, Nos. 3 and 4—

Page 42 line 21 (2nd col.) for *Lepidosperma* read *Leptospermum*.

Page 61 line 1 (1st col.) for *Glossidia* read *Glossodia*.

To further the preservation of our flora and fauna, the Committee decided to forward a donation of £10/10/- to Mr. Bellchambers at Humbug Scrub, to further the excellent work he is doing.

THE FIELD NATURALISTS' SECTION
EXCURSIONS:

1952.

December

13—Halletts Cove. 12 noon Willunga train to Halletts Cove. Leader: Mr. Havard.

25—Jan. 1. CHRISTMAS CAMP AT CORNY POINT.

1953.

January

26—Australia Day Holiday. Buckland Park. All day trip. Bus from Kintore Avenue, 8.30 a.m.; fare 8/-. Leader: Mr. Brian Glover.
Leader—Mr. Brian Glover.

31—Open Meeting and Social to be held at the Botanic Garden. Meet north side of the Simpson Kiosk at 2.30 p.m. Charge for afternoon tea, 2/6.

February

7—Mr. Pritchard's block at Magill.

15—(Sunday). Burnside to Mt. Lofty. 10 a.m. trolley bus from Adelaide to Burnside terminus.

21—Outer Harbour. Subject: Estuarine Shells. Train leaves Adelaide at 1 p.m.

March

7—Escourt House. Subject: Shells. Leader: Mrs. J. J. Turnbull.

15—(Sunday). Mt. Lofty. Subject: Autumn Foliage. 10.45 a.m. train to Mt. Lofty.

28—Botanic Garden. Leader: Mr. T. R. N. Lothian. Meet inside eastern gates, 2.15 p.m.

MONTHLY GENERAL
MEETINGS:

Feb. 17—Subject: Zoology, Mr. I. Thomas.

March 17—Plants of Eastern Australia: Mr. T. R. N. Lothian.

BOTANY CLUB STUDY CIRCLE

Feb. 23—Plant Ecology.

March 23—Plant Physiology.

COMMITTEE MEETINGS:

February 10

March 10

CONCHOLOGICAL SOCIETY:

Feb. 18—Molluscan terminology.

March 18—*Scaphopoda*.