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Field Naturalists' Club of Victoria

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EXCURSIONS

SATURDAY, APRIL 7—Zoological Gardens. Leaders: Mr. and Mrs.
J. M. Pinches. Subject: Australian Fauna. Meet at main gates
at 2.30 p.m.

SATURDAY, APRIL 21—Macroolbark, combined excursion with
E.O.C. Leader: Mr. R. G. Painter. Subject: Autumn Foliage.
Take 1.35 p.m. train from Flinders Street to Macroolbark. Leader
will meet party at Station. 2nd Class return fare 2/5.

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PROCEEDINGS

The monthly meeting of the Club was held on Monday, April 10, 1944, at the Royal Society's Hall. Mr. Ivo C. Hammet, vice-president, presided in the absence of the president, and some 80 members and friends attended.

Reports of excursions were given as follows: Queen's Park, Miss Wigan (who reported noting five species of ducks, including the Musk Duck, as well as Moor Hens, Grebes, Coots, etc.); Seaholme, Mr. J. H. Willis.

The following were elected as ordinary members: Mr. and Mrs. Burgess, Mrs. C. W. Connery, Miss Nellie Stewart, Mr. Albert P. Dunn; as country members: Mr. A. Teese and Mr. S. C. Nicol; and as associate member: Miss Valda Baley.

NATURE PROBLEMS

The subject for the evening was "Quest Night," wherein members were invited to submit queries that were passed by the Chair for discussion and reply by other members. Following are the items (with replies) that came before the meeting:—

BOTANICAL QUESTIONS

1. Have any subterranean orchids like the West Australian *Rhizanthella Gardneri* been discovered in Victoria, or, if not, are they likely to occur here?—ANSWER (Mr. W. H. Nicholls): None has been found to date, but it is quite likely that the New South Wales *Cryptanthemis Slateri* (first unearthed in 1931 at Bulladelah, 150 miles N. of Sydney) may occur in soils favoured by the Hyacinth Orchid, *Dipodium punctatum*.

2. Friends from England state that the Australian Acacias seem to resemble very closely the Mimosas that they know in Europe. What is the difference, if any, between an Acacia and a Mimosa?—ANSWER (Mr. J. H. Willis): *Acacia* and *Mimosa* are two superficially very similar genera of pod-bearing plants belonging to the *Mimosoideae* section of the family *Leguminosae*. Linnæus called them both "Mimosa," but modern botanists distinguish the former by its numerous stamens (in each minute floret), and by the almost invariable occurrence of glands on the leaf-stalk or midrib; a true *Mimosa* has 10 or less stamens, and rarely shows any leaf glands. Early colonists called many of our *Acacia* species "mimosa" from their resemblance to that tropical genus, one of which has become naturalised in Queensland (*M.*

pubica, the "sensitive plant"), and "Prickly Moses" for the common *Acacia verticillata* is said to be a corruption of *Prickly Mimosa*.

3. The New Zealand Looking-Glass Plant (*Coprosma repens*) has small pits in the undersurface of its leaves, at the junction of mid-rib and lateral nerves. What is the explanation?—ANSWER (Mr. J. H. Willis): Apparently no one can explain the nature of the little "pockets" or domatia which occur in several species of *Coprosma*. The late Professor A. I. Ewart frankly admitted that he did not know, and W. R. B. Oliver, in his exhaustive monograph of the genus (1935) made no attempt to account for the leaf pits. Even the much larger and commoner glands in *Acacia* are still very imperfectly understood. Mr. Ivo Hammet reported having noticed ants about the glands of *Acacias*, where they were apparently feeding on some sugary excretion.

4. The family *Caprifoliaceae* includes elder-berries, guelder roses, honey-suckles, cinchona-bark, etc., and is derived from the Latin *caper*, a "he-goat," and *folium*, a "leaf." What is the origin of the name "goat-leaf"?—ANSWER (Mr. J. H. Willis): The family name has been adopted from Tournefort's old pre-Linnaean genus *Caprifolium*, which Linnaeus (1753) and others after him included in *Lonicera*—the large assemblage of "honeysuckles," now numbering nearly 200 species. Tournefort's name (published in 1700) is a straight-out translation into Latin of the vulgar French *chevre-feuille*, by which "honeysuckles" had been known in France for centuries, the German equivalent being *geiss-blatt*, with precisely the same meaning. Strangely enough, no available French dictionary, encyclopædia, or botanical text-book attempts to explain the term, but Loudon's *English Encyclopædia of Plants*, 1855, says, "poetical name, signifying . . . a leaf which climbs like a goat." Nevertheless, Tournefort's diagnosis contains the Latin equivalent of "with stinking seeds," thus alluding to a bad odour in some parts of the honeysuckle plant, and as dried foliage of the related *Viburnum* species is truly offensive (even in old herbarium specimens), it is more than possible that "goat-leaf" was originally associated with an objectionable goat-like odour.

5. Schomburgk, a prominent naturalist-explorer in South America during the earlier part of last century, was afterwards director of the Adelaide Botanic Gardens. Did he accomplish any outstanding work in Australia?—ANSWER (Mr. J. H. Willis): Dr. Richard Schomburgk held the directorship of the Adelaide Gardens for 25 years until his death in 1890, and was therefore contemporary with Guilfoyle of Melbourne; the present fine lay-out owes much to his energy and foresight. He did not concern himself with pure botany, and the only noteworthy

contribution in that direction was a *Flora of South Australia*, 1875, being a 64-page essay with list of species known to inhabit the Colony. In the 1870's he wrote many smaller papers on tobacco culture, grasses, fodder plants, and such-like economic subjects, but none of them can be compared with the voluminous writings of the colonial botanists (Mueller, Maiden and Bailey).

ORNITHOLOGICAL QUESTIONS

6. What are the latest theories regarding bird migration?—Mr. A. H. Chisholm summarised the various types of movements among Australian birds, including overseas, interstate, inter-tropical, altitudinal, and gipsy migrants, and gave brief details regarding each of the sections. The subject was also discussed by Messrs. Hammet, Mattingley, Colliver, Miller, and Miss Watson.

7. What peculiarities has the Lyre-bird that it should have a Natural Family almost to itself?—Mr. Chisholm said that osteological study of the Lyre-bird had been interrupted by the war, and so it was not yet possible to "place" the group on a structural basis. However, sufficient regarding the nature of the bird's "make-up" was learned long ago to make clear that it had very distinctive characteristics.

8. What are the differences in the tree habits of Tree-runners and Tree-creepers, and how can they be recognised?—Mr. Chisholm replied that the clearest superficial point of difference was that Tree-creepers worked upward on the trunks of trees, and Tree-runners worked downward. The Tree-creepers were a good deal larger than the other group. Mr. A. H. Mattingley remarked that there were also differences in voice and nesting habits.

GENERAL ZOOLOGY

9. What are the reptilian characteristics which link the Platypus with the lower orders from an anatomical point of view?—Mr. Colliver stated that as far as he knew, the egg-laying habit would be the only trait. Mr. Chisholm stated that Prof. S. Sunderland, working on the brains of monotremes and marsupials, found that the impression previously held that both these forms were somewhat allied to the reptiles is now incorrect, and that the Monotremes are much more closely related to the Eutheria. It has thus been shown that the concept of marsupials being an advanced stage of the monotremes is wrong, and actually there is no direct connection between them. A further question regarding differences between the Platypus and the Echidna was answered by Mr. Colliver, and a question whether both these animals hibernated was answered by Mr. Chisholm, who stated that a short period of hibernation was common to both forms.

10. We are told that the Koala has an appendix some 6 feet in length. Seeing that the appendix in man, a very much larger animal, is only an inch or two long and can very well be done without, what is the function of such a long one in the Koala?—Mrs. Pinches suggested that it was probably due to the small amount of nourishment in the large amount of food taken, stating further that Ambrose Pratt gave this as a reason in his book on the Koala. Mr. Chisholm said that Sir Colin MacKenzie was so engrossed by this appendix problem that he studied the Koala to apply the lessons learnt to humanity, but up until the time he left for Canberra he had not reached any definite conclusions. Mr. Colliver understood that Sir Colin had at least proved the organ to be functional.

11. Miss Watson stated she had been told of a large turtle being seen close into the shore at Portland, and asked what sort it would be?—Mr. Mattingley stated it was the sort that was occasionally found in Bass Strait. Mr. Colliver stated that several records of the large leather-back turtle occurring in Victorian waters were known, and that just prior to the war he had seen a very large specimen that had landed alive on the beach near the mouth of the Glenelg River at Nelson, Victoria. This one had apparently travelled from the Indian Ocean.

12. We are told that the common Earth-worm aerates the soil and benefits it. How is such a soft-bodied creature able to burrow into hard ground? What particular mechanism does it employ?—Mr. Colliver stated that worms generally had masticatory jaws, and were not found, as the question seemed to suggest, in particularly hard ground, but rather in damper portions of soil. The soil was passed through the body, and food particles extracted in the process. Slime (as well as salivary secretion) was no doubt used to help soften the ground. Mr. Mattingley remarked that worms fed on decaying vegetation, which separated the earth as eaten, and that the worms were helped in their travels by bristles, which made sufficient noise to attract the attention of birds hunting for food. Mr. Colliver stated that the giant worms of the Bass Valley had their burrows nearly filled with liquid mud, and the gurgling sound they made was easily heard by the human ear. Mr. H. V. Miller reported that lime-water poured over the soil would bring out worms very quickly.

GEOLOGICAL QUESTION

13. A few years ago a resident in one of the Melbourne suburbs put up a wall in which a large number of "Dendrites" were visible. These have now almost entirely disappeared. Where have they gone?—ANSWER (Mr. A. C. Frostick): Most likely weathering of the rock surface caused the disappearance

of the dendrites; as they had been formed from solutions there was no reason that he could see to prevent their being removed by solution. Miss Wigan stated that the dendrites at one time a feature on the fence around the property of the late Sidney Myer in Toorak had disappeared.

REMARKS BY EXHIBITORS

Mr. C. J. Gabriel remarked on the living species of Victorian *Teredo*, and also a species new to him that may be Victorian or an introduced form.

Mr. Mattingley exhibited some seeds of the sweet Quandong, and asked if they had ever been propagated in Victoria. Mr. Willis stated that the seeds were often germinated but their future life was a problem owing to parasitic habits; the roots developed suckers which entered other roots. Mr. Hammet stated he had a plant growing, now seven years old, and he attributed his success to the undisturbed growth of grass and weeds around the tree. Mr. Mattingley said that people in Central Australia believed the seeds would not grow until they were eaten and voided by an emu.

Mr. Colliver displayed a series of the larger forms of Victorian fossil sharks' teeth, and mentioned a theory that was recently put forward that these teeth were not shed but were permanent and had a certain amount of movement due to conscious muscular action. Slides of a restoration of the jaw of a giant shark (fossil) *Carcharodon megalodon*, displayed in the American Museum of Natural History, and several showing views of the recently discovered Coelacanthid fish from the African Coast were also shown, and with this last the importance of the discovery was emphasized and the extension of the evolutionary scale mentioned.

THE CHANNEL-BILLED CUCKOO IN VICTORIA

To the discussion which revolved around the question of the occurrence in Victoria of the Channel-billed Cuckoo (*Scythrops novae-hollandiae*) at a recent F.N.C.V. meeting may be added John Gould's quotation of a description of its habits by Dr. Bennett, of Sydney, in 1858: "When the young *Scythrops* (Channel-bill) was introduced into Mr. Denison's aviary it was placed in a compartment already occupied by a *Dacelo gigas* (Kookaburra), and doubtless feeling hungry, immediately opened its mouth to be fed, and its wants were readily attended to by the Kookaburra, who, with great kindness, took a piece of meat and, after sufficiently preparing it by beating it about until it was in a tender and pappy state, placed it carefully in the gaping mouth of the young *Scythrops*; this feeding process continued until the bird was capable of attending to its own wants, which it now does, feeding in company with the Kookaburra in the usual manner. When I saw it in the morning it was perched upon the most elevated resting-place in the aviary, occasionally raising itself, flapping its wings, and then quietly settling down again after the manner of Hawks in confinement, and presenting much the appearance of a member of that tribe of birds." This account indicates an extraordinary instinctive dependence on an equally instinctive response of another bird not famed as a friend in adversity. Is there any record of the Channel-bill's egg having been found in a Kookaburra's nest?

[No.—Ed.]

H.C.E.S.

PLEA FOR A HALL OF SCIENCE.

By A. H. E. MATTINGLEY, Melbourne

More than 30 years ago, on 26th August 1911, I advocated in the Melbourne *Argus* the institution of a Hall of Science as part of the Melbourne Public Library building. Subsequently a meeting was held at the home of Mr. R. D. Elliott, when two of the Public Library trustees (the chairman, Dr. Leeper, and Mr. Elliott) commended the scheme, and Dr. Leeper indicated that the time for establishing such a hall would be when the present Public Library block of buildings became overtaxed for suitable space—probably after a lapse of 20 to 30 years.

The time has now arrived for reconstruction on more spacious lines, and, since the site for a cultural centre for Melbourne has been selected near Prince's Bridge and approved, it behoves the Victorian Field Naturalists' Club, in conjunction with kindred scientific societies, to approach the Minister of Public Works before plans of the prospective buildings are drawn up. The desirability of incorporating a wing specially designed to house in separate rooms all the small libraries, belonging to struggling scientific societies and scattered throughout the city and suburbs, is apparent.

The proposed wing should also have a central hall, open to the use of each society and for the purpose of giving educational lectures to the public and students. Above all, the libraries would be centrally accessible and, if the building were fire-proofed, the valuable collections of reference books and documents (unprocurable elsewhere, but at present exposed to the risk of fire) would be safeguarded for the nation.

Most of the natural history societies, owing to their slender finances, are now occupying unsuitable rooms, whilst others cannot properly utilize their literature for want of shelf-accommodation. In several instances valuable and irreplaceable papers are deteriorating for want of binding and shelf-space. The money at present dissipated in high rentals could be saved and utilized in publishing the results of research by the societies—results which for want of sufficient funds now go unrecorded. The labours of skilled naturalists are of a national character, and the community cannot afford to lose them.

Great credit is due to the Council of Education, heretofore engaged in the national work of broadening the channels through which scattered and disconnected rivulets of the nation's education flows. Why not, then, give the societies engaged in other branches of education (which for obvious reasons are outside the jurisdiction of the Council), the opportunity to organise themselves for the public weal? The facilities afforded by such a

scheme of centralization are manifold. Scientific attainment would become more popular by a reduction in expense to club members, whilst the membership itself would increase by virtue of the greater comforts and facilities provided for study and research.

Compared with many countries, Australia is deplorably lacking in scientific outlook, as witness the researches into our unique fauna and flora which are avidly taken from us and dealt with by Government-aided foreign scientists and investigators—a galling fact to those worthy Australians who *could* accomplish such work admirably but for financial disabilities.

In this manner Australia loses her prestige, and other nations, far better organized scientifically in their arts and crafts, outstrip her. The national importance of the arts and sciences to our country cannot be over-estimated. If these languish, so does the country also, as history bears ample testimony.

Our American cousins, with clear perception and true patriotic unity, have established such useful State-subsidized departments as the Smithsonian Institute, a society that has materially helped her citizens to develop the arts and crafts of their mighty confederation, and is still enabling them so to do, by equipping them mentally in their struggle for international supremacy. The comparatively small amount spent in maintaining this institute has returned untold wealth to the coffers of the United States.

As our Victorian associations, without any thought of fee or reward, and at considerable pecuniary sacrifice, are rendering public service and making for national prosperity by the researches of their members, is it too much to expect from the Government a building for such work?

The time has surely arrived when it behoves our State administration to help build up that portion of her national edifice which, at present, is being tediously erected by devoted, but unorganized, bands of enthusiasts.

The Field Naturalists' Club of Victoria, as an old and strong body, is the logical convenor of all societies with this laudable object. Let us seize the opportunity now offered to mitigate those difficulties so long suffered by the champions of natural science in our State.

SPIDERS STOP TELEGRAMS

On the Nullarbor Plain there was a telegraph line where spiders at times made webs which connected from the wire to the pole. When the webs got wet they "earthed" the electric current until there was not enough to operate the telegrams.—ALEX MCKENZIE, Glenhuntingly.

OBSERVATIONS ON THE BREEDING OF THE
PLATYPUS IN CAPTIVITY

BY DAVID FLEAY, B.Sc., DIP.ED.,

Director, Badger Creek Sanctuary, Healesville

For nine years—three in the Melbourne Zoological Gardens and six at the Badger Creek Sanctuary—I have striven to bring about conditions conducive to the laying of eggs and successful rearing of young by our shy and temperamental duck-billed platypus. It was obvious that many interesting little details of intimate habits denied to Mr. Harry Burrell during his very thorough compilation of platypus lore could only be revealed when a truly domesticated "duckbill" consented to perform her duties as a mother.

In this 1943-44 season, after years of trial and error, high hopes and great disappointments, Fortune really smiled, and "Jill," mate of "Jack," made history by hatching and rearing a splendid young female platypus.

Before proceeding I would like to acknowledge the debt owed in these investigations to Mr. Karl Byron Moore, of Melbourne, a member of the enthusiastic Sanctuary Committee, who, knowing the tremendous expense involved in procuring the necessary quantity and variety of food for the pair of platypuses, has assisted financially each month throughout the difficult years of this war. In days when even our butcher's order had to be dropped in favour of using up ancient horses, it is doubtful whether the platypus experiment could have been carried on but for Mr. Byron Moore's very practical help.

There must also be remembered the steady conscientious assistance of my deputy, Mr. Cecil Milne, who has never spared himself in the many and varied duties involved in caring for the welfare of our *Ornithorhynchus* family. Mrs. Jemima Dunolly, too, last of the old aboriginal people at Coranderrk, supplied us consistently in all weathers for years with the important platypus food items until practically the day of her death in early January 1944, at the reputed age of 102.

In the *Victorian Naturalist* for March 1943, the ways of "Jack" and "Jill," their places of capture and many vicissitudes were described. On this day of commencing my further record (February 19, 1944), "Jill" has completed six years in captivity, and as she began her life in the Sanctuary at the nest-leaving stage, her age on this date is roughly, but fairly accurately, six years, three and a half months. This fact, plus her bright alert ways and excellent health despite the constant demands of her

youngster, are clear indications that the life of a platypus is a lengthy one.

"Jack," whom we captured as a half-grown youngster in Badger Creek a year later than "Jill," is approximately the same age as his mate, and this big, richly-coated animal, 20½ in. in length and weighing 3¾ lbs., now has more than five years in a platypusary to his credit.

With the object of providing a suitable small-scale "river bank" wherein "Jill," at her chosen time, could excavate a breeding burrow, hard-packed earth and logs had been arranged in an enclosed area at the western end of our Badger Creek platypusary since early 1939. Variations in the mode of entry to this section from wooden "tunnels" running to the swimming tank had to be devised from time to time; the excavated earth had to be carefully removed as "Jill" brought it out, and the relations between the lady and her mate (who was almost double her weight) had to be most carefully watched.

With all our well-intentioned architecture and experimentation with the all-important balanced diet, it seemed that only during the winter of 1943 were conditions brought to such a state that they met with "Jill's" unqualified approval.

Small even for a female platypus, "Jill" measures 16¼ inches (average, 18 inches) and weighs a bare 2 lbs. in her fattest condition. Her extraordinary tameness is largely due to the fact that, for some unknown reason, she left the nesting burrow at a very immature stage, being then no more than 10 inches long—the smallest young platypus in the free state that I have ever seen. (Compare this with her own youngster, which at the length of 13½ inches was still in the nesting burrow.) Thus "Jill's" early impressionable weeks and months were our own to instil into her the necessary trust and confidence. Little did Mr. Vince McCrohan of Healesville think, when he picked up the tiny and very weary "Jill" ambling down a hard mountain road three-quarters of a mile from water, that she would later create a stir even in wartime London!

The happy result of "Jill's" early "education" is that she has absolutely no fear of human beings even when they crowd about her in hundreds, and, unlike the general run of platypuses, she is little inhibited by the traditional temperament. In fact, when I recently tied her up in a bag to ascertain her weight, she resumed feeding immediately afterwards as if nothing had happened.

"Jack," the male platypus, who was captured after months of free life, became very quiet and accepts food by hand, but

he has never been the friendly and frolicsome little pet that "Jill" is.

In the cases of both animals the success in breeding was not brought about by shutting them away and leaving them strictly alone. The daily exhibition, with a general alternate day appearance of each (unless "Jill" happened to be hibernating) went on much as usual right until the famous October day when "Jill" actually gathered nesting material under the eyes of spectators and began to construct her nursery. Naturally thereafter "Jack" had to represent the family at 3.30 p.m. each day, but even so "Jill" appeared on many occasions in succeeding weeks on daylight foraging excursions, and "Jack" was able to enjoy periods of well-earned rest.

Normally crepuscular and nocturnal, platypuses in Victorian streams are rarely seen during daytime unless flood-waters are high, food is scarce or females are engaged in caring for infant families. The usual thing is to find the animals slipping out into the streams during the evening light and swimming continuously up and down stream practically the whole night through.

Three years ago, while I was engaged in procuring five pairs of platypuses for liberation in the streams of Kangaroo Island by the South Australian Government, it was particularly instructive at night to illuminate by means of a powerful spotlight the shallow rapids of such Healesville streams as the Watts River and Chum Creek, and observe the underwater "swim past" of a number of otherwise unseen duckbills on their various lawful occasions.

The most usual indication of their presence when one is quietly sitting on a river bank at night is the sudden "splash dive"—an almost double sound characteristic of the platypus alone. This alarm signal, like that of a rabbit's or wallaby's "thump," conveys its meaning almost simultaneously to any other platypus in the vicinity.

In view of the typical nocturnal habits of the species, the behaviour of "Jill," which has been most consistent over the past two seasons, is of exceptional interest. "Jack," not being concerned with procuring food or preparing himself for incubatory duties, broke his nocturnal emergences on but a single occasion during the pairing month of October 1943.

Skippping then the notes made over several past years, I shall describe "Jill's" movements from the day they departed from normal in 1943 just as they did in the preceding year of 1942. In the winters of these two years, and in fact at odd times even before that, "Jill" had disappeared for periods of several days

at a time deep in her burrows. There is little doubt that these absences were stretches of hibernation or sleep during the coldest and bleakest periods of the year, and they may be in the case of the female animal part of the preparation for the incubation period to come. At such a time, she plugged up or blocked off her camping chamber from its connection with the water. "Jill" is not the only platypus I have known to hibernate.

Harry Burrell (*The Platypus*, Page 164) says: "Although Bennett has made the suggestion that *Ornithorhynchus* hibernates, my investigations do not bear him out. In the New England district of New South Wales, the pairing season commences in July, which is the mid-winter month on those cold highlands. The platypus lives an active life the whole year through." Bennett's statement read: "These creatures are seen in the Australian rivers at all seasons of the year, but are most abundant during the spring and summer months, and I think a question may arise whether they do not hibernate."

Robert Eadie (*The Life and Habits of the Platypus*) recorded periods of hibernation during the months of June and July for his famous pet platypus, "Splash," a male animal. There is no doubt whatever that in Victoria platypuses do hibernate for greater or lesser periods, and my field observations agree exactly with those of Bennett. Unless a platypus in captivity has access to earthen burrows of its own construction, it will not always hibernate. Since it is possible that such periods of retirement plus ensuing stretches of ravenous eating, in the case of the female, are correlated (as suggested) with the nesting period, I have tabulated the following account of "Jill's" winter behaviour in 1943. The summary indicates the dates and periods of time, apart from ordinary nocturnal emergences, spent inside the burrowing bank with the animal "pugging" or sealing herself in — to use the mining term so appropriately adopted by Mr. Burrell.

Another interesting thing was the fact that from this period on for the first time in 1943, the end of her tail took on the bare and patchy appearance that so commonly develops each year. This, of course, was a direct result of using the tail in back-pushing soil to close off unwanted passages and working up blocks of pugs. On emerging from her various absences, "Jill" became definitely diurnal and could usually be seen feeding ravenously all day long. It was a common sight on such occasions to watch her working away in patches of mud below water with her ever-questing bill, and when on a good prospect flailing hard with both "fore paddles" in unison to stir up small delicacies from obscure crannies.

It will be noticed that the hibernation periods began towards the end of May and ended just before mid September:—

Date	Approximate Time Spent in Retirement	Ensuing Feeding Period.
Intervals	Spent in Retirement	
May 28	One night and day—24 hours.	Out at night.
May 31-June 1	Two nights and a day—36 hours.	Out two succeeding days all day and sleeping at night.
June 4	One day and night—24 hours.	Out all day.
June 7	Two nights and a day—36 hours.	Out two succeeding days all day and sleeping at night.
June 12-June 19	156 hours.	Emerged for half a day—12.30 p.m. until dark. Fed all next day and for several days with nights in retirement.
June 24-June 26	36 hours.	Fed all day for two days—away at night.
June 28-July 3	120 hours.	Out all day for four days. Nights in retirement.
July 6-July 12	132 hours.	Feeds all day for five days. Away at night. Extra hungry.
July 17-July 21	102 hours.	Emerged in early afternoon. Fed 6½ days consecutively, and away each night.
July 28-Aug. 2	120 hours.	Emerged 4.30 p.m. Fed until well into night. Out in afternoons for several days and for several other whole days—away at night.
Aug. 8-Aug. 13	120 hours.	Appeared 3 p.m. Fed into night. Out with little variation for seven days, running. Away at night. Three more half days staying in to night.
Aug. 25	24 hours; away during a day and night.	Out all day three days running. Away at night.
Aug. 29	One night and day—24 hours.	Fed in daylight two following days. Away at night, emerging after mid-day in each case.
Sept. 1-Sept. 3	92 hours.	Emerged 4 p.m. Out most of day for three following days. Away at night. Fourth and fifth days out from 3.30 p.m.
Sept. 10	to Sept. 15	Away at night. "Jill" out each day all day and away sleeping at night.

From September 15 onward "Jill" gave no further indication of any periods of hibernation, but her appearances in daytime continued more regularly than previously. With few exceptions, she now appeared in the afternoon (from 3 p.m. onwards) and fed into the night.

In the 1942 season, when no pairing was observed and evidently none took place, "Jill's" habits returned to normal in late October, and from the 23rd of that month onwards (the end of the mating season), she became once more a nocturnal creature, sleeping by day and appearing at dusk to feed through the night.

The most interesting observations in this 1943 season, as in the preceding year at a corresponding time, lay in the prodigious spring appetite displayed by the vigorous creature. Following her three months of on-and-off hibernation, during the intervals of which she ate very heartily indeed, she now (from early September on) devoted herself to banqueting of a much more intense nature. From the time of her afternoon bow to the public (coming out of her own accord) until far into the night she devoured grubs, yabbies, beetle larvae, worms, and tadpoles with little pause, coming out each and every day. In view of the story yet to be told, it will be seen that this performance was a preliminary storing-up in preparation for the domestic activities so close at hand.

Throughout all these months, "Jack" had inhabited the same home and swimming pool as "Jill," but he had not been permitted to enter her bank of earth. He showed no inclination to hibernate, did not come out to feed during daylight, and fed as usual throughout the nights. I am not inferring that the male platypus does not indulge in periods of winter hibernation. "Jack" has never done so, but it must be remembered that he has not been permitted to excavate his own burrows. The adult male platypus is also far more difficult to observe in the wild state than the female, for these big "old men" are far more suspicious and retiring than the females.

In a long period of observing and capturing platypuses in various Victorian streams ranging from the Western District to Gippsland, I have only once managed to hoodwink a fine big fellow like "Jack," whereas young males and immature and fully-grown females are fairly easy game.

Returning, then, to the mid-September period of 1943 (by which time "Jill" had ceased her bouts of hibernation but still continued to feed by day), it happened on the 14th of that month, during an afternoon show featuring "Jack" (who had been brought from his "burrow" for display) that "Jill" slipped forth from her tunnels and began begging for special items of food. This she does by waving her beak jerkily above the water surface and repeatedly emerging from underwater dives in the corner nearest the hand holding the food. Accordingly some beetle larvae were proffered to "Jill," who reacted eagerly by clinging to the hand that approached her and levering its fingers apart with her bill.

After a few minutes it was noticed that "Jack" seized "Jill's" tail in a firm grip with his bill and the two animals swam slowly in a processional circle. The period between mid-September and mid-October was evidently the pairing season, and several instances of courting actions with the two animals swimming in a processional circle were noted during that time. "Jill" (as previously mentioned) continued her daylight feeding sessions—occasionally varying the procedure by appearances at night. Apart, however, from the rather interesting evidence of this play at courting, the first true act of mating was observed on October 11.

During the afternoon fairly heavy rain fell, and at 3.30 p.m. both animals were in the water of their own accord—"Jack" of his own volition in broad daylight for the only time noted in his five years at the Sanctuary. In view of Mr. Harry Burrell's notes and theories on one use of the platypus spur as a means of holding the female during copulation (Burrell, Chapter 7), it is worth recording that during this act when the animals were fast for nearly 10 minutes no spur grip was noted. A good deal of splashing and floundering about occurred, and in the first place the male animal doubled his body under while maintaining his grip on the female's tail with his bill.

"Jill" fed on ravenously each day—if anything coming out even earlier (about 1 p.m.). On October 18 it was decided to remove "Jack" and give him the run of a new eastern section or wing of the platypussary, which was shut off from "Jill's" western quarters. "Jill" became more and more hungry. She was often seen now at 9 a.m., feeding continuously right through to 9 p.m., and for hours after that. Down she would dive time after time to weave her blind way about on the bottom seeking palatable items, rising then to the surface for a leisurely chewing and continual bulging of her cheek-pouches. I supplied her with aquatic plants, thinking that green vegetation might be in demand at this particular time, but all to no purpose.

On October 22 her actions were decidedly restless. She had for a week or more beforehand changed her entrance-hole from the water to one leading out on the northern side of the platypussary, and had excavated a fresh entrance-burrow high up in her burrowing bank. On this day she emerged at mid-day, disappeared again at 3 p.m., re-appeared at 4 p.m., and again retired at 6 p.m. Possibly, in view of her further activities and the amount of earth thrown out, she was working on the nesting chamber at the burrow terminus.

Weighty support for this theory developed on the following day (October 23). "Jill" was ready to build a nest!

(To be continued.)

BIRDS OF THE MISTLETOE

BY A. H. CHRISHOLM.

Members of the large family of Australia's Honeyeaters (some 70 in number) manifest among them considerable variety in size, voice, and general behaviour. Some are distinctly "unorthodox." But the most singular species of them all, perhaps, is the one known loosely as the Painted Honeyeater, *Grantiella picta*, the sole member of its genus. It is curious in its distribution, its movements, its voice, its general conduct, and above all in the fact that it has forsaken nectar as food—if indeed it ever *was* a honeyeater—in favour of mistletoe berries.

I discussed this singular little bird—it is rather less than six inches long—in the *Vic. Nat.* for December 1940. In that article it was shown that John Gould encountered the species nesting in the interior of N.S.W. in September 1839; that Kendall Broadbent shot a specimen near Melbourne in the 1850's; and that a break of many years' duration occurred before the bird was again recorded. Eggs were taken at Bathurst in N.S.W. on December 23, 1899, and near Sydney in January 1901, and in later years the species was reported spasmodically from some few parts of the interior of N.S.W., Queensland, Victoria, and the Northern Territory. It thus became clear that the bird was distributed; but only sparsely, over a wide area of the sub-interior of the eastern portion of the continent.

The points in Victoria where the species has been seen, either in small flocks or pairs, are Carinya (far north-west), Parwan (28 miles north-west of Melbourne), Eltham (15 miles north-east of Melbourne), Bendigo and Maryborough. At Eltham Mr. W. C. Tonge first saw a pair and found a nest in 1923; and after that there were two breaks of six years each (to 1929 and 1935) before he again saw the birds. At Bendigo the species appears to have been first seen in 1925, and since then it has been noted in various springtimes, though not consistently. At Maryborough the bird has been seen in several years since 1937; not 1939 as stated in my previous article.

The date of the first Maryborough record was October 25. Two birds were noted and both were very restless, as though in strange country; moreover they were chased by other birds. Whether any members of the species returned to Maryborough in 1938 I cannot say (I was abroad then), but two pairs were seen there, about two miles apart, in November of 1940.

In the following spring (1941), as early as September 21, I again heard the Painted Honeyeater at Maryborough, by which time I began to regard it as a confirmed, if inconstant, visitor

to the district. But the visitations clearly were only of recent occurrence, for certainly the species was not in the district when I lived there years ago. Probably, indeed, the restless pair of 1937 were pioneers in the area, and possibly they were an extension of the little colony that had discovered and adopted the Bendigo district in the 1920's.

Curiously, however, during ten days spent in the Maryborough region in October of '42 I neither saw nor heard a Painted Honeyeater, and this despite the fact that the season was good and many birds (notably the erratic migratory Wood-swallows) were breeding.

A very different story is to be told in relation to the spring of '43. In that period a remarkable irruption of Painted Honeyeaters occurred near Maryborough. Within a week I located at least six pairs of the birds at various points close to the town; and in the same period I found no fewer than six nests of that other lover of the mistletoe, the brilliant little red-and-blue Mistletoe-bird, *Dicaeum hirundinaceum*. (Incidentally, in the same period and the same area I inspected about 30 other nests representing 18 species, and saw in all some 80 species of birds.)

To begin with, on October 31 I wandered on to a hillside near the East Maryborough State School. Many years previously, when the Mistletoe-bird was uncommon in the district, I had found my first nest of the species being built in this spot, but had been denied knowledge of the complete nest (after having sought an example for several years) through removal from the district. Other nests of the species had been found in Queensland and N.S.W. in the intervening years, but it was at least refreshing, after a lapse of about a quarter-century, to find my first completed nest of the Maryborough district on the site of the original discovery. The nest was situated at a height of about 5ft. in an ironbark sapling. It was found through the activities of the female, who when I sat down to watch her soon made it clear that I was "parked" fairly alongside the nesting bush.

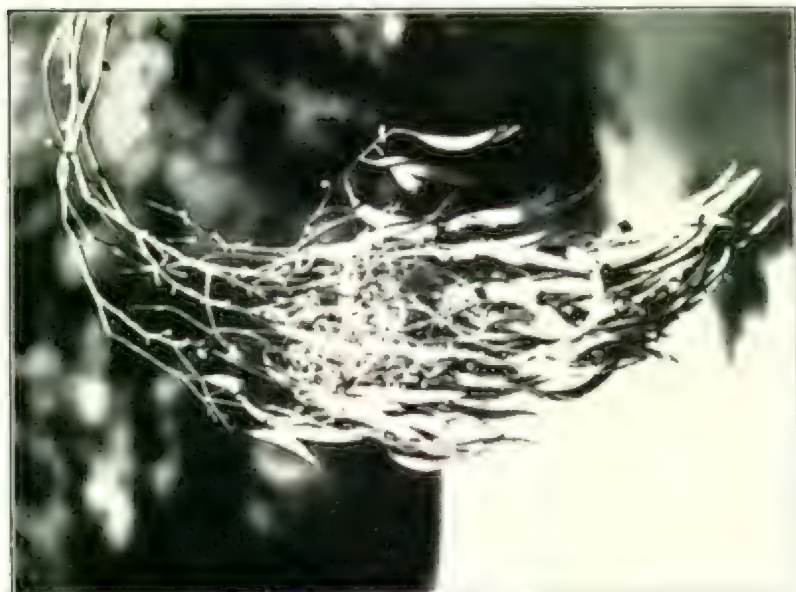
Presently, from a spot perhaps 300 yards away there floated through the morning air the voice of a Painted Honeyeater, and soon afterwards I found the bird upon a hillside that carried only goats, jam-tins, and ironbarks festooned with mistletoe. "Georg-EEE, Georg-EEE, Georg-EEE," the Painted Honeyeater called, and then it broke into a rapid "Kow-kow-kow-kow" and notes suggesting the prattling of the Brown Flycatcher.

After feasting for a time in a mistletoe cluster the bird sprang into the air, shot upward, and began its wavy, erratic, incons-

PLATE II



Spore of the Mistletoe



Spore of the Mistletoe

quential flight; and as it did so I imitated the "Georg-EEE" whistle, upon which it turned quickly and flew to a tree near by, where the morning sun played upon its clean black-and-white body, the gold bars of the wings, and the pinkish-red bill. Each time the bird launched itself into space, or even after it had alighted in a tree some distance away, it came at once in response to an imitation of its call. Evidently it was a solitary specimen and was seeking a mate.

When about to leave the spot I heard again the call of a Mistletoe-bird, and, following the flight of the female, found another nest situated at a height of 5ft. in a small ironbark bush. The pretty little purse-like structure contained three eggs.

On the following day (Nov. 1) I went to the western fringe of the town and immediately found a third Mistletoe-bird's nest, this time a half-built example placed about 10ft. up in an ironbark sapling. Here, as in the earlier instances, the tell-tale factors were the high-pitched chatter of the brilliant little male bird and a sight of the female going to the nest. In this spot, too, I heard and saw another Painted Honeyeater, but one lacking the enthusiasm of the bird of the morning—it only occasionally cried "Georg-EEE" and it refused to acknowledge imitations of the call.

Later in the day three local residents accompanied me on a visit to the first "Georgie," and when the bird appeared in response to a whistle they greatly enjoyed seeing, with the aid of field-glasses, the dainty little form and the pretty plumage lit by the evening sun. Subsequently we went on half a mile or so to the Maryborough cemetery and there (through following the distinctive, deliberate call) saw another "Georgie"—two in fact, for the first bird was soon joined by a second one and they disappeared in company.

Here it may be said that the season was very dry, so much so that agriculture was suffering ("as badly as 1914," said one farmer) and not a single orchid could be found flowering in the district. As for birds, a fair number of sedentary species and some few visitors were nesting, but the two Wood-swallows that had been abundant in the previous spring—the White-browed and Masked species—were conspicuous by their absence. To what extent these conditions affected the Mistletoe-birds and Painted Honeyeaters is problematical. The fact is, however, that either in spite or because of the prevailing dryness there was an abundant crop of berries on the many examples of mistletoe, and the berry-loving birds had rallied to the feast.

During the next few days (Nov. 2-6) I encountered at least three more pairs of Painted Honeyeaters and found three more

nests of the Mistletoe-bird. All of the nests were placed in ironbark saplings at from 5ft. to 15ft. In one instance the building material was mainly wool, but for the most part it was soft vegetable fibre. In all instances the nests were ornamented externally (either for camouflage or decoration) with the brown castings of wood-boring caterpillars or the brownish dried fragments of dry heads of flowers. The colour-fancy of little *Dicaeum*, it would appear, tends strongly to brown, since decorations of the kind are freely used by the species.

A question that puzzled me was this: Why were the Mistletoe-birds nesting in advance of the Painted Honeyeaters? Was it because the bulk of the berries were not yet ripe and the supply was not sufficient to satisfy the needs of the larger birds? On the other hand, it is possible that some at least of the Painted Honeyeaters were breeding. Close searching, it is true, failed to reveal a nest, but discovery is much more difficult in this case than that of the Mistletoe-bird.

In any event the failure did not trouble me unduly; there was sufficient recompense in watching the beautiful little "Honeyeaters" feasting and preening and flying, and in listening to the "Georg-EEE" and other curious calls. Almost every example located was right on the fringe of the town (in one instance the bird flew over houses in West Maryborough to reach a cluster of mistletoe in an ironbark growing in a back yard), and so the making of visits was an easy matter. Indeed, when news of the birds' presence was circulated quite a number of Maryborough citizens—otherwise more or less normal—discovered themselves to be potential ornithologists. So did certain visitors from Melbourne, including three resolute women who serve as Manpower officials. In these excursions it was the "Georgie" first found—the bird that always responded to a call—together with the pretty Mistletoe-bird's nest near by, that provided most entertainment. The Manpower ladies offered an assurance that the sight and sound of "Georgie" afforded a pleasant and novel contrast to their usual experiences!

The first definite indication of breeding on the part of the Painted Honeyeaters was gained on Nov. 6. We (a few local residents had joined in the hunt) inspected two Mistletoe-birds' nests on the south-eastern edge of the town and heard Painted Honeyeaters in the same paddock; and then we went on a mile or so to a spot where I had heard "Georgie" in November of 1940. Sure enough, the familiar cry arose again and two birds were seen flying to a large Yellow Box in which they (or others of their kind) had been seen disporting four years previously. Although very restless they returned to the tree again and

again, and each time the female entered a cluster of pendulous leaves at a height of about 30ft. and squatted there for a while. When the birds were at a distance the "Georg-EEF" cry and the "Kow-kow-kow-kow" were freely uttered (I cannot say whether both birds or only the males use these calls), but when the big tree was approached a strange *purring* note was added to the repertoire.

Using two pairs of strong field-glasses, we peered up at that leafy cluster until our necks ached. But we did not see a nest. It seemed clear that the little cradle was not yet built or was so flimsy as to be indiscernible from the ground. At this stage I had to return to Melbourne, so I asked Mr. S. C. Nicol, town clerk of Maryborough, to watch developments.

Two months later (Jan. 5) Mr. Nicol came to Melbourne with a report that in the intervening period the numbers of Painted Honeyeaters in the district had increased, possibly through the emergence of young ones. "Georg-EEF," he said, was the dominant note in bush areas on the outskirts of the town. He said, too, that Mistletoe-birds were still abundant, but of the six nests we had found only one survived—one or two apparently were wrecked by boys and the others had been torn open at the back, presumably by bird-raiders of some kind, a fate that often overtakes the builders of small suspended nests.

Moreover Mr. Nicol brought with him a nest of the Painted Honeyeater, the first example found in the district. It was recovered from the spot on the Majorca Road where we had acquired neck-aches on Nov. 6. The birds had been seen at the site frequently in following days, and, after allowing ample time for the young to be reared, Messrs. Nicol and Phelan had climbed the tree, cut the nesting branch, and lowered it with a rope.

The nest surprised me. John Gould, who found an example containing young in September, 1839, had described it as "the frailest structure possible"; later observers had made similar comments, and a nest which I saw near Sydney in 1932 had seemed very flimsy. This Maryborough example, too, was very sketchy—a remarkable contrast to the closely-woven purse-like nest of the Mistletoe-bird—but it was by no means frail. Suggesting lace or net-work in general appearance, it was a fine little cup consisting of numerous fibrous threads attached to no fewer than 22 branchlets. The binding material was mainly spider-webbing, but here and there a glutinous spot suggested that, either deliberately or fortuitously, the jelly from mistletoe berries had also been used. In all instances the supporting threads were firmly attached and at the base of the nest fibre

had been woven into a solid foundation for the eggs and young. Possibly this nest improved on the average (Mr. Tonge says that his specimen of 1923 consisted merely of a few dry grass-stems and two or three small dead leaves), but certainly it was, in spite of its "open-work" nature, a strongly-built little cradle. Incidentally, a glance at this nest showed clearly the reason why Painted Honeyeaters always build among pendulous branchlets and slender leaves, such as the "needles" of Casuarinas, the fine leaves of Melaleucas, and the slender leaves and twigs of Eucalypts of the type of the Yellow Box. Situations of this kind are necessary for the weaving of the delicate nest.

This history of the Maryborough irruption of 1943-4 ends with summer. Mr. Nicol tells me that he examined the environs of the town thoroughly at the end of February, but, although Mistletoe-birds were still to be heard, he could neither see nor hear a single Painted Honeyeater.

"Where have they gone?" Mr. Nicol asked: and I could only reply, in the modern phrase, "Search me!" I assume, however, that all those "Georgies" of the Maryborough district reared at least one brood to each pair, and that when the supply of berries became exhausted they collected their young and made off towards some indefinite point in the northern interior.

That aside, there are other questions relating to the Painted Honeyeater that I cannot answer. Here are some of them:

Assuming that the species was once a true honeyeater, what caused it to turn to mistletoe berries? Bearing in mind that Gould saw specimens catching insects on the wing, and that this practice has not since been reported, is it to be supposed that the mistletoe-eating habit has developed, or at least become more confirmed, during the last century? Where does the species spend its time when not visiting southern N.S.W. and/or Victoria? What causes it to be so erratic in its movements and how are those movements regulated? Assuming that the fruiting of mistletoe is the decisive factor, how do the birds "know" from a distance whether the season is or is not favourable?

Additional questions arise from reflecting upon the behaviour of the other eater of mistletoe-berries, little *Dicaeum*. Firstly, in view of the fact that this species may be seen in Victoria during winter, should it be regarded as more adaptable in its food-tastes than "Georgie"? Secondly, recalling that the Mistletoe-bird's nest is the more accessible and open to danger, why is the tiny bird the better stabilised and more widespread of the two species? Should we assume that the semi-migratory movements of the "Painteds" affect their chances of survival? Thirdly, what significance, if any, is to be attached to the fact

that both these eaters of mistletoe berries are amongst the most beautiful of all our birds?

Other questions again arise from recent events. Since the "Painteds" were not in the Maryborough district until about 1937, and then only scantily, what factor or factors caused them to discover the district as a good feeding-ground in 1943, and what factor or factors caused mistletoe to flourish to a degree sufficient to warrant a company visit of the kind? Further to the same point (and possibly botanists can answer this question), in view of the fact that "Painteds" were not at Maryborough in the lush springtime of '42, but were in record abundance in the dry springtime of '43, are we to assume that mistletoes fruit best in dry seasons?

Finally, there is the question of a name. John Gould called the bird "Painted Honeyeater" because of its pretty colouring and because its general characters (noted in skins seen before he left England) showed it to be related to the Honeyeater family. But Gould did not know—although he suspected the species to differ in some respects from true Honeyeaters—that the bird was an eater of mistletoe berries; and now that the point is well established the term "Honeyeater" becomes anomalous. What then should the species be called? "Mistletoe Honeyeater" will not do. "Mistletoe-bird" is pre-occupied. In fact, if the word "Mistletoe" is to be used in the title of the "painted" bird, it will probably be necessary to find a "Christian" name for the present Mistletoe-bird.

Are there any suggestions to be offered? For its own part, the gay little *Grantiella picta*, like the bird that "tells its name to all the hills," is quite assured on the point—it calls itself "Georgie."

JOHN GOULD TO AUSTRALIANS

"Now a word to the Australians, particularly to those who are interesting themselves about acclimatizing animals from other countries—wishing for things they have not and neglecting those they possess. At what cross purposes are we playing both in Europe and Australia?—in England a price is put upon the head of the Sparrow, while in Australia rewards are offered for its introduction; but on this subject I must content myself by praying that protection may be afforded to that noble bird, the Emu, in order that it may not be extirpated from the continent, as it nearly has been from Tasmania, where, I hear, it would require a month's search, in the most remote parts of the island, before one could see any of the few that are still living thereon. How much will the loss of this fine bird be regretted by every right-minded person who claims Tasmania as his fatherland?"—*Handbook to the Birds of Australia*, Vol II, p. 202, published 1865.

"THE ORCHIDS OF NEW SOUTH WALES"

The Rev. H. M. R. Rupp has eclipsed his handy *Guide to the Orchids of New South Wales* (1930) by a much more pretentious work bearing the above title and the date December, 1943. As an honorary member of the Sydney National Herbarium staff, to Mr. Rupp has been entrusted the honour of producing this first part of the projected *Flora of New South Wales*. We warmly congratulate both the author and the Herbarium on what is probably the finest piece of monographical botany to issue from an Australian press this century.

The book is a 168-page octavo volume in red cloth, obtainable from the Chief Botanist, National Herbarium, Botanic Gardens, Sydney, for 9/6. Its set-up is excellent, the introduction being informative but not unwieldy, the headings of genera and species in bold, heavy type, the keys simple, well spaced and, above all, *workable*. Full citation and synonymies accompany every species described, and there is data on the known distribution within New South Wales, with flowering times indicated against each locality collection. Occasional notes as to pollination are given, and intricate problems in nomenclature are discussed throughout. The final section of the book is devoted to a dictionary of impersonal specific and varietal epithets, a glossary of botanical terms as affecting the *Orchidaceae*, and a complete index embracing synonyms.

The systematic arrangement follows that of Pfitzer in the main, which is a reversal of the order usually adopted in Australian floras (with epiphytes at the beginning and the tribe *Neottinae* last). Most of the 24 full-page line drawings are the work of Mr. G. V. Scammell and attain a very high order of merit, recalling those lithographic masterpieces of Blume and contemporary Dutch artists.

Out of a total of 253 species (25 in excess of what Bentham described for the *whole of Australia* in 1873), there are only two at which we feel inclined to level criticism, viz., *Pterostylis squonata* and *P. Boormanii* *sp. nov.* The description under the former name applies to what we regard as typical *P. rufa*, whereas the latter is surely a re-description of true *P. squonata*. Specific rank has been given to certain entities which Victorian orchidologists would merge with older species as mere variants, but that is where the individual tastes of specialists will always deviate, and so long as a group of plants can be recognized as different, even under varying edaphic conditions, we shall not object to their having a distinctive name, particularly if so designated by one of such long field experience and outstanding ability as Mr. Rupp.

The Orchids of New South Wales is likely to be a scientific reference work for generations to come and an indispensable asset to the serious student of *Orchidaceae* anywhere in Australasia.

W. H. NICHOLLS and J. H. WILLS.

HAWK AND STARLINGS

Twice while staying at Sorrento we saw a large number of starlings flying high over the dunes, with a hawk in pursuit. Massed into a living balloon they flew as one bird. Occasionally the hawk dived into and scattered the cluster, which re-formed again and again. Eventually, his object probably achieved, he was shaken off and we lost them in the blue distance. Is it possible that the starlings first united to attack the hawk? In the garden one often sees small birds in force attacking the frogmouth or the kookaburra and even the magpie.—EDITH COLEMAN.

JOHN LEADBEATER, OF THE NATIONAL MUSEUM

I read with much interest the account of John Leadbeater's early history as given by H. M. Whittell in the March issue of the *Victorian Naturalist*, and as I was associated with him for a few years prior to his death in 1888, the following facts may be of additional interest.

Just when Leadbeater arrived in Melbourne is uncertain, but in a Melbourne Directory for 1856-7 appears the firm of Williams & Leadbeater, Naturalists, 107 Queen Street. The firm was apparently short-lived as it did not appear in later issues.

John Leadbeater was appointed taxidermist to the Museum in 1858 and held that position for about 30 years. He was recognized as an excellent taxidermist and keenly interested in his work, the results of which were to be seen in the fine collections of mounted mammals, birds, fishes, etc., then on public exhibition. Many examples of his skill may still be seen in the galleries and cabinet skin collections. Although from Major Whittell's account he collected "for the London House" in all branches of natural history, he did not appear to have undertaken much, if any, active field work during his association with the Museum. He was, however, instrumental in acquiring for the Museum numerous specimens, many of which at that time were little known or new to the collections.

I think I am correct in stating that he married a Miss Peters, whose father lived for many years at Western Port, and it was through the latter that he obtained from time to time many of the smaller mammals, and particularly birds, from that locality, including the hitherto unknown and still very rare marsupial *Gymnobelideus leadbeateri*. His chief hobby was birds, a number of which he kept in his aviary, and among these he succeeded in breeding the king and swamp quail.

My recollection of John Leadbeater is of one of good appearance and of a genial and kindly disposition.

Thomas Leadbeater, a relative, was appointed assistant taxidermist in 1882. His health was very unsatisfactory and he died on 22nd September, 1884.—JAS. A. KERSHAW.

After reading the article about John Leadbeater in the *Vir. Nat.* for March, I examined a case of birds we have had in our possession for some years. On the back is a small advertisement measuring 3 x 4 inches, stating under the Royal Coat of Arms: "John Leadbeater, Ornithologist to Her Majesty and the Royal Family," followed by his address, 19 Brewster St., Golden Square, London. On the left are the words: "Birds preserved, collections arranged"; on the right: "Manufacturer of ornamental cases and cabinets." Across the top is written in neat handwriting: "John Leadbeater, Melb. Australia," and "son of" is written between the Royal Coat of Arms and the name John Leadbeater. The case, which is very heavy, measures about 4 feet high—20 x 38 inches wide, and contains 29 birds, 2 nests and eggs.—M. E. B. FREAME, Glenferrie.

VISITORS TO THE SOUTH

While on a visit to Portland recently a friend of mine was fishing off the pier when a large turtle swam into view. It was accompanied by several black-and-white striped fish, which kept the same relative positions whenever the turtle altered its course, i.e., to each side and just below it. Its width was estimated at at least 4 feet. Surely this is an unusual record for so far south?—INA WARSON.

SCIENCE CONFERENCE IN JUNE

The F.N.C.V., in conjunction with fifteen other representative scientific societies, has participated in organizing a four-day conference on the "Planning of Science," to be held at the University Union Theatre on June 6, 8, 10, and 11. Admittance to one or all sessions is 2/- and attendance is open to the general public.

The aims of the conference deserve your warmest support and are briefly:—

1. Critical examination of science in Australia.
2. Policy for organizing science to meet immediate and post-war needs.
3. Ways and means for implementing the scientific utilization of all our natural resources.
4. Promotion of applied science for the common good.
5. Provision of a unified voice to express conclusions and an organization to achieve the above aims.

Some 16 addresses and lectures will be given by scientific specialists, followed by discussion periods, and will embrace such topics as the structure of science in Australia, the making of a scientist, the planning of research, post-war reconstruction, and the application of science to primary and secondary industries. Simultaneous conferences are to be held in New South Wales and South Australia.

Further details may be obtained from the secretary or assistant editor of the F.N.C.

EXHIBITS AT APRIL MEETING OF F.N.C.

Mr. C. J. Gabriel.—All the *Teredo* species of Victoria.

Mr. A. H. Mattingley.—Fruit of the Quandong, *Santalum acuminatum*.

Miss Lyndon.—Skull of the hawksbill turtle from Whitsunday Is.

Mr. A. N. Carter.—Specimens of molluscs from Western Port showing various parasitic marine growths; also specimens of the cow fish, (*Araucana flavigastro*) from Flinders, Vic., similar to those featured in *Wild Life* for April, 1944.

Miss G. Auchterlonie.—A number of garden-grown native plants, including *Billardiera longiflora* (purple apple-berry), *Solanum aviculare*, *Epacris longiflora* and *Melaleuca nesophila*.

Mr. F. S. Collyer.—Specimens of the larger Victorian fossil sharks' teeth, including *Carcharodon megalodon*, *Isurus hastalis*, *Lamna apiculata*, *Isurus retroflexa*, etc. (All Tertiary in age.)

Messrs. H. C. E. Stewart, J. H. Willis, Mrs. M. E. Freame and others.—Objects from the Easter Saturday excursion to Seaholme, including live spiders and crabs, shells, and plants of the salt-marsh; with flowers, breathing roots, and a seedling of White Mangrove (*Avicennia marina*).

Mr. Owen Singleton.—Fronds of Victoria's latest fern record, *Dryopteris pennigera*, from Sherbrooke River, west of the Otways (Jan, 1943).

Mr. Frank Kitchen, a Boyanup farmer, reports that two large Wedge-tailed Eagles (evidently from a distant district) some two or three weeks ago visited his farm and carried off one of his sucking pigs. The meat was evidently acceptable to the birds' palates for despite Mr Kitchen's constant vigilance they returned from time to time and carried off seven more of his young pigs.—*West Australian*, Perth, 29/3/44.

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PROCEEDINGS

The monthly meeting of the Club was held on Monday, May 8, 1944, at the Royal Society's Hall, where the President (Mr. P. F. Morris) and about 100 members and friends attended. Among other visitors, Mr. Hanson, of New South Wales, and Staff Sgt. Reynolds (U.S. Forces) were made welcome.

Excursion reports were given as follow: Frankston, Mr. P. Bibby and Mr. A. C. Frostick; Balwyn Wild Life Sanctuary, Mr. A. S. Chalk.

The following were elected as ordinary members: Mrs. Pratt, Mrs. A. E. Holland, Miss Violet Fletcher; as country member: Mr. G. Ashmore; and as associate members: Mr. H. R. Shaddock and Mr. Bruce Salau.

Nominations for office-bearers, 1944-45, were received as hereunder:—President: Mr. Ivo C. Hannet. Vice-Presidents: Messrs. H. C. E. Stewart, J. H. Willis. Hon. Editor: Mr. A. H. Chisholm. Hon. Secretary: Mr. F. S. Colliver. Hon. Asst. Secretary: Miss Nance Fletcher. Hon. Treasurer: Mr. E. E. Lord. Hon. Librarian: Mr. D. Greenwood. Hon. Asst. Librarian: Mr. A. Burke. Members of Committee: Messrs. A. S. Chalk, H. P. Dickins, P. Crosbie Morrison, R. G. Painter, G. N. Hyam, H. T. Reeves. Hon. Auditors: Messrs. A. S. Chalk and A. G. Hooke.

THE MYRTLE FAMILY

An illustrated lecture was given by Mr. P. Bibby, who dealt with the ancestry, distribution, classification, habits, and economic importance of this large southern group of plants. Typical representatives of the various tribes and sub-tribes were portrayed by a fine series of coloured slides, and many instructive and interesting facts imparted to the audience. Following are some questions raised at the conclusion of Mr. Bibby's address:

1. (Mr. H. C. E. Stewart.) What are the largest and smallest members of *Myrtaceae* in Australia? *Answer*: *Eucalyptus regnans* is the largest and probably a species of *Baeckea* would be the smallest. (*B. erivaca* of our Victorian Mallee is a midget plant, often only 3 inches high.)

2. (Mr. Gates.) What is the oldest type of *Eucalypt* still living? *Answer*: Possibly one of *clavigera-setosa* group, occurring in North Australia, but confirmatory fossil evidence is required.

3. (Mr. C. J. Gabriel.) What is the difference between *Callistemon* and *Melaleuca*? *Answer*: Both genera often exhibit the "hottle-brush" type of

inflorescence, but in the former the very long stamens are always free, whereas in *Melaleuca* they are shorter and united in five bundles opposite the petals.

4. Would not some species of *Kunzea* be better classed under *Leptospermum*? Answer: *Kunzea* is distinguished from *Leptospermum* by its exserted stamens and closely sessile flowers, but certain species have intermediate characteristics and botanists are yet by no means in agreement as to their systematic status. (As late as December last Mr. Edwin Cheel, former Government Botanist of New South Wales, transferred the common "Burgan" from *Kunzea* to the genus *Leptospermum*.)

EXHIBITS

Mrs. E. E. Freame: Young stages of Goby, Cobbler, Gammarus and Shrimp from Altona.

Mr. Owen Singleton: Fossil fruits from the open cut at Yallourn

Mr. Eric Muir: *Olearia vandykei*, *O. floribunda* and a Leek Orchid (*Prasophyllum fusco-viride*) from Dimboola, Vic.

Mr V. H. Miller: Magnificent specimen of *Cymbidium Tracyanum* with three flowering spikes.

Mr. Alan Carter: Specimens of Victorian marine shells of the family Trochidae.

Mr. C. J. Gabriel: Marine shells (*Cardium costatum*, Linn) from Clonca.

Mr. Tom Griffiths: Water Fern, *Asolla filiculoides*, var. *rubra*, from Victoria. (Species also found in all eastern States and New Zealand.)

Mr. A. H. Mattingley: Edible fungus, "Inky Cap" (*Coprinus atramentarius*).

Mr. P. Fisch: So-called "Petrified Tea-tree" from Black Beach at Rye: shells (King's Macrocallista, Circular Dosinia, Frilled Venerid) from Rosebud; variations of common mushrooms, and a small Garlic fungus (*Marasmius alliatus*) from Koozing Creek, Doncaster.

Mr. J. H. Wills: (1) Coral Lichen (*Cladonia retipora*) and late autumn wildflowers from Coimadai district, including the five orchids *Pterostylis parviflora*, *P. revoluta*, *P. truncata*, *Acianthus exsertus* and *Eriachilus cucullatus*. (2) *Nerocila*, a parasitic fish louse, common on the gills of flathead.

NOTES ON SCRUB-WRENS

It is usually supposed that the main material of the nest of the "Devil-bird" (Yellow-throated Scrub-wren) is black rootlets, but it is really the horsehair fungus. I mentioned one day to my son that I did not know what the rootlets belonged to because on many kinds of plants these black horsehair-like growths could be found. A few days later he came home from the jungle and said the material was a fungus, and he brought some minute mushroom-like heads on the black roots. Under the microscope they were perfect little mushroom heads with gills, but about the size of an ordinary pin's head and brown in colour. I took a nest and some of the rootlets growing on twigs into town to the Naturalists' Club meeting, and was told that the material was horsehair fungus.

The other day I found in the jungle three nests of the "Devil-bird" and two were occupied by Large-billed Scrub-wrens, *Sericornis magnirostris*. One was cherishing three pretty grey eggs and the other was feeding three babies. These ladies certainly are getting worse in their lazy housekeeping ways. But why waste a good home? Should they build homes of their own when ready-made ones were available?—HILDA CURTIS, Tamborine Mountain, Queensland.

THE MOUNTAIN GRASSHOPPER: A STUDY IN
PROTECTIVE COLORATION AND MIMICRY

By EDITH COLEMAN, Blackburn, Victoria

During the past few years it has not been possible for me to visit the haunts of the Mountain-grasshopper (*Acridopeza reticulata*), whose life history I have previously described (*V.N.*, June and Nov., 1938). Having recently spent three weeks at Sorrento in close proximity to large numbers, I am able to confirm my suggestion that they feed on ragwort, which is all too abundant in the locality.

One finds isolated specimens in other parts of Sorrento, but they are numerous only where the ragwort abounds, and here one may see them actually eating out little bights and bays along the margins of the leaves.



Adult female, resting on the ground, elytra closely folded over her body, resembles a clod of earth, or crumpled leaves. (Protective coloration.)

Indeed the ragged appearance of the ragwort betrays their presence. In a natural state I have seen them eating no other plant.

Although late in the season, there were many males—once thought to be rare. I counted 35 one evening. I saw only one nymph, and no larvae. Most of the females appeared heavy with eggs. I watched closely, but saw none deposited. Only two adult females were seen on tea-tree stems, where one might expect to find eggs, and these appeared to be merely sleeping. Scores were basking, or roaming on the ground. It seems probable that eggs may be dropped at random among leaves and twigs.

On the other hand, they are covered with viscid matter which suggests that they should be found glued to stems or twigs, just as they adhere to the cage of domesticated specimens.

The ragwort had fruited, its hairy achenes had all dispersed, leaving great masses of straw-coloured corymbs of empty disks, on stems up to 4 feet in height. Here early one morning were found many females, at an hour when bird appetites are sharp. I found a few specimens with the fleshy abdomen missing. Yellow robins, grey thrushes and other insect-eating birds frequented the spot. At a footfall, or the gentlest touch on the ragwort, the insects dropped to the ground. This beetle-like dropping must be of great survival value. One touch by an investigating bill and the insect is lost among the debris below. Unless the bill is open

widely enough to get a good grip, I think few birds would succeed in taking them. Doubtless some are caught when moving slowly over the ground. If motionless they are almost invisible. The males were usually low down on the stems where leaves were dead or dying, and harmonized perfectly with their colours.

It was interesting to note in the females great variation in colour, some being green with grey, others grey with green markings. It seems possible that the insect is able to change her colour to fit changing environment.

Among the females were five without any trace of elytra, the wasp-like colours being fully exposed. They seemed just as comfortable as the others, merely dropping when alarmed in the manner of the rest. There is never any hopping or leaping at any stage of their development.



Elytra raised to show wasp-like colours, threatening to use a sting which she does not possess. (Mimicry.)
[Inset view of the legs, and below the body, showing the feet and claws.]

One is impressed by the perfection of the various protective adaptations in this insect, perhaps one of the most remarkable in the world. Motionless on the ground, with elytra closed over her terrifying colours, the female is practically invisible. At a touch, up go the elytra in a touch-me-now-if-you-dare challenge, which of course is pure bluff—no more harmless creature exists.

I saw some straw-coloured stick-insects so perfectly camouflaged on the corymbs of empty ragwort disks that they were only betrayed by movement. I brought some of the scapes to Blackburn and placed them in the cage with my stick-insects. Next day every "stick" resting on the ragwort disks had changed its colour to harmonize with its new surroundings.

From *Cassell's Illustrated Family Paper*, 15th October, 1859:—

Three hundred sparrows, carefully selected from the best hedgerows in England, have been lately sent to New Zealand. The food alone put on board for them cost £18. The necessity of small birds to keep down the grubs that devastate the crops in that colony has long been felt. The farmer is beset by myriads of caterpillars. Should the sparrows become acclimatized and multiply, the greatest benefit will have been conferred on the country.

OBSERVATIONS ON THE BREEDING OF THE
PLATYPUS IN CAPTIVITYBy DAVID FLEAY, B.Sc., DIP. ED.,
Director, Badger Creek Sanctuary, Healesville

Part 2

That day of October, when "Jill" showed so clearly that she was intent on nesting, was a memorable occasion. A considerable number of visitors was present at the time, and what a treat was afforded them! However, probably not one spectator realized the unique nature of the proceedings.

"Jill," clearly, was not inclined to feed. She appeared to be more interested in making repeated snatches at a leaf fragment in the water. I gathered a handful of dry eucalypt leaves and dropped them in the water. Immediately the lively little animal seized upon them with her bill. With feverish energy she ducked her beak below and under her body, at the same time bending and tucking her tail forward so that the leaf became held in a neat tail-grip almost identical with the mode employed by both nest-building ring-tailed possums and possum-gliders of the genus *Petaurus*.

Again and again leaves were transferred below water to the grip of the tail, and as the bulk grew the platypus's hind feet were used to kick the bundle back into a more compact roll. It was a most amazing sight, and I have often, figuratively speaking, kicked myself since for not taking photographs. All thought of food forgotten (which, in a platypus of "Jill's" calibre, was unprecedented), the little nest-builder swam towards her northern burrow entrance again and again with her tightly-held leaf bundle, and scuttled inside. There was no hesitation. She had a job to do and she went straight to it. Through the wooden burrows and then up the burrowing bank she could be heard rustling along with her loads, and then in a few minutes out she came for more. From 3.30 p.m. until goodness knows what hour she worked a continuous "shuttle service." Food was disregarded entirely. We had provided a veritable floating raft of leaves.

I saw her a number of times during the evening, and when last inspected at half an hour past midnight she was still nest-making! Leaf material was her object, but wisps of grass in the water also were gathered. A second important habit revealed at this time, apart from the actual method of gathering and carrying material, was the fact that all of it was taken from the water. Wooden burrows through which "Jill" travelled contained leaves and grass, but this was entirely by-passed. Even

leaves dropped from her tail-bundles in the burrows were not picked up. All nesting material was chosen thoroughly wet in the water. This fact has definite significance. Burrell (Page 180) quotes Kershaw as saying that mere exposure of platypus eggs to dry air produces denting in a few minutes. Mr. Burrell also suggests that it is the necessity for a moist atmosphere over the incubation period that is part of the reason for the pugging of the burrow.

"Jill" has shown that the nest itself is made originally entirely of thoroughly wet stuff, and it can be imagined that leaves and other material collected by wild female platypuses would be in an even more thoroughly soaked state than those we threw in for "Jill" on the afternoon of October 23. The thickness of the nest in a platypus nesting chamber, plus its damp nature and the pugging habit, would undoubtedly provide, for some little time, the moist atmosphere mentioned by Mr. Burrell.

The afternoon and night of October 23 saw the beginning and the completion of "Jill's" nest-building—a typical example of the restless nervous energy of our duckbilled oddity. On the following day she emerged at 3 p.m. with no further leaf-gathering ambitions, and chewed away continuously far into the night. This and the following day were the last two days before retirement. It should be understood that a very special diet had been accorded her for some time, consisting of prodigious quantities of beetle larvae, tadpoles, young yabbies (fresh-water crayfish) and earthworms of several species.

Again on October 25 "Jill" appeared—on this occasion at 10.30 a.m.—to feed ravenously and continuously. On both these days she appeared shy and disinclined for any form of frolicking, which was so frequently her custom when I paid her a visit. At dark on the 25th, after an all-day feeding session, she retired. That was her final disappearance for the incubation period, and it seems reasonable to assume that the first at least of her eggs (one or more in number) was laid during that night—for her period of preparation and feeding had ended and now she was really down to business. It should be recalled at this point that just a fortnight had elapsed since the only observed instance of mating had occurred.

At the time of her withdrawal from public affairs "Jill" was both fat and well. The number of pugs placed in the burrow, thus blocking the brooding animal in her nesting chamber, could not of course be ascertained, but that she was in the habit of carrying out these activities was revealed later when finely-worked dry earth (which, as Mr. Burrell remarks, slips through the fingers like flour) came to light along the course of the opened burrow.

Day after day passed by and night succeeded night with no sign of "Jill"—no food was touched and the water of her long swimming pool remained as clear as crystal. Imagine our excitement! I could feel it in my bones that at long last, after all the years of endeavour, luck had turned and "Jill" was curled up below ground in the peculiar upright ball so typical of her kind, while reposing in her lap were the precious eggs (one, two or three) comparable in size with those of a sparrow.

The earliest sign of a re-appearance by "Jill" was evidence that during the early morning hours of October 31 she had pushed away grass arranged in the nesting burrow "doorway." She had defaecated in the water, but no food had been touched, nor was the water stirred up. The animal was not seen, and evidently she had simply come in and out for the purpose of wetting her fur and defaecation. This emergence was on the sixth night following five full days and nearly six nights of absence.

On the next occasion "Jill" appeared—November 1, at 2 p.m.—she stayed out for just half an hour. She appeared unusually timid. For the whole of this time she rolled and swam about in the water, making no definite attempt to feed, but concentrating strongly on toilet-scratching of her fur with her hind feet, and combing her flanks and lower back; and for the first occasion in the many times she had been watched at this process her combing extended into the abdominal region in what might be termed the pouch or mammary area. Perhaps this region was matted owing to the stickiness of the eggs when first laid; or, again, perhaps the stimulus of developing milk glands caused "Jill" to scratch so continuously at this spot.

During the brief half hour of her outing, she kept her beak pointing anxiously towards her burrow entrance and was never far from it. Her outing obviously had a four-fold purpose: (a) a wetting, (b) exercise, (c) a cleansing of her fur, (d) defaecation.

Following her return she could plainly be heard scratching through and replacing pugs in her burrow. Her third outing took place during the early morning hours of November 3, sometime between 1 a.m. and dawn. There was little, if any, evidence of feeding—and again the excursion was almost certainly a matter of defaecation, fur-wetting, and brief exercise.

On account of the considerable loss of condition noticed in the animal over this period, as distinct from her appearance following winter absences, added to the forerunning preparatory period when she built up her reserves, I think it most unlikely that she passed into any state of torpidity or low body-temperature

peculiar to periods of hibernation. On the other hand, Burrell (*The Platypus*, page 182) writes: "I am convinced that during the three weeks or more which elapsed between the laying of the eggs and the onset of lactation the female not only does not leave the nest but also passes into a condition of partial æstivation."

In order to convey some idea of the period of incubation, which must necessarily be somewhat uncertain but is definitely much shorter than was supposed, the following tabulated observations are set out:—

No. and Date of emergence	Time Duration from Date of Retirement (7 p.m., 25/10/43.)	Time Spent Out and Notes on Behaviour
1. 31/10/43	Five complete days and nearly six nights.	Out during early morning hours for extremely brief wetting of fur and defæcation. No food eaten. Animal not seen.
2. 1/11/43	Six and a half days and seven nights.	Observed 2 p.m.-2.30 p.m. Fur-preneering and considerable scratching at mammary area. Animal raising her body side on to reach this abdominal region. Exercise and fur-wetting "pointing" anxiously with beak at burrow entrance.
3. 3/11/43.	Eight days and nine nights.	Not seen. Out between times of 1 a.m. and dawn. Evidently same as before — simply a wetting, preening and defæcation. Extremely small evidence of feeding.
4. 6/11/43.	11 days and 12 nights.	Seen 11 a.m.-11.45 a.m. Looked rather miserable. Feeding; ate a few small yabbies and earthworms. Exercising a lot. Up on landing board, concentrating on turning side on and continuously scratching "mammary area" with hind feet.
5. 7/11/43	12 days and 13 nights.	Seen 5 p.m.-5.45 p.m. Swimming actively, feeding, and again scratching "mammary" area while on landing board: "Waving" her bill anxiously at entrance of burrow as seen on previous occasions. Once she made up her mind there was no hesitation about returning.
6. 9/11/43	14 days and 15 nights.	Seen 12.30 p.m.-1.30 p.m. Same behaviour.

7.	10/11/43	15 days and 16 nights.	Seen 3.30 p.m.-6.30 p.m. Very little fur-preening. Feeding very vigorously.
8.	11/11/43	16 days and 17 nights	Seen 3.30 p.m.-6.30 p.m. Feeding hungrily whole time. Looked well though usually thick tail had now become strap-like.
9.	12/11/43	17 (really 18) days and 18 nights.	Seen 7 p.m.-10 p.m. Very hungry and lively. Feeding vigorously.
10.	13/11/43	Actually 19 days and 19 nights.	Seen 4 p.m.-8 p.m. Behaviour similar to last.
11.	14/11/43	Nearly 20 days and 20 nights.	Seen 3 p.m.-6.30 p.m. Feeding vigorously. Much food consumed now.

In arriving at a fairly reliable, though naturally somewhat approximate, estimate of the incubation period (which is my main purpose in giving the above table), it is as well to bear in mind Mr. Burrell's chapter on "Nursing habits of the Platypus." On page 184 he says: "The most remarkable and mysterious feature about the baby platypus is that it is not suckled at all by the mother for some days after hatching, for the very good reason that the maternal mammary glands are not yet actively functional. Investigations of this extraordinary phenomenon have advanced far enough to place the matter beyond doubt. . . . The delayed lactation which I have observed may be due to the incomplete development of the necessary stimulus in the early young. How the young platypus is nourished in the meantime I do not know."

From the notes in the table it will be observed that "Jill" concentrated in each of her early outings on an oft-repeated and entirely new habit of scratching vigorously at the area of the mammary glands. It was no mere preening, and probably may have been brought on by stimulus from within requiring a type of external massage. In other words, it is possible that the mother animal may stimulate herself in order to bring about the supply needed by the very tiny helpless babes. Bearing this in mind, and the fact that the mammary glands are not functional for several days after hatching, and the important observation by Caldwell that the egg of *Ornithorhynchus* when ready to be laid contains an embryo already in approximately the same stage of development as a thirty-six-hour chick, it seems that "Jill's" activities indicate a very short incubation period.

The mere fact of a three-quarter hour absence from the nest on 6/11/43 (her fourth outing), her feeding on that date, and

practically daily appearances for increasingly long periods thereafter, are strong evidence that hatching had occurred at least several days previously. In view of the evidence set out it is not unreasonable to suggest that the *longest possible period for egg hatching was ten days and the shortest perhaps slightly less than a week*. It is, of course, quite possible that her first and even second excursions, brief as they were, took place before the hatching point had arrived, and had as their aim the bringing in of additional moisture.

Definite evidence of demands upon the mother's resources appeared from 6/11/43 onward, when her mammary glands were evidently functioning. She began to feed vigorously and appear regularly for longer periods. An interesting observation was the fact that the times between her outings became progressively shorter. No further scratching of the mammary area was noted after 7/11/43, when the busy little animal spent her whole water periods in continuous feeding.

Carrying on with the tabulated and systematic summary of "Jill's" activities from the last listed date, 14/11/43, we have the following:—

Date	Time Spent in Water.	Behaviour.
15/11/43	11.30 a.m.—3.15 p.m.	Fed vigorously.
16/11/43	12.30 p.m.—4.30 p.m.	Feeding very keenly on yabbies, worms, grubs.
17/11/43	11.30 a.m.—4 p.m.	Same as above.
18/11/43	10.30 a.m.—4.30 p.m.	"Jill" now left baby or babies in nest for six-hour stretches and was with them for approximately 18 hours.
19/11/43	8.30 a.m.—2.30 p.m.	Hours in nursery steadily decreasing.
20/11/43	Out early morning hours—11.30 a.m.	First time out; twice in 24 hours.
21/11/43	"Jill" out during night. Out again 5 p.m. onwards.	
22/11/43	Out 2 p.m. until dark.	Her appetite greater than ever.
23/11/43	Out early morning and all day until dark.	
24/11/43	11 a.m.—evening.	
25/11/43	12 noon—still out at 10 p.m.	Had been out 10 hours continuously feeding and still going strong when last seen.
26/11/43	1 p.m. until far into night.	Condition of "Jill" herself vastly improved. No longer at all worried about nesting burrow. Resuming her old playful ways and leisurely preening of her fur on landing-board at night.

27/11/43	Out 3 p.m. — most of night	Exhibited each day.
28/11/43	Out 4 p.m. — onwards through night.	Exhibited each day.
29/11/43	Out 2.30 p.m. onwards through night.	Exhibited each day.
30/11/43	3.45 p.m.—through greater part of night.	

"Jill" now had reached her peak as far as maximum foraging periods were concerned—spending as long as fourteen consecutive hours in the water, feeding with very occasional visits to landing platforms for a little fur-preening—while her baby (a single one as we discovered later) was safely tucked away in its nesting chamber behind safety pugs in the passage-way. However, in this process, largely performed by the mother's tail, no further abrading of the stiff hair on its extremity—apart from that lost in the winter period—occurred.

With the coming of December, "Jill's" excursions took more of a nocturnal turn. She appeared round about 7 p.m. and stayed out all night. There was also evidence on December 2 that she had pulled grass from her wooden "burrows" into the water and then probably transferred it as fresh material up the burrow to the nesting chamber. Wisps of wet grass were strewn over the water-surface in all directions, and also about the entrance to her burrow.

According to calculations about the incubation period, the single youngster was now (2/12/43) aged four weeks. "Jill" was very consistent in her outings, appearing each evening between 7 and 8 p.m. (E.S.T.), and leaving the youngster to its own devices in the nest all night. She was quite back to her normal outlook on life—gay and carefree in behaviour. Naturally, however, any shortage of food supply on a particular evening would cause her to emerge hours earlier on the succeeding day to make up the leeway.

On the night of December 7 I caught her for an inspection, noting that her condition was comparatively fat, while the abdominal mammary area showed the typical slight indentation with a median-growth of rusty-red fur differentiating it from the rest of the ventral surface. Domesticated and trusting as "Jill" is, she objected most strenuously to such indignities as this, so, although I made an attempt to express milk by squeezing the mammary area, I had to desist almost at once.

On December 13 a test feed was given to ascertain the quantity and weight of the assortment of items the little animal was now in the habit of devouring during her nightly banquets. The list included the wireworm larvae of click-beetles, chafergrubs, stag-beetle larvae, earthworms, and land yabbies (burrowing

crayfish). The youngster at this date was nearly five and a half weeks old.

It was found that "Jill" in this one night consumed a typical meal of the following items:—

Worms (Native species, larger than European earthworm)	400
Grubs (mainly chafer)	338
Yabbies	38

The total weight of all these items (without soil of any kind) was 28½ oz. or 1¾ lb.! Considering "Jill's" mere 16¼ inches length and her own body-weight of 2 lbs. when in her fattest condition, this test gives some idea of the amazing appetite of *Ornithorhynchus*—particularly during some phases of the nursing period. What a terrific line of it mother platypuses must have in their wild state! Little wonder (see later) that some baby animals leave the nesting burrow too soon. Naturally, an animal weighing 2 lb. could not hold a meal of another 1¾ lb., and it follows that the nursing platypus mother must assimilate the food as she swims and build up her milk supply to full capacity over the extremely long hours (up to 14) of continual foraging.

Energetic "Jill" actually found time away from her hours of busy mastication to drive into her nesting chamber from an old side-burrow which she cleaned out—this was now used as an entrance-passage while the original doorway high up on the north side of the platypusary was abandoned. From December 19 onward, with the youngster then approximately 6½ weeks old, there was a noticeable falling off in "Jill's" appetite. She ate few earthworms and concentrated mainly on grubs and yabbies.

This, together with the abandonment of her former mode of entrance to the nesting burrow, plus the fact that now for the first time since the pre-nesting period she had commenced working soil out of the old living burrows on the south side of the platypusary, seemed to me a very ominous state of affairs. To make my worries worse a family of Swainson's phascogales (large pouched "mice" of insectivorous and occasionally carnivorous tastes) had taken to living in and about the platypusary, and naturally I imagined that perhaps they had even tasted tender young platypus.

Beyond a good appetite "Jill" gave few signs that she had any family responsibilities. She was to all intents and purposes an ordinary platypus "citizen." As we discovered later, her labours on the southern side of the platypusary, where soil would occasionally be pushed back for 18 in. by 6 in. by 6 in. into wooden "burrows" connecting with the water, were devoted solely to the purpose of making pugs for yet a third route of daily egress from, and entrance to, the nesting chamber.

I could sometimes watch her at work blocking up the passages—a small creature of marvellous strength and industry. In view of later knowledge, the comparative falling-off in "Jill's" appetite was probably connected with the stage of growth attained by the youngster. Burrell (page 189) remarks: "A rapid rate of growth in the early stages, but such rapidity is explained by the fact that when once the young commence to suck, their appetites increase rapidly. The quantities of food found in their stomachs on dissection are surprising."

It is indeed very probable that once having attained a certain size, with fur beginning to make an appearance, the youngster enters a quiescent phase, requiring less nourishment than previously. In any event, it was true that leading up to the stage of 5-6 weeks, "Jill's" baby required a phenomenal amount of nourishment. However, in our general ignorance at the time of "Jill's" late December activities—or shall I say lack of extra activities?—time dragged and I became an impatient and badly disappointed observer.

The days went by until the calendar registered January 3, which would make the inmate or inmates of the nursery at least 8½ weeks to 9 weeks of age. It seemed that "Jill" must have failed, particularly in view of Burrell's statement (page 188): "About 6 weeks after hatching the young will have reached a length of twelve inches. By this time their eyes are open, their fur is a quarter of an inch in length, and they are able to crawl freely about the burrow."

In any case it now seemed that, in the interests of finding some record of "Jill's" underground activities, the nesting burrow should be opened. With great care, then, we began this delicate operation on January 3, carefully removing the firm ground from the extreme back of the platypusary so as to avoid as far as possible interference with any tunnels leading to the nesting chamber.

Rather high up near the passage-way used during and after the incubation period, we found a deserted composite nest of grass and leaves. Possibly this was a nest from the previous year, though we had not seen her carrying in the material. At all events it did not improve our prospects. We dug on—not so carefully now—and found we were following a burrow that ran well below the surface on the southern side of the burrowing bank. On its floor was a good deal of the well-worked bone-dry floury earth that tells of frequent working and pugging.

Then things began to happen.

(To be continued.)

FOUR NEW SPECIES OF *DIURIS* FROM MOUNT VICTORIA,
NEW SOUTH WALES

By PEARL R. MESSMER, Lindfield, N.S.W.

One day's work does not often yield from a locality some two hundred yards long and the width of a road eight species of a genus, four of which are new to science. Such was my good fortune on October 19, 1943, when I went to Mount Victoria in the Blue Mountains to procure more material of what appeared to be two new species of *Diuris*. I had received dried plants from my son Bruce the previous spring.

Upon investigation of the locality last year, *Diuris maculata* Sm., including the dark southern form was found to be very plentiful, *D. pedunculata* R.Br., *D. polachila* Rogers and *D. plotichilus* Fitz moderately so. Not only the two species hoped for, but also two additional new species, were plentiful enough to establish their just claims to such rank. I have called them *Diuris victoriensis*, *D. flavo-purpurea*, *D. polymorpha* and *D. lineata*, and have published my original descriptions in *The Orchids of New South Wales*, by Rev. H. M. R. Rupp, Dec., 1943.

Between these four outstanding species, there are so many variants, intermediates and indeterminate forms, that one is forced to come to the conclusion that, in this locality, hybridization has taken place to an unusual extent, which, when the confined area of the locality and the close proximity of the various species is taken into consideration, may not be so remarkable. Some intermediate forms show so many constant characteristics, namely, labellum markings, shape, etc., that, upon further investigation next year, they may merit specific or at least varietal rank.

The season being almost at an end, on the date of my visit, further work last year was unfortunately impossible.

In addition to the four species from Mount Victoria, I have also described a new species of *Diuris* which I collected in small numbers on the slopes of Mount Jerrabomberra at Queanbeyan, N.S.W., in October, 1942. This was submitted to Mr. W. H. Nicholls for examination and he suggested that I should call it *D. similis* on account of its affinities with *D. maculata*, but the half-moon shape of the large side-lobes of the labellum and the dorsal sepal are so distinctive that I considered *D. semimaculata* more descriptive. In many respects this species approaches *D. maculata* Sm., but differs in the shape and proportions of the labellum, in the length of the column wings and the anther and in the general aspect of the more robust and waxy flowers.

In the private herbarium of the Rev. H. M. R. Rupp are two specimens which I would refer to *D. victoriensis*: one collected by himself near Launceston, Tasmania, Sept., 1922, and labelled "doubtful *D. polachila*," but probably a hybrid between *D. maculata* and *D. pedunculata*, and the other collected by Mrs. F. Persin in the Victorian Grampians, Oct., 1922, and labelled "possible hybrid." A specimen in the N.S.W. National Herbarium was collected by W. F. Blakely, Sept., 1932, and labelled "indeterminate," but it seems to tally with some of my intermediates or hybrids between *D. flavo-purpurea* and *D. lineata*.

Would orchid enthusiasts keep a close watch in the Grampians and also the north-east of Victoria for specimens which accord with any of these five new species (as described in detail in Mr. Rupp's recent work)?

The accompanying plate has been prepared from line-drawings by the Rev. H. M. R. Rupp and will serve as a useful guide to recognition of the four Mount Victoria *Diuris* spp.



Fig. A: *Diuris victoriensis* (1, dorsal sepal; 2, labellum; 3, column from rear; 4, column from front; 5, column wing; 6, crenate ridge on labellum). Fig. B: *D. lineata* (1, labellum; 2, crenulate margin of dorsal sepal). Fig. C: *D. polymorpha* (1, labellum; 2, column from rear; 3, column from front). Fig. D: *D. flavopurpurea* (1, 2, and 3 as in preceding).

EXCURSION TO SEAHOLME

SALT-MARSH FLORA AND MANGROVES

A fine burst of summer weather added much to the enjoyment of forty excursionists who visited Seaholme on Easter Saturday (April 8th), and it was encouraging to number in the party half a dozen children of club members whose keen interest in wild life and alertness throughout the afternoon is surely a happy augury for the future F.N.C.V. The previous part-botanical outing held here fourteen years ago registered an attendance of only fourteen (for report by the late A. E. Rodda, see *Vict. Nat.*, Vol. 46, p. 220, March, 1930).

The sandy cliffs and heathland scrub, so familiar on the opposite eastern sea-board of Port Phillip, are here replaced by a seemingly bare and monotonous lava plain which meets the sea at dead-level. Evidence of a recent slight uplift, with recession of the shore line, is provided in the raised shell beds and ridges of sand that overlie newer basalt immediately west of the railway; otherwise the local geology is not particularly interesting.

Between railway and beach is a tidal flat, subject to frequent inundation by high seas, and on this saline swampy area is developed a luxuriant salt-marsh flora. Right at the Seaholme station one steps out among halophytes (salt-loving plants), both native and introduced, and these extend in a more or less continuous belt to the mouth of Kororoit Creek (1½ miles north-east) where they attain their best development. Including the few sand-loving plants of the narrow elevated zone between marsh and sea (e.g., *Suaeda elatior*, **Lagotis ovatus*, **Agropyron junceum*, *Atriplex cinereum*, *Salsola Kali*, *Cakile edentula*, **Melilotus indica*, **Lycium ferocissimum*, and **Solanum sodomaeum*, which are only marginal to the marsh proper, the indigenous and alien species total about 50 species each and blend agreeably in a fairly stable population—no aggressive weeds are conspicuous. It is thus apparent that, although the salt-marsh is densely populated with individual plants, the number of species is not large when compared with a heathland association or even that of the adjacent but sharply differentiated basalt plains.

The leader briefly explained the peculiarities of halophilous vegetation: how it exhibits much the same physiognomy with the same contributing genera the world over, for only a few groups of plants have become adaptable to high salinity in the soil (sea water is about 3½% salt). As in other coastal marshes, as well as inland salt-pans, dwarf shrubs of the "Goosefoot" family (*Chenopodiaceae*) were found to predominate at Seaholme (viz., *Arthrocnemum arbusculum*, *A. halocnemoides*, *Salicornia australis*, *S. Blackiana*, *Suaeda maritima*, and *Hemichroa pentandra* of doubtful affinity). "Physiological drought," due to the difficulty of moisture absorption from salt water, is overcome by a rising saline concentration in the cell sap itself; this attains an osmotic pressure of more than 50 atmospheres in the two *Salicornia* species ("glassworts").

The late season precluded any chance of viewing those tiny ephemeral plants which flower in the marsh during spring (*Triglochin minutissima*, *T. mucronata*, *Sagina apetala*, *Hydrocotyle capillaris*, *Sebaea albidiflora*, *Angianthus Preissianus*, *Cotula filifolia*, etc.) and only occasional blooms were noticed on the Sea-heath (*Frankemia pauciflora*) and Rounded Noon-flower (*Disphyma australe*), which are such a riot of colour in early summer. However, the exquisite green to rosy-amethyst transitions in the foliage of Sea-blite (*Suaeda maritima*) were some compensation for floral inactivity.

Holding close to the shore, members were afforded a variety of attractions in the arthropod, mollusc, and bird life to be found hereabouts: excellent examples of the "bird-dropping" spider (*Celaenia*) and spiny spider (*Gastercantha*) were examined; the Port Phillip coral (*Plesiastrea*) and numerous shells were collected, notably *Phasianella australis* ("Pheasant Shell" or "Painted Lady") and a sample of *Murex triformis* with colour beautifully preserved; gulls and black swans (several hundred on off-shore sandy shallows) were plentiful, while a flock of the Little Stint or Red-necked Sandpiper defied custom by remaining there when all such birds should have migrated northward.

The culminating interest of the excursion was an unbroken line of healthy White Mangroves (*Avicennia marina*), stretching along the southern bank of Kororoit Creek for a quarter of a mile from its mouth. Strange indeed it was to gaze upon a strip of distinctly tropical vegetation, so far removed from its usual association with palms, epiphytes and the like and so near the heart of Melbourne (6½ miles away). A. E. Rodda said, "These small trees were once abundant around the mouth of the Yarra." Baron von Mueller frequented the Yarra mouth in the 1850's, but if he ever collected mangrove, it is not now represented among his specimens at the National Herbarium.

Just as the term "mallee" is used to denote a certain habit of growth among eucalypts of diverse affinities in arid parts of southern Australia, so "mangrove" is applied to an assembly of small trees favouring tidal mud flats throughout the torrid regions. Mixed mangrove forest is a feature of North Australian coasts, eight species in four different families occurring near Darwin; as one comes south along the Queensland and New South Wales coastline, the components of mangrove forest gradually decrease until *Avicennia marina* alone enters Victoria, penetrating as far as South Australia but not crossing Bass Strait; records for Chatham Island (on latitude 44°, 400 miles east of New Zealand) are quite erroneous.

White Mangrove (family *Verbenaceae*) always occupies water-logged soil which is inundated by every high tide, but it will not endure exposure to the wind or ocean breakers. The roots are aerated by singular vertical branches or "pneumatophores" which project several inches above the mud, like a crop of asparagus shoots; these structures are brittle, with spongy texture and abundant stomata. (The northern Black Mangrove, *Rhizophora mucronata*, bears large aerial "stilt-roots" on its trunk, but these are never developed in *Avicennia*.) Another noteworthy feature is the viviparous habit, seeds germinating on the parent plant and the young embryos dropping off into the mud or sea water for dispersal.

The timber is bad-smelling, coarse-grained and difficult to dress, but has been used for mallets, boat-knees and bullock-yokes; it yields an ash that will cleanse cloth and has been used in soap manufacture.

At the time of our visit, most trees were in full bloom (though no fruits were observed) and the small golden four-lobed flowers emitted a sweet perfume, suggesting pollination by insects. Several specimens of the agile mangrove crab (*Graphisura* sp.) were taken alive from burrows among the "pneumatophores." So ended this very pleasant afternoon, and all participants were back at Seaholme station in time for a 6 p.m. train.

By virtue of the great scientific interest attaching to the mangrove survival along Kororoit Creek, it is desirable that negotiations for a guarantee of adequate protection be made with trustees of the Williamstown Racing Club, which leases from the Crown that triangular flat of some 30 acres between the eastern fence of the course and the creek mouth.

J. H. WILLIS.

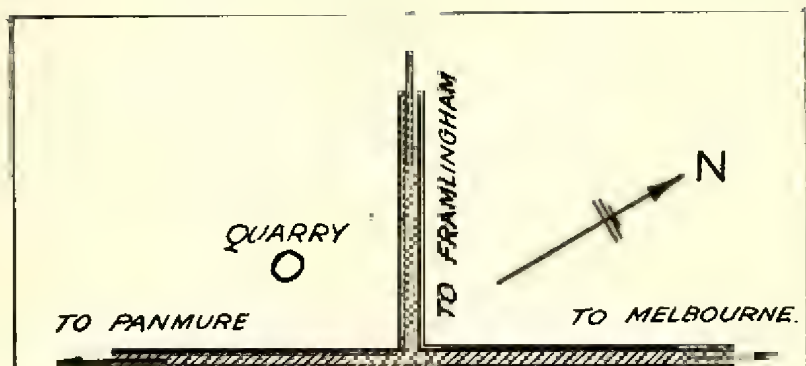


Figure 1.
Sketch plan of Locality near PANMURE
showing position of quarry from which the
basalt cave is entered.

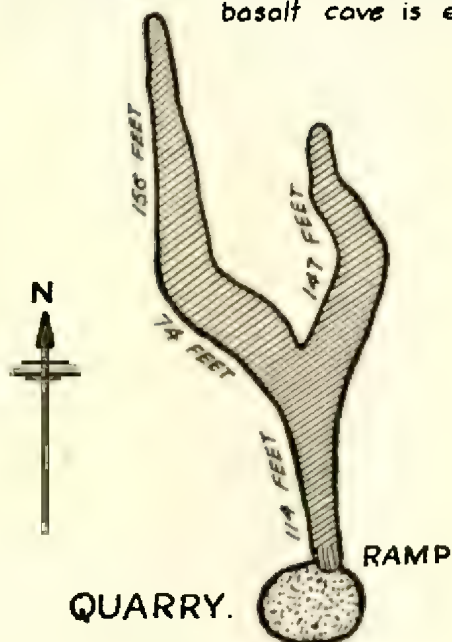


Figure 2.
Sketch plan of BASALT CAVE at Panmure.

Basalt Cave at Panmure. The illustration above is supplementary to an article by the Rev. Edmund D. Gill in this journal, Vol. 60, p. 167 (March, 1944).

RADIAL RAYS AND BIRD BEHAVIOUR

(To The Editor)

Sir.—Two letters appear in your issue of March, 1944, from Messrs. A. A. Cook and A. H. E. Mattingley, respectively.

With regard to the term "radial ray" this appears to be just as intelligible as "luminous light," "musical music," "painful pain," etc. I am unaware that any physicist has ever used such a term. Who coined it?

As a specialist in roentgenology I am, of course, well conversant with the various electromagnetic waves from the longest wireless right down to the cosmic rays of Millikan. I am also aware that a satisfactory cause for the discovery of beetles and worms by certain wasps, as beautifully illustrated by Fabre, has not yet been obtained. Moreover many zoologists regard the antennae of certain insects, etc., as sense organs, perhaps for the reception of electromagnetic waves of certain quality, and they have good reason in doing so; but, as far as I am aware, such waves although suspected have never been actually demonstrated. But even if these were actually demonstrated, it is surely not logical or reasonable to attribute numerous other operations such as the flight of birds to these without further proof. The Spanish experiment quoted is surely vague and absolutely inconclusive!

The remarks quoted about the impulse to seek for food depending on environment is not supported by proof and is absolutely unconvincing, and vague. The fact remains that the newly-hatched spider can spin a miniature web just like its parents without any previous experience. No other explanation than instinct—of this phenomenon, at present very little understood—can apply until satisfactory proof of the actual cause, based upon experiment, can be adduced and zoologists will continue to use the term "instinct" until further information is available to justify the application of a more satisfactory cause.

The brain is not peculiar in providing electronic impulses, for such are present in many other tissues, notably muscle, heart, gland, etc., and is merely a function of the activity of these. These facts are not at all relevant to the question at issue.

Re directional guidance. Although this may be suspected for insects with special organs, there is no evidence of the existence of any such guidance in birds, nor is there any indication of the presence of any such sense organ.

The dogmatic statement "what is certain is that some form of ray in the environment surrounding the bird acts upon it in directing its course and must motivate its action," is absolutely unjustified by the facts. The behaviour of the reef heron can be easily explained by simple means well known.—Yours, etc.,

H. FLECKER, Cairns, Queensland.

"Many beginners sweat needlessly after the rare. Common objects have the widest and deepest significance, and there is never any end to what you can learn about them. Instead of the rare, go after what is new to you; you get the same thrill."

"Some people think of nature only as something to collect. Alas for the butterflies, birds' eggs, ferns and orchids. A collection, of course, can be scientifically valuable, but the collecting mania is not related to science or to the enjoyment of nature; the urge to have something nobody else has breaks the first rule of honest science."—DONALD C. PEATTIE.

CLUSTERING OF WOOD-SWALLOWS

On 26th February 1944, at 8 p.m., my daughter called me to see a cluster of wood-swallows in one of our gum-trees at Blackburn. Like a swarm of great bees they clung, almost encircling the stem, where three forks meet at about 15 feet from the ground. There must have been 80 or more in the swarm judging by the number of bills or tails I managed to count.

They suggested a pill-box bristling with guns or a night-mare cluster of saw-fly larvæ. Some were head up, others head down, while the rest clung horizontally or at varying angles, so that tails and bills protruded like spines of an echidna. When motionless they resembled a dense mass of mussels clinging to the pile of a pier. For a time there was much "talking" and fidgeting as they pushed in and out of the cluster, each seeming to seek a cosy spot, although the evening was warm and sultry. When one fell out of the swarm it merely clutched the bark 2 or 3 feet below and clambered back instead of flying, while all the rest made encouraging little sounds. At about 8.30 p.m. a magpie flew into and dispersed the cluster. We did not see them re-assemble again that evening.

Next evening they clustered again in the same place at the same time, and remained all night. As there were no droppings on the ground it was obvious that faeces were retained during the period of clustering. We left for Sorrento on February 28, but my husband noticed the swarm in the same tree for another week.—EDITH COLEMAN.

BOWER-BIRDS "THEATRES"

On the edge of a path through the jungle I found a very pretty bower quite unlike any I had ever seen. It was small and very neat and the depression inside was completely covered with the lavender flowers from the kangaroo-apple bush. There were no ornaments at all outside the bower. I did not see any bird. This was not a Satin Bower-bird's bower (it was too small), but I have never seen a Regent Bower-bird's bower decked with blue or lavender. I think it must have been a Regent's bower (what else could it be?) but it alters all my records of bowers of the species.

A Regent-birds' picnic was held in an inkweed just outside our flower-house one morning. There were three fully-plumaged males at the party, and they made a very lovely sight with their rich colours of black and gold.—HILDA CURTIS, Tamborine Mountain, Queensland.

TASMANIAN TIGER REAPPEARS

Mr. Charles Spencer, of Fitzgerald, reports having seen a fine specimen of the Tasmanian tiger in the Styx River Valley about five miles from Kalista, at the terminus of the Derwent Valley line. Mr. Spencer says the tiger was beautifully marked and would measure at least 6 ft. from tip to tip. Mr. Spencer, who is an experienced bushman, was engaged cutting a track from the Styx to the Franklin range, and had a good opportunity of seeing the animal. It was not aware of his presence until he spoke, and then it only went leisurely away. Mr. Spencer also states that he saw the tracks of a female tiger with cubs at Adamsfield last March. In the days when there was a price on the head of the tiger, Mr. Spencer had considerable experience in hunting it in the Swansea district. It is now very scarce.—(*Hobart Mercury*.)

The Victorian Naturalist

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July 6, 1944

No. 727

PROCEEDINGS

The annual meeting of the Club was held on June 12, 1944, at the Royal Society's Hall, where the President (Mr. P. F. Morris) and about 100 members and friends attended.

The Hon. Secretary announced the recent death of two Club Members, Miss E. L. Keartland and Mr. A. Underwood, and a tribute was paid to their memory.

The following matters were reported on by the Hon. Secretary: Conference of scientists at the Melbourne University with an attendance of over 1,000; a meeting of combined societies in the matter of the proposed Cultural Centre; receipt of a letter from Prof. W. E. Agar thanking the Club for congratulations on his being presented with the Clarke Medal; receipt of letters from Lieut. Noel Lothian (past Assist. Secretary), now in charge of the 3rd Army Farms Coy.; and Capt. Lee Burcham, of the U.S. Marines, sending good wishes to the Club.

An excursion to Mooroolbark was reported on by Mr. R. G. Painter. Mr. H. C. E. Stewart reported that the Kālorama excursion was cancelled owing to train restrictions.

The following were elected as Ordinary Members of the Club: Mr. and Mrs. Savage, Mrs. Robertson, Miss Latham, Miss C. Clark; as Country Members: Miss Lorna Hansson, Mr. R. A. Hansen; as Associate Member: Miss E. Hill.

Mr. H. W. Davey was elected as an Honorary Member of the Club.

The Annual Report was read by the Hon. Secretary and its adoption was agreed to on the motion of Messrs. V. H. Miller and E. S. Hanks. Mr. Gates spoke on the work the Club had done over many years.

The Balance Sheet was read and explained by Mr. A. G. Hooke, who proposed its adoption. This was seconded by Mr. A. S. Chalk and carried.

ELECTION OF OFFICE-BEARERS

Mr. P. F. Morris, as retiring President, called on Mr. Ivo C. Hammet to take the presidential chair. Mr. Hammet thanked members for the honour done him.

Other officers elected were: Vice-Presidents, Messrs. H. C. E. Stewart and J. H. Willis; Hon. Editor, Mr. A. H. Chisholm; Hon. Secretary, Mr. F. S. Colliver; Hon. Assist. Secretary, Miss Nance Fletcher; Hon. Treasurer, Mr. E. E. Lord; Hon. Librarian, Mr. D. Greenwood; Hon. Assist. Librarian, Mr. A. Burke. A ballot for Committee returned the following: Messrs. A. S. Chalk, H. P. Dickins, P. Crosbie Morrison, G. N. Hyam, H. T. Reeves.

NATURE QUESTIONS

Mr. R. G. Painter asked why Honeyeaters ("Greenies") chattered and attacked a Black-faced Cuckoo-Shrike. Mr. Miller suggested it was mistaken for a Pallid Cuckoo or a Hawk. Mr. Chisholm said that small birds often attacked large birds that were strange to an area, and that Greenies were naturally aggressive.

Mr. V. H. Miller asked whether the Blackbird or the Thrush was the first to begin singing. Mr. Chisholm replied that the Thrush was usually about two months ahead of the Blackbird. Miss Wigan stated she had heard odd Thrushes in April, and that Blackbirds were now beginning to sing.

EXHIBITS

Mr. Ivo C. Hammet: Garden-grown native plants (*Diplolaena grandiflora*, *Hakea petiolaris*, *H. sulcata*, *Correa reflexa*, *Viola hederacea*).

Mr. Tom Griffiths: The Tree Cricket (*Paragryllagris combusta*).

Mr. P. Crosbie Morrison: Egg of the giant Gippsland Earthworm (*Megascolides gippslandicus*) showing the unhatched young. Specimen from Korumburra, Victoria.

Mr. J. H. Willis: "Red Stink-horn" fungus (*Ithyphallus rubicundus*), an uncommon and remarkable species, occasionally appearing on Buffalo-grass lawns.

Mr. C. French: *Correa reflexa*, var. *rubra*, from Anglesea.

Mr. R. G. Painter: Eight species of garden-grown native plants.

Mr. F. S. Colliver: Three skulls of Koalas and a skull of a domestic goat from Quail Island.

SOUTH AUSTRALIAN CORK

We have been shown (reports the *S.A. Register*) by Mr. A. Hardy, M.P., a sample of cork, nearly an inch thick, stripped from a cork tree grown by him near Mount Lofty, at an elevation of about 2300 feet above the sea level. In 1864 the then Government obtained from Spain a number of acorns of the genuine cork tree of commerce. Many of these were distributed through Dr. Schomburgk, and Mr. Hardy obtained 25 plants, of which 20 are now in a flourishing state. The tree from which the bark referred to was taken is over 12 feet high, and is 18 inches in circumference at one foot above the ground. The sample will be sent to Philadelphia, and will no doubt form a noticeable addition to the list of our products. It is evident, too, that the cork tree could be profitably cultivated here on a larger scale. (From a Sydney newspaper of January, 1876).

SIXTY-FOURTH ANNUAL REPORT

The Membership is as follows: Hon. Members, 15; Ordinary Members, 253; Country Members, 94; Associate Members, 18. Total Membership 380, being an increase of 41 on figures for the last report.

Still more of our members are on service with the Forces and we note the following: Messrs. K. E. Ash, E. V. Barton, R. S. Bellinger, J. L. Bignell, J. A. (W/O) Blackburn, T. H. (Major) Brunn, C. A. Burley, A. Carter, A. Coulson, W. R. Cover, G. J. Dungas, J. Firth, H. Fulton, M. Furze, D. C. Geddes, W. (Dr.) Geroe, D. E. Greenwood, Keith V. Hately, R. D. Kent, M. F. Leask, N. (Lient.) Lothian, R. G. Matthews, C. C. Ralph, B. M. Sloggett, N. A. Wakefield, and J. Waterhouse. Possibly there are others and the committee would be glad to have their names.

We record with sorrow the death of the following members: Mr. A. F. Fullard (1901-1943), Mr. F. Chapman (1902-1944), Miss Ethel Bage (1921-1943), Mr. George Aiston (1927-1943), Mr. A. B. P. Underwood (1935-1944), Mr. Lance Le Souef (1943-1943).

Attendances at meetings have averaged about 90 and a series of interesting lecturettes and symposiums was held during the year. The displays of exhibits have been well maintained.

Excursions this year were subject to minor alterations only, and the several close-by localities gave outings of good general interest.

Volume 60 of the *Victorian Naturalist* has been completed, and, notwithstanding paper rationing, the standard of publication has been maintained.

War conditions have again prevented matters affecting the protection of fauna and flora from receiving the attention that is their due, but we have considered many items and contacted the relevant authorities. Matters in which the Club was called to collaborate included: Investigation into the high price of scientific books; Provision of accommodation for Allied Societies in the proposed new Cultural Centre or vacated National Museum building; Control of Sherbrooke Forest; Save the Forests campaign; Proposed Memorial to the late Mr. F. Chapman at Maranoa Gardens, and the Conference of Scientists convened by the Australian Association of Scientific Workers.

A sub-committee for the Cultural Centre project arranged a meeting of interested kindred societies and further joint meetings are anticipated.

Owing to the fact that many of our kindred societies are in recess, we were not asked to assist so much at displays, but on the other hand several of our members have been prominent in lecturing to the Forces and other organizations.

The Junior Club at Hawthorn was successfully inaugurated this year and we hope this will prove the forerunner of other such clubs and feeder societies in the suburbs. To stimulate interest among the juniors a small show was staged at the Hawthorn Free Library from October 4-9, 1943, and proved very popular.

The Australian Natural History Medallion was awarded this year to our fellow-member Major H. W. Wilson, recently of the Teachers' College, and the presentation was made by the Director of Education, Mr. J. A. Seitz.

No Wild Nature Show was held this year, nor does it seem possible to stage one for the duration of the war, but we look forward to days when the Club can again bring Natural History before the general public in this popular way.

The Plant Names Sub-committee has made slow but definite progress with its revision of the Census and findings have been published in the *Naturalist* with a note asking for comments by interested people; these are in turn carefully considered and desirable alterations made to vernacular names.

The successful breeding of the Platypus at Badger Creek prompted one member to offer the sum of £25 toward a fund for Mr. David Fleay, if the Club could raise a similar amount. Mr. Fleay would not accept the money for himself, but agreed to use it in the best interests of the Healesville Sanctuary.

An Author Index for the first 60 volumes of the *Naturalist* has been commenced and the work is progressing favourably, although more slowly than at first anticipated. This will be a useful piece of work and the Committee is hoping to make arrangements for printing it in due course.

The appeal for old pamphlets, members' lists, newspaper cuttings, etc., made some time ago has yielded a few items, but the material to hand is not very representative. Members are asked to keep this matter in mind, since the Committee desires as complete a collection as possible of these interesting relics.

We have welcomed to our various meetings visiting naturalists and members of the Allied Forces stationed here, and from time to time it has been a pleasure to see some of our own country members.

To Mr. MacCrae Howitt we tender our sincere thanks for continued use of his rooms as a Committee meeting place; to Mr. Cooper for his onerous work in addressing wrappers for the *Naturalist*; to Mr. F. A. Cudmore for completing our set of *Wild Life*; and to Mr. J. A. Kershaw for a good series of early Club meeting notices. A comprehensive expression of thanks is extended to all who have given of their time and energy toward the advancement of the Club and its ideals.

FIELD NATURALISTS' CLUB OF VICTORIA

STATEMENT OF RECEIPTS AND EXPENDITURE FOR 12 MONTHS ENDED 30th APRIL, 1944.

RECEIPTS				EXPENDITURE	
Balance at Banks on 1st May, 1943—				<i>Victorian Naturalist—</i>	
E.S. & A. Bank	£23 8 10			Printing	£188 15 0
State Savings Bank	57 16 6			Illustrating	40 8 0
			£81 5 4	Index	3 18 6
Subscriptions—				Despatching	7 12 5
Arrears	£32 17 0				
Current	202 11 6			Reprints	£240 13 11
In Advance	31 2 7			Wrappers for despatching Naturalist	1 2 6
		£266 11 1		Postage and Freight	12 18 9
Cash Sales of—				General Printing and Stationery	6 3 0
<i>Victorian Naturalist</i>	£2 10 6			Library	5 14 3
Publications	4 0 8			Rent and Caretaking	12 0
Badges	3 5 0	9 16 2		Affiliation Fees	17 10 0
Interest Received—				General Expenses	10 6
"Best Fund"	£1 4 9				5 3 10
Fixed Deposits	11 3				£290 8 9
Commonwealth Loans	25 5 10			Invested in Commonwealth Loan—	
Savings Bank	1 7 2	28 9 0		"Best Fund"	£50 0 0
				General	100 0 0
Fixed Deposits Matured—					150 0 0
"Best Fund"	£50 0 0				£440 8 9
General	50 0 0			Balance at Banks on 30th April, 1944—	
		100 0 0		E.S. & A. Bank	£70 10 5
"David Fleay" Testimonial		28 0 0		State Savings Bank	3 2 5
					73 12 10
		£514 1 7			£514 1 7

July
1944

Balance Sheet

FIELD NATURALISTS' CLUB OF VICTORIA

BALANCE SHEET ON 30th APRIL, 1944.

50

LIABILITIES		ASSETS	
Late Dudley Best Fund	£50 0 0	Arrears of Subscriptions—	
Subscriptions paid in advance	31 2 7	Estimated to realize	£40 0 0
Special Trust Account	12 15 3	Advertising charges due	10 0 0
		State Savings Bank—	
	£93 17 10	General Account	£3 2 5
"David Fleay" Testimonial	28 0 0	Special Trust Account	12 15 3
Balance, being surplus of Assets over Liabilities	1,553 10 3		15 17 8
		E.S. & A. Bank—	
		General Account	70 10 5
		Investments—	
		Commonwealth Bonds:	
		Late Dudley Best Fund	£50 0 0
		General	750 0 0
			800 0 0
		Library, Furniture and Epidiascope—	
		At insurance value	680 0 0
		Stock on hand of Books and Badges—	
		At valuation:	
		Fern Book	£39 0 0
		Fungus Book	19 0 0
		Club Badges	1 0 0
			59 0 0
			£1,675 8 1
	£1,675 8 1		£1,675 8 1

Balance Sheet

Audited and found correct on 25th May, 1944.

A. S. CHALK }
 A. G. HOOKE } Hon. Auditors.

E. E. LORD, Hon. Treasurer.

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THE VALUE OF NATURE SOCIETIES
TO THE STATE

Summary of Presidential Address to the F.N.C. by P. F. Morris.

It was a momentous day for Australians when the ship *Endeavour* hove-to in Botany Bay on April 28th, 1770. Accompanying Captain Cook was a party of skilled naturalists headed by Mr. (later Sir) Joseph Banks, who had personally subscribed £10,000 towards the scientific work of the expedition. A duplicate set of the specimens collected by Banks and Solander is now housed in the Melbourne Herbarium.

As the first settlers arrived native pastures were located and a rapid development in the pastoral industry followed. Wheat breeders and plant hybridists gave to the new Australians suitable plants for their country, whilst the merino sheep breeder founded studs which produced the finest wool on the world's market to-day. The pastoral pioneers were sound practical men, thinkers in their own line of research, and to-day we must realize the value of their endeavours. These men and women may be styled our first naturalists.

It must be borne in mind, when reviewing social progress in a new country like Australia, that any comparison with the more settled European communities, living and working under different conditions of climate, geography, geology and ethnology is entirely futile. The isolated position of Australia, the sparseness of its population, the forbidding character of its forests and deserts, seemed to conspire against even the most strenuous efforts to extend to the pioneer the benefits of modern social institutions. It was just here that the early scientists were able to help, by the establishment of natural history societies and the publication of suitable literature.

Natural history societies contributed to the welfare of the community by bringing members regularly together to share observations and express opinions; excursions were held to the seaside or country for studying the fauna, flora and geology of each State. Such contact with nature soon develops a lively interest outside the ordinary routine of city living. These interests we know to be worth while; they are educative, curative and stimulating.

Education is fundamental to social progress. Nature is a great teacher when she comes in contact with a keen and receptive mind. True knowledge does not come from books, but from practice; one gives us information, the other familiarity with an object, which is permanently imprinted on the mind. Our conversaciones, exhibit nights and field excursions enable us to practice what we choose and knowledge so gained is passed on from member to member.

The successful business man is very often self-made. His knowledge and success have been gleaned along the hard road of experience. He has learned his work by applied science. The fact that man's very existence upon earth is due to vegetable matter is often disregarded by the multitude.

Students of nature are lovers of the earth, the skies, and their products, and join together to protect the natural features of their native or adopted countries. The earth is a loving mother to all plants, animals and men. She gives us the chemicals necessary to build our skeletons, our bodies and brains; the sun and air provide the rest. Our chief aim is to preserve a balance of nature, knowing well its significance to the present and future generations.

The present world condition of war places upon us all the necessity for special care of our collections. Destruction to scientific institutions abroad is constantly enhancing the value of our own collections; military occupation and despoliation of wide natural areas makes replacement of scientific material in many cases impossible. The material we have, both living and preserved, must not be neglected; it is a trust which we must bear for our fighting men and women and for the culture and life of future generations in our Commonwealth.

Natural laws guide the earth kindly, but man tears and burns. He over-crops the arable land, over-grazes the pastures, destroys the forests, and erosion takes place; the birds disappear and insect and mice plagues harass agricultural communities, which trek to the cities. The knowledge of, or ignorance of, a few facts of nature may mean the difference of millions of pounds to us. The recently introduced cabbage or white butterfly has laid waste our cruciferous crops; a fungus disease recently introduced may probably wipe out the daphne growers, while St. John's Wort is still costing Australia many thousands of pounds yearly. It is useless to expect the trained orchardist to keep his land clean when every cottage garden in his vicinity is a breeding-ground for the pests against which he is battling in fear of the law.

There is a notion that a naturalist should be a recluse, one unfit for hard work. This could apply to so-called highly educated classes, but it is not my judgment of fellow-members, who seem to be drawn from all ranks of society. Many of the leading scientific workers in Australia are self-taught.

There are at least two types of study in natural history: (1) original research or the thorough study of a branch of natural science in detail, with all necessary observations, experiments and calculations; (2) the study of scientific facts without a mastery of the methods or processes by which they have been ascertained—a form of study which may be compared to wandering on pleasant

by-paths beside the regular roadway. The latter methods generally lead to the former more important phase.

Of all the attractions of rural life, probably none is more interesting and profitable than the study of the periodic phenomena associated with plants and animals, and to persons engaged in rural pursuits they are a concern of great moment. (The germination of seeds; the blossoming of flowers; insects and their larvae; the migration, song and nesting of birds; the habits and instincts of animals: all are phenomena largely dependent on seasonal and meteorological conditions, and therefore correlated.)

During the present century, study of natural history has altered much, both in methods and in character. It no longer consists of merely collecting, preserving, classifying and naming plants, insects or animals; but embodies the development, life history and periodic phenomena of such objects and the relation they bear to each other and to the pleasures and wants of man. What a wonderful change has been produced during our lifetime by the discovery of radio, radium and the germ origin of disease. It should be clear, too, that the life history of stock diseases must be given most serious consideration, as many are transferable to man and are probably the cause of high infant mortality.

Educationists realize that impressions gained in childhood are the most vivid and lasting and that knowledge must be flavoured with something different from the daily class-room routine. Let our children acquire the habits of close observation and the added power of reflection upon the facts observed, so that what is studied becomes theirs in very truth and must out in character and deed.

"Nature study is learning those things in Nature that are best worth knowing, to the end of doing those things that make life most worth living." This statement by Professor J. Hodge expresses admirably the whole purpose of nature study and the value of natural history societies to the State. The association of workers in natural history is, in fact, no longer a matter of choice, but of necessity. Collection, classification, and publication by the various societies throughout Australia is an essential element in modern progress.

SPECIMENS WANTED

Mr. Melbourne Ward, well-known as a naturalist, who has recently opened a "Gallery of Natural History and Native Art" at Medlow Bath in the Blue Mountains of New South Wales, is anxious to secure specimens of insects, preserved lizards and snakes, shells and similar objects of interest. He is prepared to buy or exchange and will be glad to hear from collectors. The address is Gallery of Natural History, Medlow Baths, N.S.W.

The Editor acknowledges receipt of several papers that have had to be held over, together with two letters on the interesting subject of radial rays.

OBSERVATIONS ON THE BREEDING OF THE
PLATYPUS IN CAPTIVITYBy DAVID FLEAY, B.Sc., Dip.Ed.,
Director, Badger Creek Sanctuary, Healesville

Part 3

Suddenly, in a bend of the burrow dry leaves showed up—there was a shrill sustained growl of annoyance (like that of a broody hen) and "Jill's" beak and head poked out. To our delight, and horror also, there bulged out and was pushed out—as "Jill" in her rage turned her back and began to throw out nesting material and earth to block out the daylight—a blind, fat, wrinkled babe with satiny short fur forming a very thin coat.

The baby creature had a tiny stubby "milk bill," aptly likened by my assistant (Cecil Milne) to the beak of a Cape Barren goose. Here at last was actual proof that we had really bred the platypus. It seemed also that we had wrecked all our chances of complete success by unwittingly breaking in too soon! At eight and a half weeks this youngster was only nine inches long and entirely helpless, its only utterance a kiss-like sucking sound, and its only movement that instinctive lifting of a hind foot to go through the characteristic motions of scratching the fur on its flanks. On the ankles of its hind feet tiny spurs were visible.

A frantic few moments followed with the camera recording half a dozen hasty pictures. What would "Jill" do? She had already thrown out part of her nest and blocked the way by which we had disturbed her. We thought at the time that in with her was another infant, or perhaps two, but later observations proved the baby we photographed to be the only one. I scraped away her hastily-constructed "pug" and endeavoured to replace the baby. However, she persisted in her "back-shoving" and buried the baby with earth. I repeated the performance, got the baby fairly well in, and then built a "pug" of my own, so as to block it in. Then we fitted a hollow log over the spot and filled up with an overburden of earth and old bags.

It can well be imagined that our feelings were very dubious. What good all the notes so far if "Jill" did not rear this little fellow? I called back that night after dark to see if "Jill" had pushed the baby out into the loose soil in the hollow log, and it was slightly re-assuring to find that she had not done so. Evidently, however, she was in a considerable turmoil over the event, for an hour after we had replaced the youngster in the burrow at mid-day "Jill" appeared in the water in obvious agitation. And hers was not the only disturbance of mind! We had staked everything on a successful issue with the platypus

—even to almost ruinous expenditure from slender Sanctuary financial resources—in purchasing food that cost at least £1 per day, and in dry summer months 22/- to 25/-. It seemed that it was this season or never, and, in spite of all, this season it was!

Following several weeks of doubt and worry, subsequent to January 3, it was found that "Jill" had re-established her quarters and maintained her youngster in spite of the general upheaval. Considering that this small mother animal is a member of such an exceptionally nervous species, with probably no temperamental equal among the world's furred animals, no tribute to her mothercraft can be too high in view of her actions following the breaking-up of her home. Here, in the survival of her helpless youngster, is noteworthy evidence of a strong maternal instinct in the platypus—one reason, perhaps, why this ancient species has managed to survive and even thrive in modern days. Why, even a tame doe rabbit would probably have deserted her brood had the nest been interfered with as had "Jill's."

For several days after the disturbance I could hear her towards evening, through the walls of the dwelling, excavating passages and also pugging up the outlet near her entrance to the water as she prepared for the night's feeding activities. Actually, it was not for two days after the inspection of January 3 that "Jill" got back into her normal habits of feeding. The night following the excavation of her nesting tunnel she spent within the burrows, evidently keeping the youngster warm, for later inspections revealed that in thoroughly pugging up the original entrance that I had ruined she pushed out her whole nest and much soil beside. Then she dug a new entrance and exit burrow to the nesting chamber on the opposite side from the original one which we had unwittingly destroyed. For weeks, then, the youngster was entirely without "bedding" of any kind until on the next inspection I provided a new collection of leaves, which "Jill" accepted quite gratefully.

On January 3, then, it was found that the youngster, whose sex at that time could not be determined, but we now know by the disappearance of its spurs to be a female, had attained a length of nine inches and was blind and entirely helpless, with a very short growth of satiny fur, at the age of eight and a half weeks.

Such observations, and others to follow, do not agree entirely with Burrell's notes on incubation and adolescence, but, as I mentioned previously, this is not surprising, for throughout his long and careful work resulting in the classic book on the platypus, Mr. Burrell did not have the good fortune to keep a

breeding platypus where he could watch it. He had to make his estimates from laborious field-study over long years, for which valuable work naturalists the world over, and I particularly, are grateful to him.

From mid-January onward "Jill's" furry coat took on a very sorry appearance. This was partly due to the arrival of the moulting period. Each year in southern Victoria towards the end of January and beginning of February platypuses lose their old coats and rapidly grow new ones. Worn patches on tails are covered by a fresh growth of hair in a very short period, and it is no time before a platypus is clad in a new and glossy coat of superb fur.

"Jill," with her domestic cares, was terribly "moth-eaten" and ragged, but extremely cheerful, with a streaky worn patch from shoulder to hip along the left side of her body. This was evidently due to some position adopted in the burrow or to some activity on the part of the baby. About the middle of February her new coat began to cover these marks of wear and tear.

Evening after evening, when I arrived at the swimming tank before her advent in the water, her progress along burrows could be marked by careful listening. The digging and scrambling noises as "Jill" dug through earth-blocks in the burrows and pushed them back again after her, were unmistakable. The fairly frequent dog-like shakings of her body to rid herself of loose earth during these operations sounded at close quarters like distant thunder.

The second inspection of the youngster (when all doubts as to its safety were dispelled) took place on the evening of January 26. It was obvious that by now the youngster should have made considerable progress, and since mid-January the mother's appetite had increased until she was demanding almost as much as she did in late December 1943. On the evening of the second parade of the youngster, "Jill" had already journeyed into the water, where she was "splash-diving" in mock alarm and rolling and twisting between submerging for food items.

Now aged eleven and three-quarter weeks, the youngster measured eleven inches in length; its fur had grown longer on the body regions but not on the tail. Little development of the short stubby beak had occurred. Its eyes had not been long open, probably not more than four or five days, so that it could be reasonably assumed that the young creatures spend at least eleven weeks in a state of blindness. The striking thing in the absence of the mother on this occasion was the almost reptilian coldness of the baby.

PLATE I



Baby Platypus when first seen, Jan. 3, 1944. Blind, wrinkled with fat, and having a scant growth of satiny fur, she measured 9 in. in length and was aged 8½ weeks. Note the short "milk bill."



Baby Platypus on Feb. 18. Age now 15 weeks and length 13½ in. Note long glossy fur. She did not make her first exit until a fortnight later.

Photos.: David Fleay

Generally speaking, the little creature was much less fat than when first seen, its tail now being more flat and platypus-like than the roly-poly, sausage-like appendage noted on January 3. Also, though no longer blind the young animal possessed no power of locomotion and again went through the curious instinctive action of scratching at its flanks with its hind feet. When my wife nursed it, it pushed its short stubby beak down on the skin of her arm. Its only reaction to the disturbance was to growl shrilly when first touched in the burrow. In the absence of a nest, a position that was soon remedied, dry earth from the floor of the chamber had caked into hard mud over the doubtless oft-wetted bill and nostrils of the baby. This was removed.

"Jill's" feeding periods were regularly from ten to twelve hours in extent, commencing towards evening and extending through the night. The evidence of various faecal deposits in the water (the pools being cleaned daily) indicated that, as usual, she masticated and assimilated food continuously throughout the nights in order to build up the all-important milk supply.

The third inspection of the baby was made easy by the fact that I had a bag "plug" in the back of the nesting chamber, this in turn being buried under a weight of soil; for it is very obvious that in some mysterious way a platypus senses the thickness of soil between itself and the surface. "Jill" evidently became more or less reconciled to these visits, for beyond a little shrill growling, she was not unduly upset. The date of the third visit was February 8; the baby now was 13 inches long, its eyes were quite bright and alert, and its age was $13\frac{3}{4}$ weeks, or slightly more than three months. The youngster was three inches longer than "Jill" herself had been when picked up—six years ago, on February 19, 1938.

On scraping away the soil immediately adjoining the leaves of the nesting-chamber "bedding" when opening up for each of these inspections, it was extraordinary to feel the intense warmth that had emanated from the closely-curved mother and baby. This in itself, even before sighting the animals, proved a certain indication that they were at home.

The baby was now a young platypus with a fairly straight though short bill and long and very handsome fur. It was definitely a female, for the small spurs on the ankles of its hind feet had shrunk away to mere hard stubs. Remarkable to relate, the animal still did not show any sign of activity, remaining curled up in the typical platypus ball in the nest.

(To be concluded)

RECORDS OF NATIVE INSECTS ATTACKING INTRODUCED PLANTS

By C. FRENCH, Retired Government Biologist, Melbourne

It is remarkable how many of the native insects are changing over from their natural food to that offered by cultivated alien plants which they find to be as palatable, or more so. The familiar "Emperor Gum Moth," whose natural diet is eucalypt foliage, turned first to the Peruvian pepper-tree (*Schinus molle*) with a very different sap; it has since gone on to roses, apple, plum, apricot, and many kinds of street trees (*Tristania*, *Eugenia*, Birch, Plane, Elm, etc.)—a highly varied menu.

All of the following records have come under my personal observation and some have not been previously published. No doubt members of the Field Naturalists' Club could augment this list of insects and/or hosts, and I would suggest that they register their observations in this journal, as a matter of economic interest.

I have adopted a systematic arrangement (based on the work of R. J. Tillyard) and am indebted to Mr. John Clark, entomologist at the National Museum, Melbourne, for kindly checking the scientific nomenclature, which has been subject to much recent alteration.

Order ORTHOPTERA—

Locusts and Grasshoppers:
cereals, vegetables, flowers, fruit trees.

Order ISOPTERA—

Coloterms lacteus ("White Ant"):
from diet of native timber trees to wood of vines, apple, apricot, peach, also potato.

Order HEMIPTERA—

Nysius vinitor ("Rutherglen Bug"):
vegetables, cereal crops, fruit trees of all kinds.

Dindymus versicolor ("Harlequin Bug"):
fruits (pomes, drupes, berries of all kinds), greens, potato, tomato, flowers (esp. dahlia and hollyhock).

Mictis profana ("Holy or Crusader Bug"):
from eucalypts and wattles to lemon, orange.

Icerya purchasi ("Cottony Cushion or Fluted Scale"):
from wattles to cypress, pine, pittosporum, lemon, orange, rose, gorse, grasses.

Eriococcus cariaceus ("Eucalypt Scale"):
from eucalypts to pear twigs.

Order COLEOPTERA—

Bostrychopsis jesuita ("Anger Beetle"):
silky oak, tamarisk, elm, fig, orange, lemon, apricot.

Xylion collaris ("Apple-tree Beetle"):
apple.

Lagria grandis ("Bronze Apple Beetle"):
ripe fruits of apple, pear, apricot, strawberry, etc.

Lamprima rutilans ("Golden Stag Beetle"):
from decayed eucalypt wood and leaves to apple, cherry, and other fruit trees.

Diphucephala colaspidoides ("Cherry Green Beetle"):
from tea-trees and wattles to cherry, plum, peach, apple, Hawthorn, quince, rose.

Aulacophara oliveri (*Aularis*) ("Pumpkin Beetle"):
all members of the pumpkin-melon family, also vines, cherry.

plum, peach.

Halicta pagana ("Metallic Flea Beetle"):

from Sheep's Burr (*Acacia*) to root crops (carrot, beet, etc.), also parsley, strawberry.

Leptops squalius (*hopei*) ("Apple Root Borer"):

from wattles to vines, citrus trees, apple, pear, peach, plum, apricot, rose (buds).

Orthorhinus cylindrirostris ("Elephant Beetle of Orange"):

from eucalypts and wattles to orange, lemon, apricot, apple, quince, plum, vines, tamarisk, elm, pine trees.

Orthorhinus klugi ("Vine Weevil"):

from wattles to vine stems.

Belus bidentatus ("Apricot Beetle"):

from wattles to apricot, apple.

Order LEPIDOPTERA—

Ctenus (*Charagia*) *lignivora* ("Smaller Green Wood or Apple Hanging Moth"):

from tea-trees, wattles, young eucalypts, etc., to apple, pear, citrus-trees.

Xyleutes (*Zenzora*) *eucalypti* ("Wattle Goat Moth"):

from wattles to apple, peach, plum.

Moraga unipunctata ("Cherry Borer Moth"):

from *Acacia*, *Banksia*, *Cassinia* spp. etc. to brambles, fruit trees, and many kinds of street trees (oak, elm, plane, willow, etc.)

Tortrix postvittana ("Light-brown Apple Moth"):

from wattles to fruit trees, street trees (pine, cypress, oak, silky oak), vegetables, and garden flowers.

Mecyna polygonalis ("Tree-lucerne Moth"):

tree-lucerne (*Tagasaste*), cape broom, weeping willow.

Ceclisus (*Melura*) *elongatus* ("Saunders' Case Moth"):

orange, lemon, and other fruit trees (young foliage and bark).

Hyalarta hubneri ("Leaf Bag Moth" or "Hubner's Case Moth"):

from eucalypts and tea-trees to pines, oak, quince, vines (leaves and grapes), rhubarb, chrysanthemums.

Clania (*Entometa*) *ignobilis* ("Faggot Case Moth" or "Stick Moth of Orange"):

pines, cypress hedges, vines, cherry, plum, apple, quince, orange, lemon—young foliage and fruit spurs.

Thyridopteryx herrichii ("Ribbed Bag Moth"):

from eucalypts to apple, cherry, quince.

Doratifera spp. ("Cup Moths"):

from eucalypts to apple, pear, cherry, apricot.

Pinara cana ("Pinara Grub of Apple"):

from wattles to apple, pear.

Nyctemeria amica ("Ivy Moth"):

aster, cineraria, carnation, *Begonia Rex*.

Orgyia (*Teia*) *anartoides* ("Painted Apple Moth"):

from wattles and eucalypts to ferns, fruit trees, street trees, garden flowers, cabbage, cauliflower.

Phalaenoides glyceina ("Vine Moth"):

vines, virginia creeper, fuchsia, apple (leaves).

Agrotis spp. *Heliothis* spp. etc. ("Cutworms"):

cereal and vegetable crops, garden flowers, apple, strawberry.

Diacrisia canescens ("Tiger Moth"):

cereal crops and garden flowers (esp. violet, pansy, carnation, pelargonium).

- Hippotion celerio* ("Silver-striped Vine Hawk-moth"—may be an early introduction):
vines, morning glory.
- Lophodes suistraria* ("White-shouldered Looper"):
from wattles to apple, pear, apricot.
- Phrissogonus* spp. etc. ("Loopers"):
pines, cypresses, fruit trees, rose, fuchsia, pelargonium, etc.
- Antheraea eucalypti* ("Emperor Gum Moth"):
from eucalypts to pepper-trees, fruit trees (apricot, plum, apple),
and many street trees (elm, plane, birch, etc.).
- Anophaelis java-germanica* ("Caper Butterfly"):
from *Capparis* spp. to citrus trees, fuchsia, virginia creeper.
- Zizina labradus* ("Bean Butterfly"):
from native and introduced legumes to garden beans:

SAVE THE FORESTS

By R. H. CROLL

It looks as if the Age of Destruction of our most valuable asset, the forests, were really passing. The present Save the Forests Campaign is so wide and so definite in its appeal, it is so richly backed by earnest people and powerful organizations, it is broadcasting so many reasons, both logical and sentimental, for better treatment of our timbered areas, that one feels that this effort, of all the many that have been tried, cannot possibly fail.

There are some forty societies and institutions, government departments and municipal bodies, united in the campaign. Together they represent, it is calculated, over 200,000 citizens. The objects of the movement are easily stated:

To arouse public interest in forestry; to enlist public assistance in preventing and fighting bush fires; to take action to ensure that the timber, water and soil resources of the State are conserved; to build up an organization to ensure continuance of active public interest in our forests.

A club such as ours needs no reminder, or should need none, that forest products enter into practically every domain of human life, especially the life which we call civilized. From the cradle to the coffin we use timber in a multitude of ways. It may astonish some to learn that it takes ten million super feet of timber every year, in Victoria alone, to produce the matches we use here. And we carry our dead to the grave (or the crematorium) in another million super feet annually.

Apart from such utilities how could animal life exist in the world without the necessary vegetation? That point is too obvious to need dwelling upon. Our water supply, even the retention of our food-producing soils, largely depends upon our care of the forest cover.

Those are general statements—what about our special interests as naturalists? Again it is stating the obvious to point out that the green covering of the earth (all of it so readily a victim to fire), from the tiniest growth that scarcely casts a shadow to the tall tree that overtops all living things, that covering is our happy hunting ground, in itself a study and at the same time the home of the creatures in whose lives we are interested. Even the geologist's needs are met, for the dead forests of the past live for him.

This campaign deserves the full support of every Australian, for both national and personal reasons. An informative booklet entitled *Forest Facts* has been issued by the Campaign Council. This may be obtained free of cost from Mr. J. S. Owens, Town Hall, Melbourne.

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PROCEEDINGS

The monthly meeting of the Club was held on July 10, 1944, at the Royal Society's Hall, where the President (Mr. Ivo C. Hammet) and about 120 members and friends attended.

The Hon. Secretary announced the death of Miss Ewings, a Club member of some years' standing, and a tribute was paid to her memory.

The President welcomed to the meeting Lieut. A. G. Young (on leave from New Guinea), a member of the Queensland Naturalists' Club.

Excursion reports were given as follows: National Herbarium, Mr. P. F. Morris (for Mr. Jessep); Botanic Gardens, Mr. H. C. E. Stewart.

The following were elected as Ordinary Members: Mr. and Mrs. D. K. Hill, Mrs. M. Murphy, Miss Eileen McGlynn, Mr. P. Wyatt; and as Associate Member, Master R. Barron.

NATURE QUESTIONS AND NOTES

1. What are Greywackes? *Answer* (Mr. F. S. Colliver): The term is rather loosely used according to the country and the author. (a) A sedimentary rock of a particular kind altered by pressure (dynamometamorphism) has been termed a Greywacke. (b) A slightly felspathic sandstone slightly altered has been referred to as a Greywacke. (c) The term has been revived for a complex rock with grains of quartz felspar, and other minerals and rocks united by a cement usually siliceous.

2. What is Oolitic Limestone? *Answer* (Mr. Colliver): Many shallow-water limestones, of all geological ages, contain spheroidal grains built up of successive coats of calcareous material; and these may be so numerous as to make up the chief bulk of the rock. Such rocks are called Oolitic Limestones, Oolites, or Roestone.

3. What are Permian Sequences, and are there any in Australia? *Answer* (Mr. Colliver): The term Permian is applied to one of the ages of the geological Time Chart, and Permian Sequences would refer to a series of rocks somewhat different from each other but of the same age, e.g., Permian. The order in which these rocks are to each other would make up the sequence.

Such rocks do occur in Australia, as at the coalfields of N.S.W. and the Bacchus Marsh area in Victoria, but they have not been zoned to the extent similar sequences in America have.

Mr. R. G. Painter stated that he had noticed Swallows in Box Hill on July 2. (Mr. A. H. Mattingley commented that some Swallows remained in Victoria all the year round.)

Miss Wigan reported having seen two Pied Currawongs near the Alfred Hospital, Melbourne). (Remark by Mr. A. H. Chisholm: This is chiefly a bird of the mountains, but it is usually wandering at this time of the year.)

Mr. H. C. E. Stewart commented upon the early flowering of almond trees, and stated that a very dry summer, then rain and absence of frosts, explained it. He had noted some trees flowering in June.

Mr. V. H. Miller said he had observed a Black-faced Cuckoo-Shrike eating cheese and fat from his bird-tray at St. Kilda.

Mrs. Pinches reported that the Zoo's colony of Koalas had four females each with young!

Mr. Ros Garnet stated that a *Grevillea* had seeded and young plants had appeared for the first time, probably due to climatic conditions.

Mr. Hammet drew attention to the fact that a new bee had been named by Mr. Tarlton Rayment after Miss Lynette Young, who found the specimen in a post close to her home.

Mr. F. G. Elford reported having received a country paper containing an account of the capture of a Wedge-tailed Eagle in a rabbit trap baited with a rabbit. The article stated that the bird was available for exhibition. Mr. Elford said he had written to the paper concerned, and he suggested that the committee discuss the matter with a view to educating the people of the district concerned as to the economic value of Eagles.

FORESTRY AND NATIONAL WELFARE

Slides and a motion picture with a commentary given by Mr. C. M. Ewart, of the Forests Commission, afforded insight into problems of erosion, soil conservation, proper care of watersheds, etc., besides the varied aspects of forestry and the use of timber in industry. Stress was laid on protection of forests from fire, and safeguarding measures were shown. Above all it was urged that forests were an invaluable national heritage, and not something to be erased as soon as possible.

A vote of thanks to Mr. Ewart and to Mr. Thompson (lanternist) was expressed by the President and carried by acclamation.

EXHIBITS

Mr. V. H. Miller: Seven examples of native Queensland timbers, also red gum from Kenny's baths at St. Kilda (portion of a pile that had been immersed in sea-water for upwards of 70 years) and Banksia wood being used as fuel by the cook on the Western Australian Railway. Specimens were all hand-polished by Mr. Miller.

Mr. T. Griffiths: Pressed ferns, including twelve species of Maiden Hair (native and exotic), *Cyrtomium falcatum* from Japan, and *Blechnum pennatorina* from the Victorian Alps.

Mrs. M. E. Freame: Termites and wood bored by them; wood bored by Teredo; large burrows containing Crustacea, and also ant mounds.

Mr. C. French: Forked Comb Fern (*Schizaea asperula*) collected at Anglesea.

Mr. R. G. Painter: Six species of garden-grown native plants.

Mr. C. J. Gabriel: Marine shells, including *Chilomyx pallium*, Malden Is.; *C. asperimus*, Vic.; *C. leopardus*; *Pecten novae-selandiae*, Vic.; *P. novius*, Britain; *P. heppelliana*, Cape Verde Is.; *P. sicca*, W. Indies.

Mr. Hammet: Wrappings from a mummy at one time on show at the Exhibition Building.

Mr. S. R. Mitchell: Examples of aboriginal stone knives, some specimens being hafted.

Miss Wigan: Albino form of Flame Robin (*Petroica phoenicea*) collected in the Mansfield district over fifty years ago by Mr. J. O. Edwards; also Delicate Owl (*Tyto alba*) collected by Serg.-Major Toone at Cape Otway, 8/6/44.

Mr. F. G. Elford: *Ganoderma applanatum* (Giant Lacquer Fungus), a polyporoid fungus found growing on the trunks of Eucalypts and other trees, specimen from Sherbrooke Forest; Crested Grasshopper (*Alectoria superba*) from Lake Meran, Eastern Mallee, and also the Smaller King Cricket (*Anostostoma erinaceus*) from Red Hill South, Mornington Peninsula.

Master A. B. Court: (Omitted from June list)—A collection of mounted fern specimens recently gathered in the Mt. Dandenong district.

DEATH OF MRS. W. H. NICHOLLS

Members of the F.N.C. will join in sympathizing warmly with Mr. W. H. Nicholls, Victoria's chief student of Australian orchids, whose wife died suddenly on July 29. Mrs. Nicholls was a woman of competence and sunny nature, and gave her husband considerable help in his work. Several officers and members of the Club attended the funeral at the Footscray Cemetery on August 1. Native flowers were a feature of the floral tributes.

PERSONAL

Master Arthur B. Court, of Child's Road, Kaloraria, Vic., desires to make pen-friends who are interested in botany, preferably among residents in the Grampians of north-eastern Victoria.

NON-MIGRATION OF WELCOME SWALLOWS

By H. N. BECK, Hon. Secretary Gould League of Bird-lovers,
Victoria.

The seasonal movement of animals from one region to another is a matter of common interest to all students of nature, but it is the migration of birds that makes the strongest appeal, because so much is hidden from us that we can only theorize on the motives or principles guiding these movements.

Of course, one can hardly doubt that it is mainly a matter of food that drives the creatures from a region of lessening supply to one where the requisite food is increasing in quantity, or, in any rate, where it is more abundant. This would adequately account for much of the limited migration or seasonal wanderings of many birds that we might class as nomads rather than as migrants—for example, Robins (*Petroica*) and Thrushes (*Coluricincla harmonica*), which during the cold season leave the shady forest and mountains for the more open fields, and Lorickeets, which follow the blossoming of the eucalypts.

Probably, too, many of the birds that have spent the warm months in the district move away with the sun, while their place is taken by others of the same kind that have spent their summer further south. There may be much more of this sort of migration than most of us suspect. Two species I have in mind that probably do this are the Black-faced Cuckoo-Shrike and the Bronze Cuckoo. Observations of many persons remove any doubt that these birds move to the north in winter; yet every year during the coldest months they are reported to be seen around Melbourne.

A most remarkable feature of the true migratory birds is that some species in their wanderings completely by-pass regions that one would imagine could supply them with all they needed. The great problems are: How, why, and when did they acquire these habits? One can assume the habits to have been gradually evolved. If such is the case, might not the evolution be reversed—and the once-migratory bird become one of stationary habit? This thought is occasioned by the fact that of the birds credited with migration to distant lands the Welcome Swallows (*Hirundo neoxena*) are bringing themselves to the notice of observers by remaining in their summer habitat throughout the year in increasing numbers.

How wonderful it would be if we were being privileged to actually observe a step in evolution!

The thought that this might possibly be, so stirred the imagination of Bruce Fleece and other members of the Gould League of Bird-lovers of State School No. 1601, Oakleigh, that from early April, 1941, they made regular counts and kept records of the

number of Welcome Swallows found perching at night on wires stretching under a shop verandah—"like clothes-pegs on a line."

This record, in the form of monthly graphs, shows a maximum of 260 birds early in April with a sudden drop to 80 on the last day. The count rose to 150 for May 1, and next evening again dropped, this time to 50. A steep rise is shown for the second week, and the last record for May was 228 birds. For June the count fluctuated between 160 and 220, and for July between 188 and 236. August shows 236 as the highest count. This was in the middle of the month. Then there was a gradual fall to 160 on the last day. On the 6th of September 176 was the score, then the number decreased till the count was 108 on the 30th.

From this on we have a declining chart right through October, when the last week shows counts down to 30. This was a steady month and gave the lowest average record. November was also a steady low month with gradual rises to 80. From then on the birds came along in increasing numbers, 210 being reached in the last week in December.

January shows a limit of 308 on the 25th, and the maximum for the first twelve months was reached on February 4th with a count of 316. January and February were months of greatest variation. March also showed considerable fluctuation between 180 and 300. The graphs for the remainder of 1942 mark similar conditions, with somewhat higher numbers for most months.

Records for 1943 are not available; and now has come misfortune—the perching wires have been removed. The Gould Leaguers are keeping a lookout, hoping to find that the Swallows have located such another convenient roosting place. Final records were taken last May. The count was about 200.

A remarkable feature is that such a very small percentage of the birds frequenting this particular locality moved away for the winter, that one would scarcely imagine them to be a migrating species.

The notes do not give any reasons (perhaps they were not known) for the extra low counts on two or three dates in April and May but possibly, as many people pass that way, the birds may have been disturbed on these occasions. However, Bruce records: "On stormy nights they sometimes amount to 200 or over. Towards nesting-time they gradually decrease; and in springtime there are hardly any. In summer when breeding has ended they begin to increase gradually to their normal."

Adults also reported the occurrence of these Swallows—"about 400," one man reckoned; but no doubt the boys' counting was more accurate. They had set out to do a definite job.

At the foot of Mt. Arapiles in western Victoria, where the

writer spent the winter of 1942, Welcome Swallows were so plentiful that "familiarity bred contempt," or at any rate led to the following instance of careless and therefore worse than useless observation:

On August 21 the children of the Grass Flat School came with me to a nearby little freshwater lake mainly to study Little Grebes. "Swallows" were hawking over the water as we had seen them on other days throughout the winter. It was a bright day and we casually remarked that there was a good number of Swallows and that insects were fairly plentiful. The children had just left for school when a flash caught my eye as a "Swallow" skimmed the water; and to my surprise, and disgust at my lack of care, I found that more than half the birds were Fairy Martins—probably 40 or 50 were in sight. We had witnessed the return of the Martins from their northern flight. The incident "pointed a moral and adorned a tale" when next I met the children.

Regarding the graphs. The boys were very interested in the task and I have confidence that they carried it out with commendable care and that the many counts were substantially correct. It would give me pleasure to submit the graphs for inspection at any of the Club meetings.

So many observers have noted the rapidly increasing number of Swallows to be seen in winter during the past decade or so that the possibility of the movement being a stage in evolution is worthy of serious consideration; and for the guidance of future students definite data of the incidents originating the idea should be recorded in official publications, then later generations might be able to prove or disprove the suggestion.

GERALDTON WAX-FLOWER IS A *CHAMELAUCIUM*

Desfontaines' original description of this genus (*Mém. Mus. D'Hist. Nat.*, Vol. V, p. 39, 1819) plainly sets out the spelling as *CHAMELAUCIUM*. The error in writing *CHAMAELAUCIUM* appears to be have been made by Sprengel in his *Systema Vegetabilium* (No. 1622, 1825) and has been followed ever since by botanical writers. The apparent derivation of the two genera is interesting: *Chamae-laucium* derived from the Greek *Chamae* (dwarf) *lauchis* (poplar); *Chamelaucium* from *Chamelaio*, meaning a small evergreen shrub of the olive or daphne kind. Desfontaines probably had the latter in mind, as some of the Mediterranean species of *Daphne* resemble *Chamelaucium* in their ericoid foliage; no *Chamelaucium* bears the slightest resemblance to a poplar. Mr. C. A. Gardner, Government Botanist, Perth, is in complete accord with the above views.

It can be assumed that Desfontaines knew Greek sufficiently well not to make a mistake in writing *Chame*, and to keep on writing it when he meant *Chamae*. The International Rules of Nomenclature, 1930, Art. 70, state that the original spelling must be retained, unless it can be proved that either a typographical or an orthographic error has been made.

CELL-BUILDING BY A MASON WASP

By F. O. DONNELL, Newbridge, Victoria.

Most of us are usually glad to receive visitors, but it is doubly interesting when the visitor is a "lady" and is dressed in shining orange and black. Such a one—of the wasp family—arrived at the school, Poowong North, Gippsland, on April 15, 1943.

She examined walls, posts and other objects, with the idea, I hoped, of building. Later I was able to watch the whole procedure of cell-construction and note every action that she made. My first thought was to capture her and mount her beauty, but the urge to know more about her actions led me to act as an observer. In size, form, and colour, she answered the description of *Eumones latreilli*, a Queensland wasp. Gippsland seemed a long way from Queensland and the climate perhaps is not so inviting to a sun-loving insect.

A start was made on the side of an old desk, but this did not seem to be satisfactory. Another cell was begun on the north side of a verandah post and it was completed. As it was placed about five feet from the ground, I was able to watch every movement from a distance of six inches. She flew within an inch or so of my face but did not seem to resent my presence. With long legs folded close to the body, she hung poised in front of her work, her wings seen only as a thickening of the air on each side, her sensitive antenna touching all work with a touch so light that it seemed a caress.

The first cell-foundation began as a crescent and gradually grew into an oval. The walls began to rise, taking the form of a dome. I could not but admire the dexterity with which the clay pellet was manipulated. It was spread evenly, but thickly, on the top of the growing wall, and then with the underside of her head against the inside of the cell wall, and the tarsus of both fore-legs on the outside and opposite, she began to draw the clay up to an even thickness. This was done in the same manner as the potter who draws the spinning clay into shape with one hand on the inside, and one on the outside of the growing vessel. Work was carried out on a different section each visit, thus allowing all work to dry thoroughly before being added to.

The dome rose slowly until only a narrow aperture remained at its apex, and this was finished off with an outward curling lip. I thought at first that she had seriously miscalculated the size of the aperture, but she soon disproved this idea by inserting her abdomen through, until at its thickest it was a neat fit. She remained in this position for about two minutes; and later, by flashing a mirror and lighting up the inside of the cell, I could see a white sausage-shaped egg suspended from the top by a short

silken thread. Her next task was to carry three paralysed smooth-skinned caterpillars, and stuff them into the cell, laying them horizontally. After this operation the opening was closed and another cell was begun at the side of the first.

During the building process she made occasional visits to a nearby gutter, resting at the water's edge, apparently drinking. Then she would disappear for a time, returning later with a ball of clay. Enlisting the aid of the children, a line of observers was formed in the direction of her flight from the site of work. It was found that she alighted on a path of hard-packed, clayey gravel. She set to work, tearing at it with powerful mandibles, kneading the clay into a moist ball, discarding the sand grains and making a smooth mixture. So engrossed was she in her task, or so amiable was her disposition, that I was able to kneel and approach my head within about 18 inches of her. The moisture that she used to work up the clay was supplied from the mouth, and perhaps had some adhesive quality. One pellet that I saw her make up came from a patch of white gravel. It was difficult to understand why she should change her place of gathering material, especially as this was her only lapse for the whole of the time.

When the second cell was finished, an egg was suspended from the top as before, but a period of bad weather kept the builder away for two days. When she returned she seemed to have lost interest in her work and we did not see her again.

EMUS AND "INDUSTRY"

"At an emu drive in this district last Sunday over 400 emus were shot, representing about two tons of good meat which, if prepared in the correct way, cannot be distinguished from wild turkey," writes D. J. O'Leary, of Walgoolan, in the *West Australian* (Perth) for July 10, 1944.

"During a short visit to the city this week, everywhere I went people were complaining of the very inferior meat supplied to city consumers and it occurred to me that perhaps something could be done to send supplies of emu meat to the meat hungry people of Perth."

"I believe that a very lucrative industry could be established not only in the marketing of emu meat but by the sale of emu eggs and feathers. Offers have been received from Perth buyers for blown emu eggs at 10/- each, for sale as souvenirs to Allied servicemen; and the Walgoolan Emu Destruction Committee has already sold £26 worth of emu feathers to an eastern States buyer at 10/- per lb. An average size emu yields about 4 lb. weight of feathers."

"Emu oil is considered by old bushmen as an infallible remedy for rheumatism and no better dressing could be used for the preservation of harness and other leather goods."

"I want to make it perfectly clear, however, that farmers haven't time to take advantage of the opportunities outlined above. They are engaged in a fight against the emus for survival and have to neglect important jobs just to shoot down as many as possible on Sunday drives, the carcasses being left to rot . . ."

BIRD LIFE ON MOUNT BUFFALO

By H. C. E. STEWART, Melbourne

Apart from the Lyre-birds, the Buffalo Plateau is not renowned for its avifauna. One reason may be that the native birds found there, almost without exception, can be observed close to Melbourne. Still, in the words of Viscount Grey of Falloden, we feel a "sense of privilege" to observe a wild thing free of all restraint. Common birds can be an attraction when we are in holiday mood, amid magnificent scenery, and breathing the rarefied atmosphere of over 4,000 feet!

The most pleasant feature of a stay by a regular Buffalo visitor, from 8th to 19th January last, was evidence that the birds seem to be "staging a comeback" after the fires of 1939. This was particularly noticeable with the Lyre-birds. The former well-known domain from the Chalet to the Haunted Gorge is again tenanted by *Menura* after a vacancy of some years. On one occasion at dusk a family party of male, female and heir was seen and followed for some distance. At other times the female and chick were watched as they scratched for provender in the forest debris. Both fed with an air of proprietorship, disdainful of prying eyes. Lyre-birds were also to be seen and heard in other areas, and Lyre-bird Hill once again enjoys the reputation implied by the name. The Lyre-bird commensal, the Pilot-bird, too, has returned. Right in front of the Chalet, by the Guinea-pig Rock, one was momentarily seen. A little later his presence was confirmed by his distinctive call.

Some seventy species of birds have been reliably recorded on the Plateau, at varying altitudes of 4,000 to 5,600 feet. These may be broadly grouped as (a) permanent residents known to nest in the vicinity; (b) regular spring and summer visitors occasionally nesting on the mountain; and (c) birds observed as accidental or transitory. The last group contains the largest number of species. The Victorian tree-line limit, approximately 5,000 feet, determines the bird population. Therefore the law of representation among Australian birds laid down by John Gould can be properly applied only to species in the first group.

This year the commonest birds were the Robins—Flame Robins predominant near the Gorge, and Scarlet Robins at the more exposed elevations towards the Horn. Both kinds had bred freely, manifested by many nests located by members of staff and by the prevalence of young birds. The Rose and Hooded Robins included in Mr. P. R. H. St. John's list at the Chalet must be regarded as rare visitors. One male Robin, either a Flame or Scarlet, was witnessed battered to death by a Kookaburra.

Black-backed Magpies have multiplied. In Frank Williamson's phrase, their "wind-blown music came ringing down the mountain" frequently. On the wooded eminence of Lake View a pair had bred, and the fledglings had but recently vacated the empty nest seen near by. The White-backed species that had paired during a previous season had vanished.¹ More of a feature are the Grey Currawongs, often erroneously referred to as Jays. These are generally seen in small groups of at least three, with a minimum of one young bird. They possess a strong territorial sense, and jealously preserve their selected area from encroachments by other pairs. Of large size, their querulous notes when questing for insects on the trees or ground, but tuneful note on the wing and when alarmed, also their approachability, make them the subject of most bird inquiries by Chalet guests. At odd times a Pied Currawong may be sighted, but no evidence of local nesting of the species is recorded.

In the Alps, flora and fauna associations are conditioned by the snows and low temperatures of winter. Yet, consistent with the Australian scene, the Buffalo preserves with eucalypt, wattle and tea-tree an appropriate bird representation of Parrots and Honey-eaters. Among the Parrots, Crimson Rosellas, Gang Gangs, and Yellow-tailed Black Cockatoos appear regularly each summer. The dominant species, the Crimson Rosellas (*Platycercus elegans*) remain on or contiguous to the Plateau throughout the year. Common in many parts of the State, familiarity tends to make their delightful attributes pass without comment. John Gould remarks of them: "When six or eight rose together with outspread tails of beautiful pale blue, offering a decided contrast to the rich scarlet livery of the body, I never failed to pause and admire the splendour of their appearance, of which no description can give an adequate idea; the *Platycerci* must, in fact, be seen in their native wilds before their beautiful appearance can be appreciated, or the interesting nature of their habits at all understood."²

The "joy-flights" of Crimson Rosellas appeal to both eye and ear. They pass through the air in a succession of undulations close to the ground, with accompaniment of gay conversational chatter. As they feed or move in company among the trees, their deportment suggests for them the title of playboys of the avian world. Sometimes down the precipitous gullies they rest and softly whistle one to another. In the clear distances the tinkling sounds are often mistaken for Bell-miners. John Gould presumably had no opportunity to observe Rosellas in flight formation over snow-covered country. Many Buffalo visitors do. In the sunlight their brilliant plumage flashes dazzlingly by, and vies with the colourful movement of the gaily-clad skiers over the snow-draped slopes.

Of the lovely Rose-breasted Cockatoo, Captain Sturt, the explorer, writes: "It is a bird of low country entirely and limited in extent of its habitat, never being found in any great number on the banks of the Darling, or rising higher than 600 feet above the level of the sea."³ Sturt's observation is generally true, for, unlike the Crimson Rosellas, the Rose-breasted Cockatoos do not seem to visit the higher ranges in company. However, the Rose-breasted was noted on the Plateau by Mr. St. John in 1939, and this summer a solitary specimen was sighted at rest on a dead tree close to Pulpit Rock.

Gang-Gangs can be readily located by their raucous cries as they congregate in favoured meeting-places along the forest fringes of the Long Plain above the Lake, or of the Crystal Brook areas. Eastern Rosellas abound in the Buckland and Owens River valleys, but apparently avoid the heights. Very rarely, when the snow and other gums are in flower, the social Lorikeets (Purple-crowned, Little and Musk) come to banquet on nectar and strew the ground white after orgy with the blossoms. Other occasional parrot records are White Cockatoos and the Superb Riverina Parrot (*Polytelis swainsoni*).⁴

Honeyeaters vary with the season of flowers, fruits, and insects. Wattle-birds and Noisy Miners are among the larger species that are re-established to a limited degree. Spinébills and White-plumed Honeyeaters have always been common, and with the not-so-common White-eared, Lewin, White-naped and Crescent Honeyeaters, are fairly constant denizens. All breed on the mountain. In a bush of *Acacia phlebophylla* on Reed's Lookout, a Yellow-faced Honey-eater's nest showed by constant observation that the female was solely responsible for brooding and feeding the three callow young. The pensile nest was composed of soft grasses woven with green moss, the latter of a species that must have been carried by the bird from a considerable distance down the mountain. In fact, the vivid colour of this moss, which does not occur on the Plateau high-level, attracted the botanist's eye in the search for seeds of the acacia, and led to discovery of the nest.

Those distinctively Australian small birds of the tree-tops, the Pardalotes, are permanent residents, and their monotonous double call-notes are a characteristic Buffalo sound on warm still days. Until recently no indication was given in records of the particular species in residence. The Chalet list includes the Spotted, Yellow-tailed, and Striated varieties. The hard granitic formation is generally unsuitable for nidification of the Spotted Pardalote, who must needs fly to the lower silurian levels to burrow the nesting

tunnel. A record of the Spotted species nesting on the Plateau, however, was made early in December last by Mr. E. Swarbrick, a Club member, who watched a pair utilizing a burrow in excavated side of the Lake road. The Yellow-tailed Pardalote is more readily seen because of the habit of intermittently descending to the lower branches of trees after insects. Observations by the staff show that this and the Striated Pardalote nest in the hollows of trees close by. The discovery of a dead bird on the tennis court by Miss N. Taylor of the Chalet office, on January 12th, establishes the Red-tipped Pardalote as an addition to the list.

Rather sparsely represented on the Plateau, but particularly welcome for their calls, are the Harmonious and Mountain Thrushes, with the White-throated and Brown Tree-creepers. Is there any other Australian bird that surpasses the Harmonious Thrush in the exquisite timbre of its voice? If the musical bird-lover is fortunate to hear *two* birds of this species phrasing simultaneously in proximity to each other, he would detect that not only the principles of harmony but also of counterpoint are being demonstrated.

Among the small fry inhabiting the *Leptospernum* and other undergrowth, mention may be made of the Thornbills, chiefly the Yellow-tailed, Striated, Little and Brown species, all purely insectivorous. The Grey Fantail can be relied upon to give animation to the thickets that skirt the running streams, shared at infrequent intervals with the Rufous Fantail. White-browed Scrub-wrens make rather erratic appearances, and Silvereyes visit the Gorge environs; but both suddenly flit away without rhyme or reason. In the summer of 1942 an interesting first observation was of Satin Flycatchers. These engaging little creatures returned this season and showed a preference for eucalypts on the edges of Lake Catani.

In a primitive, rugged setting of granite mountains, birds of prey naturally come into the line of vision. The many kinds of lizards, large insects, and small defenceless feathered folk attract even the largest of Raptores. The most majestic of all this ilk, the Wedgetail Eagle, is invariably at home. A report of a pair that roosted near Dingo Dell caused a visit to the spot. Sure enough, the Eagles soared overhead; also a Swamp-harrier was disturbed, recognized through field-glasses by its manner of flying low over the boggy ground. Other diurnals to be seen are Brown Hawks, Nankeen Kestrels and Peregrine Falcons. The only definite nocturnal, located by its calls, is the Boobook Owl.

The more or less level and open tundra expanses on the Buffalo Plateau are thickly clothed with low-growing xerophilous alpine

plants, grasses and sedges, with sphagnum bogs intersected with tortuous watercourses, in winter heavily mantled with snow and ice. In the summer, despite the wealth of insect and reptilian fauna, the seeds and fruit of the luxuriant flora, no distinct types of bird, migrant or stay-at-home, have evolved in association. Consequently the arrival this year, for the first time in twenty-five years, of a pair of Spur-winged Plovers was an event. The pair made their abode adjacent to the ranger's cottage, and their strident alarm notes fill a gap in the strange stillness of the tundra expanses.

Disappointing, too, are the aquatic birds. The fine stretches of water in the artificial Lake Catani and the Reservoir, with the many natural pools along the streams, carry practically no endemic water-bird population. The almost sole exception is the Black Duck, which undoubtedly breeds locally, but judged by the continual diminution of numbers, absconds freely. A Little Cormorant may be sighted, sometimes a lone Coot, and two years ago a White-necked Heron waded along the margin of the Lake. Mr. Fred Chalwell, a trustworthy informant, cites the unusual spectacle of a Little Grebe, (Dabchick) on the water. How this bird, with its limited powers of flight, overcame the difficulties of altitude and distance is an unsolved mystery. Upon the construction of the Lake over 30 years ago, Black Swans were liberated. One eked out a solitary existence for a season or two, and then the *rara avis in terris* became a legend.

The complete absence of foreign birds is noteworthy. The Plateau is now one of the few localities the overseas visitor can be assured every bird he sees is a dinkum Australian.

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2. *Handbook to the Birds of Australia*, Vol. II, p. 45.
3. *Handbook to the Birds of Australia*, Vol. II, p. 9.
4. *Vic. Nat.*, Vol. XX, No. 11, March, 1904, p. 150.

FEDERAL PROTECTION OF NATURE

Mr. E. Le G. Troughton's recent presidential address to the Linnæan Society of New South Wales covers fifteen pages in the May issue of that Society's *Proceedings* and commends itself to the attention of all who have the fate of our Australian fauna and flora at heart. In an effective way, the case is summarised for Federal control of wild life conservation and the immediate institution of Commonwealth-wide biological surveys. Staggering statistics are quoted of marsupial slaughter in the several States and it is patent how the lack of uniform State laws encourages the illicit trapper. Government ignorance, apathy, and muddling, while rare plants and animals vanish for ever from Australia, are shown in stark contrast to the wise conservation measures adopted in the United States.

OBSERVATIONS ON THE BREEDING OF THE
PLATYPUS IN CAPTIVITYBy DAVID FLEAY, B.Sc., Dip.Ed.,
Director, Badger Creek Sanctuary, Healesville.

Part 4

Friday, February 18, was the date of a fourth visit to the baby *Ornithorhynchus*. "Jill" was now showing definite evidence of her new coat. The bare patch on her tail had grown over and her general appearance was much more neat and tidy. The youngster now measured $13\frac{1}{2}$ inches at 15 weeks of age. Its fur was long and glossy and its beak better developed; and now its powers of movement were much more pronounced. "Jill" seemed fonder than ever of her almost adolescent child and refused to move out of the nesting chamber at all. Her mammary glands were obviously still functioning quite well, for she still stayed out all night consuming quantities of food as huge as the tested meal of December 13. Once again the baby's nostrils and upper beak were caked with hard mud. Attempts to express milk from "Jill's" mammary area were unavailing, as, quite rightly, she objected most strenuously, and it would have done harm to have held her by force.

The fifth appearance of the young *Ornithorhynchus* was a notable one and took place on February 22, when it was aged just over 16 weeks. On this distinctive occasion, Herald-Cine-sound News-Reel photographers came by arrangement and filmed the baby (not in the water, of course) and both its parents. "Jill" rose to the occasion in a most spectacular fashion. The youngster was noticeably active on this date, and when placed temporarily in a large tin filled with dry grass, it tried repeatedly to crawl out over the top. When replaced in the nest it crawled out of sight into the burrow, but a further peep that night revealed that the comfort-loving little creature had returned to curl up on its bed of dry leaves, while poor "Jill" was out as usual hunting for its nourishment in the water.

On this occasion (February 22) when I was feeling for the baby in the nesting chamber, it had grown to such a bulk that I almost confused it with its mother. "Jill," by the way, gave in this instance a remarkable display of mock ferocity. Each time my questing fingers entered the burrow she seized them in her rubbery beak and endeavoured to remove them from the nesting chamber. Indeed, she "ran" me out of the burrow to the accompaniment of shrill growling!

There was now little doubt that the young platypus could, if it wished, enter the water and eat adult food. Its weight was

just $\frac{1}{2}$ oz. off 1 lb., and its length $13\frac{1}{2}$ inches. For the past fortnight "Jill" had made no attempts to pug or block off the burrows.

There is apparently a definite relationship between the amount of food that it is possible for the mother animal to procure and the particular time at which the young ones depart to make their own way in the world. Over the past six years I have noticed that a number of very undersized and miserable baby platypuses ("Jill" among them) have been discovered in all sorts of odd places in the Healesville district during the weeks of late January and mid-February. Some have been in a dying condition when caught. Two that we found in Lake Yumbunga, Chum Creek, Healesville, were so weak that they were picked out of the water by hand.

Evidently then, unless something happens to the mother, or for reasons of a diminishing food supply, when the young platypuses are forced to move out prematurely, they stay in the nursery for a long period (in this case 17 weeks), and when finally taking to the water at 13-14 inches in length they are thoroughly well grown and able to care for themselves. In the case of "Jill's" baby the mother herself lacked for very little in the way of food, and she had no distance to go and gather it, so that the young one, itself the sole member of a family which in the wild state usually numbers two, enjoyed conditions of the very best kind.

It left the tunnels for its first observed outing in the water at 5.15 p.m. (E.S.T.) on February 26, unattended by the mother, and immediately commenced feeding sparingly upon small yabbies, beetle larvæ, and other items of adult food. Its length was still $13\frac{1}{2}$ inches, its weight 1 lb., and its age, corresponding to the length of time it had spent in the nest, was 17 weeks.

In fact, the date of its debut was just a day over four complete months since the notable October 25 when "Jill" retired to lay and commence her period of incubation. There is little doubt that for at least 16 weeks the young animal remained immobile in the nesting chamber, feeding from its mother during her presence at home, but otherwise curling up and spending its entire time asleep in the nesting chamber.

The excursions of the little animal into the water, beginning in the late afternoon of February 26, by no means ushered in a new phase of independence, though doubtless many young platypuses—particularly those found wandering some distance from water—lose contact with their mothers at this stage, especially when the nesting-burrow entrance is many feet from

the water's edge up a steeply sloping bank. I recall that all the well-grown young platypuses I have captured in Healesville streams during the month of March have been on the thin side, with strap-like tails, which seems to indicate that the good condition of normal nest-leaving young is an important prerequisite towards the difficult early stages of enforced independence.

The young animal's activities over succeeding days to date of having these notes typed may be summarized as follows:—

Date	Time Spent in Water.	Activities of young animal and mother.
Feb. 26, 1944	First outing 5.15 p.m. In before 8.45 p.m.	On each date the mother animal appeared in the vicinity of 7 p.m., eating all night through as she had done previously. During daylight, she and the baby were curled up together as usual in the nesting chamber. As usual, "Jill" seized my fingers when I opened the bag plug in nest and endeavoured to "run" me out. This maternal solicitude, her continued enormous appetite and the fact that the youngster ate only a small amount during its two or three hours abroad at night indicated that she was still nourishing it on milk. The weaning period had evidently begun.
Feb. 27	Out 7.15 p.m. In before 10 p.m.	
Feb. 28	Out 7.15 p.m. In before 9 p.m.	
Feb. 29	Out approx. 7.30 p.m. In 10.15 p.m.	
Mar. 1	Brought out for first public swim, 3.30 p.m. Not seen in evening.	

In the water at night "Jill" played with her baby, swimming about it and nuzzling it with her bill, and once or twice she playfully pulled it off landing-stages. There was no evidence that she masticated food for it or foraged for it in any way. Both animals frequently splash-dived—"Jill" in mock alarm but the youngster quite frightened on occasions. It was clear that the fat, healthy little creature became both fatigued and very cold after a three-hour swim in the evenings of those early days.

Sure signs were a humping of her back and repeated attempts to scratch her flanks and back with the claws of her back feet. These symptoms foretold an early departure into the burrow; "Jill" was rather an unsympathetic mother on various occasions, she levered her tired offspring back into the water once or twice before it was able to retire—and then pushed her head after it into the tunnel as much as to say, "What! So soon?" It will be interesting to find out how long her maternal solicitude continues.

Apropos of this, it happened that on March 6, 1937, I dug out a platypus burrow in the banks of the Barwon River, south of Winchelsea, Victoria, and found in a nest a fine female with a young male duckbill practically the same size as herself. What he was doing in the nursery at that advanced stage has often puzzled me. It seems, however, that he was still tied to his mother's "apron strings."

Now that "Jill's" baby has ventured into the world, she becomes a personality. She is to be known as Corrie, an abbreviation of "Coranderrk," aboriginal term for the Creek of the Christmas Rush (*Prostanthera*), which is actually the name of both the Sanctuary and adjoining forest lands through which runs sylvan Badger Creek.

Sad to say, "Corrie's" advertised debut before the public on the Sunday afternoon following her baptism proved a total fiasco. "Jill" took the stage in her usual self-contained fashion. "Corrie" however, became coy for the first time and scuttled deep down into "hasement" burrows below the nursery. Instead of a 3.30 p.m. "Grand Show," "Corrie" was not unearthed until 5.30 p.m. after a Sunday afternoon's heavy shovel work. Most of our visitors had then gone home—but still we kept our word and showed "Corrie," "Jack" and "Jill" to the handful of remaining enthusiasts.

At this time, a fortnight after her first aquatic excursion, "Corrie" had become rather furtive and wild and now stayed out practically the whole night long with "Jill," in the water. However, the fairly frequent early handling and "Jill's" example of fearless feeding at afternoon show periods (at which both baby and mother were now made to appear) soon bore excellent results.

"Corrie" continued to sleep in the same nest with her mother and possibly was still suckled to a small extent until approximately March 25, following which date mother and baby "camped" during daylight in separate burrows. "Corrie's" appetite was now the gluttonous one of an adult. Her length at this independent age of practically five months—that is, a month following her first visit to the water—was $14\frac{1}{2}$ inches, and so excellent was her condition that at first glance mother and youngster in the water appeared almost as twins. "Corrie's" beak, however, was definitely smaller than "Jill's."

Feeding vigorously whenever the occasion presents itself, rolling on her back and playfully scratching herself, clinging with all four feet to any hand that approaches her, or playing "chase" by holding on to her mother's tail with her beak, "Corrie" at the end of March, 1944, had become the most frolicsome, fat and engaging little duckbill one could imagine. I am afraid that "Jill's" star that has been in the ascendent for so long will be eclipsed, for it

addition to her personality "Corrie" should grow to be a much bigger animal.

"Jill" is already adopting stern measures for the suppression of precocious daughters and in the rivalry for possession of food items she clammers firmly upon "Corrie's" back seeing to it that her offspring's head is pushed well below the water!

SUMMARY OF FACTS NOTED DURING THE BREEDING OF THE PLATYPUS

- (1) The mother gathers all her nesting material soaking wet from the water and carries it in the prehensile grip of her tail.
 - (2) Her incubation period when she remains in her nest is probably as short as one week and no more than ten days.
 - (3) The maternal instinct is very well developed.
 - (4) The mother's appetite in the early life of naked rapidly growing young up to roughly six weeks of age develops enormously. Jill (2 lbs. weight) ate on December 13 1½ lbs. food in one night.
 - (5) The youngster is totally blind till approximately eleven weeks of age. It is inactive in the nest for a further six weeks.
 - (6) It ventured out for its first swim at the age of 17 weeks, or four months.
 - (7) Early aquatic excursions coinciding with the onset of the weaning phase were of very brief duration, and little food was eaten.
 - (8) The young animal developed the typical gluttonous appetite of an adult within three weeks of first nest-leaving, though maternal solicitude continued for nearly a month after the first water excursion. Weaning period is evidently some three weeks in extent.
- From March 25, 1944, onwards with the youngster's age almost five months, the two animals no longer inhabited the same daytime nest. Length at totally independent stage on this date 14½ inches.

(Concluded.)

CLUSTERING OF WOOD-SWALLOWS

This is just a sort of answer to a question that was asked some weeks ago at the F.N. meeting regarding the swarming of the Dusky Wood-Swallow (*Artamus sordidus*). As a matter of fact it is the usual habit of these birds to mass together at night instead of perching as most birds do. They will cling to a tree trunk, in a crevice or any suitable place where they can cluster. I kept and bred these birds years ago in my aviaries at Clifton Hill and I know that they always clustered at night, sometimes clinging to a rafter of the aviary. During the breeding season the bird that was not sitting on the eggs usually clung to the side of the nest or nearby. The White-browed Wood-Swallows are not so gregarious but they cling to the branch of a tree or on the trunk in preference to perching. Wood-Swallows are interesting birds to keep as they are most friendly, but they need a large flight aviary, as I believe most birds do.

HELEN BOWIE.

STARLING AND CENTIPEDE

A peculiar occurrence is mentioned by a contemporary:

A starling flew into the garden with something on its leg, and when we caught the bird we found it to be a centipede about 4 in. long. It had crawled up the bird's leg and had it nearly eaten off. We took the centipede off and let the bird go, and hope it will live.

RADIAL RAYS AND "INSTINCT"

(To the Editor)

Sir,—The original discussion on the subject of radial rays and instinct arose through a habit attributed to the Reef Heron in which I maintained that its behaviour in timing the change of the tide was due to the influence of some form of ray directing it, such as those which radiate or are emitted as distinct from other forms of ray. Also, that "instinct" could not be applied since it was an indefinite and redundant word. Dr. Flecker has been unable to controvert either of my postulates. He assumed that the sight of the bird enabled it to proceed to sea at the precise moment, forgetting that, in many instances, the curvature of the earth prevented this. He further casts doubts on rays affecting the action of birds.

When both my original points had been shown by me to be fundamentally correct, supported as they were by facts of experiments in Spain, he says that these facts are "vague and absolutely inconclusive," thus making a dogmatic, unsupported statement.

For the orderly arrangement of Nature's manifestations nomenclatural refinement cannot remain static, and the type of ray must be defined when dealing with it since there are numerous rays associated with magneto-electric influences in the environment. All persons have the right to express themselves. For instance, the word "Radar" was employed to distinguish this ray from others such as for instance the rebounding ray used in navigation. Confronted with established facts cited by me, Dr. Flecker has the temerity to state that the Spanish experiments are "vague and absolutely inconclusive." By so doing he denies facts unjustifiably since many tests were made by the Spanish authorities and afterwards more exacting ones by Germans, all of which established the effect of radiating rays on the orientation of carrier pigeons. Thus it has been conclusively established that the rays of the environment do affect birds. That which has been proven cannot be stigmatised as a "dogmatic statement," but is acceptable evidence.

Regarding the use of the word "instinct," no proper reply has been made wherein I itemized two well-known factors operating in conjunction, namely, that of the organic structure of animals and the stimuli of the environment, both known factors of the evolutionary processes subscribed to by most scientists. To try to offset a bad position, Dr. Flecker has used some inappropriate similes. For instance, he stated that the use of the term "radial rays" appears to be just as intelligible as "musical music" and "painful pain." The average citizen knows that there is harmonious music and discordant music and excruciating pain and feeble nerve disturbance. However, the similes are not relevant to the issue.

Let me quote what Professor C. J. Patten says: "I cannot subscribe to the idea that the desired goal reached by the migrating bird, and the homecoming of the trained pigeon, are due to no other than 'unconscious inerring instinct.' The speed of flight, the keenness of visual observation, and the endowment of a retentive memory form the chief but not the whole equipment through which birds have acquired 'place memory'." I might add that the other missing factor directing the flight of migrating birds is that of radial rays.

Professor Planck formulated the theory that the energy (vibrations or radiations) given off by any living matter, whether it be a live cell or living animal, once started, never ceases to vibrate, even after death of the cell or animal. This is in conformity with the ceaseless and perpetual motion of rays of the environment as postulated by me.

Yours, etc.,

Melbourne,

ARTHUR H. E. MATTINGLEY.

RADIAL RAYS AND BIRD BEHAVIOUR

(To the Editor)

Sir,—I note Dr. Flecker's remarks re "Radial Rays and Bird Behaviour." Grammatically I agree with his criticism of "radial rays," but 99 out of 100 people will understand what is meant by the term—i.e., rays expanding in all directions from a centre, as against beam or directional rays. "Musical music" may be tautology, but the man in the street would understand its meaning, unless he be like the individual who recognizes but one air by name and that only for the reason that people stand with bare heads when it is played.

However, with due respect, this all is beside the mark. The fact remains that sufficient evidence is coming forward to enable us to believe that the actions of birds, animals, etc., are actuated to a very great extent by radial waves. The Spanish experiment with pigeons, backed up as it was by experiments in Germany, was neither "vague," nor "absolutely inconclusive." These tested experiments are very much the reverse. The radio-location and other instruments being used in the present war—which we will hear about in more detail after the struggle is over—will be practical evidence of how radial waves can be used in this direction. This evidence will assist us to understand—backed up as it is by many natural examples—what is behind the behaviour of our feathered friends which we label "instinct."

Yours, etc.;

Walkerston,
Mackay, Queensland.

A. A. COOK.

A GALAH THAT ESCAPED

Reports of Galahs and other Cockatoos encountering electric wires are not uncommon. What is probably more unusual, is for an observer to see all stages of the encounter from start to finish, and also to see a bird survive the ordeal of electrification. This was my experience on a recent Saturday afternoon at Brighton.

This particular Galah was seen to fly overhead and alight, about two feet from a pole, on one of two high-tension wires. These wires were supported by a cross-bar at the top of the pole. With a few steps along the wire, the bird was soon testing the top of the pole with its beak, and then commenced to explore the cross-bar. Finally, it reached one end of the bar and, in turning, appeared to lose balance. Stretching out its neck, it grasped the nearest wire in its beak and immediately became fixed. It was to remain in that position for the next twenty minutes.

The instant the bird grasped the wire its wings commenced to droop and the tail feathers slowly spread out. A very slight, regular vibration of the extended wings and tail was noticeable during the period of capture. At one stage the bird emitted a number of deep guttural cries, which gradually died away within a few minutes.

Within a few minutes of the Galah's capture a neighbour had telephoned the Electricity Commission, and about a quarter of an hour later linemen appeared on the scene. Just as their car was pulling into the kerb, the bird fell to the ground.

The bird was soon on its feet and, after staggering around for a few minutes, quickly regained its sense of balance—not to mention its ability to draw blood from the hand of one of the linemen. A slightly burnt toe seemed to be the only damage it suffered from its experience with a wire carrying 4,000 volts of electricity. Apparently its escape from incineration was due to the fact that it had received only a few volts of the current, and, the pole, being dry, made a poor conductor with the earth.

F. G. ELFORD.

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PROCEEDINGS

The monthly meeting of the Club was held on August 14, 1944, at the Royal Society's Hall, where the President (Mr. Ivo C. Hammet) and about 100 members and friends attended.

The President announced the death of Mrs. W. H. Nicholls, and Mr. P. R. St. John, two very good friends of the Club, Mr. St. John being a past President although not a member at the time of his death. A tribute to the memory of these friends was paid by those present.

Excursion reports were given as follows: National Museum, Mr. Ivo C. Hammet (for Mr. Mack); Melbourne Streets, Mr. F. S. Colliver (for Mr. A. C. Frostick).

The following were elected as Ordinary Members: VX82270 Gr. J. K. Slatter, Mr. E. J. Cope, Mr. Keith Winsor; as Country Member: Mr. Geoff. Huston; as Associate Member: Master B. Grant.

NATURE NOTES

Mr. V. H. Miller reported on a Blackbird feeding young at the beginning of August; locality, Brighton district.

Mr. A. A. Brunton reported seeing a Platypus in the Maribyrnong River, near Keilor.

Mr. H. T. Reeves remarked that Platypuses were often seen near the Footscray Gardens, and Mr. F. S. Colliver stated he had a record of one being seen near Princes Bridge just prior to the war.

SHARKS, FISH AND CRUSTACEANS

An illustrated lecture was given by Mr. P. F. Morris, who mentioned a simple classification of the fish, differences between these and sharks, and also some interesting items on both marine and fresh-water crustacea. Mention was made also of life histories and the lack of knowledge of some of the Victorian forms, problems due to introduction of foreign sporting fish, problems due to erosion and its effect on the fish fauna of our streams, the necessity of proper fisheries research, etc. Altogether a very interesting lecture was given by Mr. Morris, and much information was afforded those present.

SOME LIZARDS I HAVE KEPT

By II. W. DAVEY, Melbourne

If lizards, or indeed any of our Australian reptiles and amphibia, are given suitable living conditions, they can afford great pleasure to a naturalist. In this paper a selection is made from the numerous lizards I have kept in captivity, and is dealt with under five family headings.

I. GECKONIDÆ

The geckos are well represented in Australia, and diligent search would probably increase the present number of species recorded for Victoria. Several years ago the writer discovered a pretty little gecko (*Heteronota hynoei*) at Mildura and supplied the Melbourne Museum with specimens, but only recently has it again been taken in our State. This gecko apparently does not leave the ground, but prefers to shelter under logs, etc. Other genera (e.g. *Gymnodactylus*, which I have taken only from beneath broken slabs of granite) favour stony country, while others again, such as *Phyllodactylus*, are mostly found under the loose bark of trees, usually high up from the ground.

Geckos are hardy little fellows and succeed in captivity; the writer still possesses, alive and well, a specimen of *Gymnodactylus milii* that has lived in a small glass-sided case (2 ft. x 10 ins. x 8 ins.) for over seven years, in company with two other geckos—*G. milii* for five and a *Phyllodactylus marmoratus* for over four years. These lizards are extremely fond of spiders, which are not always plentiful, but they do equally well on the mealworm larvae of *Tenebrio molitor*, a beetle which may be bred easily and in great quantity.

The most remarkable thing about *Gymnodactylus milii* is the number of times it sheds its skin—never less than four per year, but some years as many as six times. After the skin is shed this species displays a pretty pattern, but just prior to moulting all geckos become quite grey in colour, due to a separation of the old from the new skin beneath.

I have reared *Phyllodactylus marmoratus* from eggs laid in captivity (hard-shelled, unlike most other lizard eggs), and it is interesting to note the length of time it takes for the eggs to hatch, viz., 207 days. Each year the female of *P. marmoratus* lays only two eggs, which can easily be seen inside her body as she crawls up the glass of her cage.

In the Mallee, I have also collected a specimen of *Diplodactylus spinigerus*, of which another was later given me by Mr. Erasmus Wilson. While in the Wimmera district it was my good fortune to obtain *D. vittatus* and *D. strophurus*.

PLATE II



A Northern Gecko.



Bearded Dragon (*Amphibolurus barbatus*).

Geckos lose their tails very readily, but it takes them a long time to grow new ones. Most writers on this subject advance the theory that the involuntary movements in the dropped tail so attract a potential enemy's notice that the tail-less owner is enabled to make good his escape; this, in the writer's opinion, does not appear to be a satisfactory conclusion, for he can see no reason why the predator that broke off the tail should lose sight of its late owner -- by far the larger object. Then again, a gecko without a tail would have little chance of escape next time, in having no means whereby to intrigue its enemy. Many lizards of the *Scincidae* part with their tails like geckos, yet other genera in the same family do not; thus, if losing the tail can save the life of one species, why should not similar species in the same family be likewise favoured? The little snake-like lizards (in the family *Pygopodidae*) are "nearly all tail" and are very helpless creatures indeed if they lose it, which can occur readily enough.

2. AGAMIDÆ

This is a large family, many of which thrive in captivity. Most of the *Agamidae* are very active and their enclosure must be covered with wire-netting to prevent escapes. The Bearded Lizards *Amphibolurus barbatus* and *A. muricatus*, commonly but foolishly named "Blood-suckers," are well known but require reasonable space in captivity. A smaller species is the pretty *A. pictus*, which is highly coloured, is fairly common in "blue-bush" country around Mildura, and makes a delightful pet. A small agamid (*Tympanocryptis lineata*) that was once so plentiful on the plains toward the You Yangs, never did well with me -- probably due to the lack of a balanced spider and caterpillar diet, also to the fact that these lizards naturally inhabit holes in the ground, and it is difficult to imitate the right soil condition so as to prevent their burrows from collapsing.

The so-called "Gippsland Crocodile" (*Physignathus lesueurii*) is quite at home near a small pond in which it can disappear when alarmed. It appears to sulk awhile after capture, but at the end of eight or nine days will eat insects, as well as small pieces of raw meat. I am not likely to forget my first encounter with this lizard at Dargo River, where it is very numerous; as soon as I realized their presence I was anxious to procure a specimen, but the problem was how to capture one alive.

Physignathus does not travel far from water, usually keeping the tip of its tail therein and plunging at the slightest sign of impending danger. The banks of the river near Dargo township are so high and steep that it would be quite useless attempting to get near these lizards from the water's edge, but by means of a

long stick and a much longer piece of string I was able to snare one; and very shortly afterwards secured another fine specimen. To hold the first reptile and take the second out of the string noose, without one or other escaping, was a problem, since these lizards can scratch like any cat; my wrists told a sorry story when I eventually got back to the Dargo Hotel, a wriggling, scratching lizard in each hand. I subsequently gave one of them to the late Sir Baldwin Spencer.

The prickly "Mountain Devil" (*Moloch horridus*) from the Inland is far from being horrid, either in appearance or behaviour, and is rather prettily coloured. I have kept at different times several of these quaint little creatures. The first specimens I ever received were kindly presented by Mr. John Clark (Entomologist at the National Museum, Melbourne); Mr. Clark was then living in Perth, W.A. With the arrival of these ant-eating lizards, I was perplexed to discover the insect species upon which they would feed; many different ants were collected in the "bush" and tried out, notably *Iridomyrmex detectus*, *I. nitidus*, *Ectatomma metallicum*, *Monomorium*, *Camponotus*, and *Pheidole*-species. *Moloch* simply ignored them all. At last I proffered the small evil-smelling ant *Iridomyrmex rufoniger* var. *domesticus* and then the lizards' troubles—and mine—were over.

The average number of ants eaten per lizard per minute is 45, providing the day be warm and ants plentiful, so that for two meals a day of about 15 minutes' duration each *Moloch* will consume approximately 1,350 ants daily! These animals are of absorbing interest and, for a more detailed account than is possible here, I would refer readers to my special article in this journal (Vol. 40, page 58) wherein are discussed their drinking and sleeping habits, the hygroscopic nature of their skins, etc.

Some years ago Mr. Norman McCance sent me a very fine example of the North Australian "Frill-neck" (*Chlamydosaurus kingii*) which, like the "Gippsland Crocodile," refused food for several days after arrival. To entice a sulky lizard, it is best to keep the food moving, so I used a sliver of beef on the end of a stick and, by moving this in front of my "Frill-neck," it began to take notice and later snapped the meat off the stick; after that, it took to mealworms and would eat many in succession.

(To be continued.)

PERSONAL

Two leading Australian zoological scientists have terminated employment in which they have rendered sound service during many years—Mr. John Clark has resigned from his position as Entomologist at the National Museum, Melbourne, and Mr. Tom Iredale has retired from the office of Conchologist at the Australian Museum, Sydney.

AROMATIC PLANTS AS ANTISEPTICS

By EDITH COLEMAN, Blackburn, Victoria.

Two interesting reports of the use of aromatic herbs for nesting material partly confirm my suggestion that they are used as insect repellants.

As related in the *P.N.* (Jan., 1944), in October, 1942, and October, 1943, leaves were stripped from a rare Pyrethrum, the only plant of the kind in the garden. A goldfinch's nest was found to be almost entirely constructed with the silvery leaves. An interesting note in *Wild Life* (March, 1944) relates to a goldfinch's nest in a Northcote garden constructed with sprigs of Thyme, again taken from the only plant of the kind in that garden.

The antiseptic theory was carried a step further when, recently, Dr. O'Shaughnessy told me of a sparrow's nest built with sprigs of Rue (*Ruta graveolens*). Some birds, the yellow robin for instance, often place green leaves flat on the floor of the nest. I had assumed that it was done as a hygienic precaution. Such leaves, if soiled, would be easily removed; yet, except when parents (and young) are perturbed by the proximity of observers, the nests of most birds are rarely soiled.

The use of Pyrethrums as insect sprays and powders is well known. It is significant that Thyme contains thymol, a powerful antiseptic, which is official in pharmacy. From very early times dried Thyme has been used as an insect-bane and the green juice as a powerful deodorant. Both Virgil and Pliny refer to its use as a fumigator. The use by the birds of Rue, is even more significant. This is one of the oldest and most interesting of garden plants. Its grey-green, or silver, foliage is powerfully scented. "Rank-smelling" Rue, Spenser calls it, with some justice. Freshly rubbed on the hands, the smell is most disagreeable, but it dries with a pleasant, gorse-like fragrance.

From Saxon times until the nineteenth century Rue was regarded as an antiseptic with almost magical powers to ward off contagious diseases, and to banish insects. Rue-water was sprinkled in houses as a flea-bane. Gerard, the Elizabethan, quoting both Dioscorides and Pliny, tells us that wasps, bees, hornets, etc., will not harm a man who anoints himself with the juice of Rue. Its very smell drives away the serpent, so "when a weasel is to fight the serpent she armeth herself by eating Rue." He adds: "The leaves are good against all evil airs, the plague or pestilence, and resist all poisons."

Pliny, who lists 84 ills for which Rue was a remedy, writes of it as one of the most active of medicinal plants. He is right when he says that large doses are harmful—they may even cause vertigo

—but his statement that the juice of Hemlock acts as an antidote must be accepted with caution.

It is fascinating to look back to those days when even physicians had such simple, unquestioning faith in the powers of these charming old herbs.

*Rue maketh chaste; and che preserveth sight;
Lufuseth wit, and putteth fleas to flight.*

So runs an old rhyme attributed to the School of Salerno, the oldest school of medicine in Europe, which has been described as "uncontaminated by superstitious medicines."

Rue (Shakespeare's herb of grace) was given by Ophelia to Hamlet's mother, as a preserver of chastity. If we may believe the old writers, Rue banished insects more loathsome than the flea. Long before gaol fever (typhus) was known to be carried by the body louse, Rue was scattered in courts of justice to protect officials from the terrible disease. A bunch of it was placed on the bench near the dock as a defensive against any infection brought by prisoners from the gaol. Says Dr. Thornton (1810): "Rue is supposed to be anti-pestilential, hence our judges have their noses regaled with this most foetid plant."

It would be interesting to learn whether Rue, natural or synthetic, has any part in the new antiseptic used to treat garments issued to soldiers in the present war.

There would seem, then, to be little question as to the antiseptic properties of the three herbs used as nesting material.

Accepting the suggestion that birds employ them as insect repellants, how do they recognize their antiseptic properties if they have so little sense of smell? When watching birds closely it is almost impossible to keep them unaware of our proximity. No matter how carefully hidden, how quiet and motionless we may be, something apprises them of our presence. Structure of the brain would seem to preclude smell as the explanation; but does it?

A tame Frogmouth which relished mice refused a baby rat which I could scarcely distinguish from a mouse. It was held above his bill where he could not possibly see it without moving his head, and this he refused to do. We tried for a long while to induce him to take it, yet a moment later when a mouse was held in exactly the same position he gulped it down at once. He could not have seen it until he raised his bill to snatch.

Many instances are recorded of the fondness of animals, including fish, for herbs. "The hidden virtues of herbs is such that the very brute beasts have found it out," says Pliny, and from Theophrastus we learn that the sheep of one place will not eat bitter wormwood, but the sheep of Pontus fall on it—"consequently they have no bile." Izaak Walton's friend Oliver Henly caught

PLATE III



Yellow Robin at Nest.

Photo.: A. H. Cutholm.



Wedge-tailed Eagle bringing green branch to nest, probably as disinfectant.

Photo.: D. W. Gaukrodger.

more salmon and trout than anybody else. This was very puzzling to Izaak and the rest, until it was revealed that, before baiting his hook, Oliver's worms were put into a box which had been anointed with a few drops of oil of ivy berries. The worms, absorbing the odour, were irresistible to the fish.

Birds love the purple-black ivy berries. The leaves were once worn as wreaths to prevent intoxication during Bacchanalian orgies, and a bush of ivy advertised good wine, until some inn-keeper discovered that good wine needs no bush.

The fondness of dogs and other animals for anise is well known, and anise is said to be the rat-catcher's second-best bait.

Bees love many herbs, which is why, from the time of Virgil, it was customary to rub a new hive with Balm, Savoy, Melilot, etc. On the other hand, a sting was the direct result of rubbing a leaf of Bergamot (*Monarda*) too near my bees! Many animals are attracted by Musk (natural and synthetic) and the oils of Lavender, Catnip and Rhodium. The latter, a kind of *Convolvulus*, is said to be the finest of all rat baits.

A few drops of oil of Bergamot (Bergamot-orange, not *Monarda*) rubbed on the bill is said to tame the wildest of birds. First catch your bird!

The passion of cats for Valerian, Catnip and Cat-thyme amounts to intoxication. The latter was once known as *Herba-catti*. My own plants were destroyed by cats until a fellow-enthusiast told me that his plants were enclosed with wire netting. Each morning I had found them broken down, and the ground about them rolled smooth. Many members will remember a story told by Mr. Charles Oke, for many years secretary of this club. He convulsed us with laughter while describing the antics of a number of cats, as they rolled in contortions of ecstasy (or intoxication) over his rubbish-heap on which he had emptied dust and ant-debris from his collecting case.

Some research into the scent of those ants and a comparison with the oils of Cat-thyme and other cat-favoured herbs might disclose a link connecting "anting" by birds and the use of aromatic herbs as nesting material.

Catnip, when chewed, is said to make the most gentle animal or person fierce and quarrelsome—which is why a certain haugman could never work himself up to perform his office until he had eaten some!

Numerous plants are repellent to insects. One need only cite the oils of Citronella, Lavender, and Cloves. Although many plants are called "flea-bane," onion juice is said to be the best bane of all. Are onion leaves ever seen in birds' nests? I find that Penthyroyal, believed to banish fleas from a dog's kennel, banishes the dog too!

Camphorwood and Sandalwood are two other well-known insect repellants. Are their leaves noticed by birds? How many birds line their nests with gum leaves?

Birds are said never to touch Fennel, yet this herb shares at least one of the virtues of Rue; but unlike Fennel, Rue would win no commendation from Falstaff as an accompaniment of conger eel.

In this garden birds have shown a fondness for leaves and seeds of many plants, such as Marigold, Elecampane, Helenium, Dandelion, Rocket, Spoonwort, and even such narcotic herbs as Deadly-nightshade and Henbane. It is possible that when exploiting the plants for food they discovered their antiseptic properties.

For a further note on the rare *Pyrethrum* which started this discussion I am again indebted to Mr. Willis. It is referred to in *Flora and Silva* (April, 1937) as endemic to the Canary Islands. Although discovered between 1836 and 1850, it was not found again until rediscovered by Dr. O. Burchard (who published an account of the flora of the Canary Islands) growing among rocks at an altitude of 1,400. to 1,500 metres, on the island of Gran Canaria.

[A question mark must be placed against Mrs. Coleman's statement that "some birds, the yellow robin for instance, often place green leaves on the floor of the nest." The leaves used by the yellow robin, and by the pale-yellow robins of the north as well, are always *dry*, and they appear to serve only as carpets. No other birds that I can recall make a practice of placing green leaves on the floor of the nest, but some of the birds of prey, and in particular the wedge-tailed eagle, often bring green branchlets to the nest when young are present, and apparently this is either to serve as an antiseptic or to cover the portions soiled by the young. That point aside, a good deal of suggestive material is contained in the above article, and it is hoped that readers will endeavour to follow it up. At present one of the difficulties is to reconcile the use of aromatic plants with the apparent fact that most birds are poorly endowed with a sense of smell.—A.H.C.]

BIRDS AND ELECTRIC WIRES

"Can you explain," asks "R.W.L." (Geelong) how it is that birds can perch without harm upon high tension electric wires, while contact with these wires would be fatal to human beings?"

It would surprise me to learn that birds are in any way immune. A bird might, of course, perch unharmed upon a single wire, but if it touched another wire in the vicinity, at the same time completing the circuit, there would be sudden trouble. Opossums, especially ringtails, often use a single wire as a right-of-way, but a good many have been electrocuted in getting in touch with a second wire. "R.W.L." has evidently not heard the story of the old lady, who, seeing an electric tram wire on the ground, asked the repairer whether anything would happen to her if she put her foot on it. "Oh, no, ma'am," he said, "not unless you reached up with your other foot and put it on the overhead wire of the other tram line." (*The Argus*.)

VISIT TO THE MELBOURNE BOTANIC GARDENS

By H. C. E. Stewart, Melbourne.

The value of our Botanic Gardens can perhaps be assessed by Club excursions such as took place on 1st July last. About fifty members and visitors attended, amid genial winter sunshine, to study tropical and sub-tropical arboreal vegetation, types that our troops would inevitably encounter on service in the north. The Gardens are notably rich in Queensland tree flora, and contain many species not ordinarily found among the Queensland trees cultivated elsewhere in Melbourne. The thirty species chosen for inspection may seem a formidable list to adequately discuss in a brief space of two hours, but this was rendered possible by the convenient groupings on the Queensland lawn near Park Street entrance, by the Queensland beds, the adjoining southern fringe of the Eastern lawn, and a few subjects selected from the general Australian section. Further, the system of labelling in the Gardens is a valuable time-saver in identification and localization.

The major tropical rain-forest vegetation, comprising eucalypts, wattles, tea-trees, proteads, palms and pines, was perforce set aside and concentration made on four kinds of *Eugenia*, five of *Ficus*, three of *Flindersia*, a number of nut and fruit-bearing trees, two of the stinging plants (Nos. 20 and 23), the curious bird-catching *Pisonia* (No. 21), and some plants with toxic qualities (Nos. 9 and 17), with several species having a timber or useful economic attribute. In addition, attention was directed to one or two examples of historic interest, No. 14, and No. 26, "White Beech," one of the last-named being heavily laden with fruit clusters. Comment was made upon the timber worth of "White Beech" (or "Grey Teak," as termed by millers), on account of ant resistance, difficulty to fire, and suitability for furniture, floors and fittings, together with a modern use as hull plankings and floats of sea-planes. Indeed, the wood has been favourably tested by Major Wackett, R.A.A.F., suggesting post-war possibilities in aircraft construction.

No. 22 is another important timber tree, known as "Australian Teak," or more correctly "Crow's Ash," which in a natural habitat attains a height of 120 feet, with straight clean boles of 80 feet. The borer-proof wood is admirable for boat decks, floors, skating rinks, and as a substitute for Indian Teak. Aborigines made use of the rough pods of the tree as rasps for surfacing weapons and scraping roots, hence the frequent allusion to "Rasp-pod trees." Another of the same distinguished genus of *Flindersia* (No. 30, the "Northern Silver Ash" or "Downy-leaf Rasp-pod") was admired for its singular beauty. No. 29, a deciduous softwood, the noted "Red Cedar" of Australia was discussed at length in the four examples seen; a highly prized dark red timber, finely grained, durable, unequalled for house fittings and furniture; it is now scarce and expensive. The new American legation building at Canberra is fitted with this "cedar." At Windsor, on the Hawkesbury, a house was constructed in 1796 almost entirely of the wood, and still stands to-day. Among many notable examples of use for interior woodwork, the seats and organ case of the historic St. James' Church, Sydney, can be mentioned. The shelter-seeking "Queensland Ironwood," No. 8, is one of our finest hardwoods, called by the timber-getters "Bullet Wood" because of its toughness; it is much in demand for parquet floors, and particularly machine bearings, as it polishes well.

Bird and tree associations were discussed with Nos. 10, 11, 14, 15, 18, 19 and 24. In Australia the Pigeons reach their highest development, and the tropical Queensland region is generously supplied with fleshy fruits to form the staple dietary for a large population of *Ptilinopus* and other Fruit

Pigeons, as distinct from the Squatter, the Plumed and the Black Pigeons of the North—seed-eaters and ground-frequenters. Cassowaries, Wompoo and Topknot Pigeons, Fig and Cat Birds figure among the larger species to need a sizeable fruit. No. 16, the "Silver Quandong," or "Brisbane Quandong," is not to be confused with the Victorian Quandongs, which are species of *Santalum*; it is also styled "Blue Fig" or "Blueberry Ash," due to the metallic blue fruits. Quite commonly in the natural bush, the ground around this tree is liberally strewn with the white stones after the fleshy part has been devoured by birds. The predilection of many Australian birds for the colour blue is confirmed by their attentions to trees bearing blue fruits.

The most remarkable tree of the afternoon (No. 6) was the "Queensland Bottle-tree," the first viewed a graceful sapling, and the second a mature specimen somewhat encroached on one side by a neighbouring, if not neighbourly, Moreton Bay Fig. Semi-deciduous, the "Bottle-tree" grows abundantly in the dry scrubs of North Australia—the specific name *rufesstris* signifies "found in rocky situations." Impervious to drought, the tree reaches a height of 30 to 50 feet, whilst the peculiar bottle-shaped trunk may attain a diameter up to 6 feet. The leaves and pithy interior can be eaten by stock. Between the pith and the inner bark drinking water is extracted, also a sweet edible jelly, wholesome and nutritious. The natives were well acquainted with the provisioning qualities of this tree.

Three examples together, constitute No. 7, the euphorbiaceous "Rivulet Tree," *Glochidion Ferdinandii* (named after Ferdinand von Mueller). These fine shady evergreens act as host for species of *Cercopidae*, or "frog-hoppers." The hoppers subsist on the young sappy growth of the leaves and stems. Ants in search of moisture prey on the frog-hoppers, which throw out a mass of froth or "cuckoo-spit." The exudation falling from a tree, when tenanted by many insects, gives rise to the vernacular "Rain" or "Rivulet Tree."

Common to the Rockhampton district, the Queensland "Snowdrop Tree," No. 27, has flowers in panicles and egg-shaped fruits half an inch long. The "snowdrops," irruptions on the trunk and branches, are a unique feature, accounting for the common name. The genus *Linociera*, called after G. Linocier, should not be mistaken for *Lonicera* (after A. Loniczer), the group of honeysuckles from Asia.

Of the more decorative trees, No. 12, the "Smooth Fig," found more often in the islands north of Australia, attracted notice, one specimen was a conspicuous picture on the Queensland lawn, with light-bued branches of coppice-like habit, and twisted buttress roots resembling octopus tentacles. No. 28, the "Rose Apple," is one of the finest native evergreens gracing the Gardens. Thick shady deep-green foliage, symmetrical growth, clusters of small flowers succeeded by rose-scented berries, should induce more widespread use of this *Eugenia* in parks and streets.

A company of black swans in flight formation overhead caused a pleasant diversion, and some members later took delight in interviewing three Cape Barron Geese quite at home by the lakeside.

Beginners may wish to study in more detail at flowering and other seasons the trees which are enumerated in the order of the tour. Books of reference are:

- A Synopsis of the Queensland Flora*, F. M. Bailey
- Australian Rain Forest Trees*, W. D. Francis.
- The Cabinet Timbers of Australia*, R. T. Baker.
- Native Trees of Australia*, J. W. Audas.
- In the Botanic Gardens*, Frank Clarke.

NAMES AND LOCATIONS OF TREES INSPECTED

(From the "D" Gate entrance)

1. Luchmann's Brush Cherry, *Eugenia Luchmannii*. (Aust. border to left.)
2. Variegated Illawarra Fig, *Ficus rubiginosa* var. *variegata*. (Aust. border to right.)
3. Bennett's Ash, *Flindersia Bennettiana*. (Aust. border to right, off eucalypt lawn.)
4. Slender Fig, *Ficus gracilipes*. (Aust. border to right, off eucalypt lawn.)
5. White Walnut, *Cryptocarya obovata*. (Aust. border to right, off eucalypt lawn.)
6. Queensland Bottle-tree, *Stereulia rupestris*. (Sapling on Aust. border: mature tree, Queensland lawn.)
7. Rivulet or Rain Tree, *Glochidion Ferdinandii*. (Queensland lawn—three specimens.)
8. Queensland Ironwood, *Sideroxylon australe*. (Queensland lawn, etc.)
9. "Papajarin" or Fitzalan's Gardenia, *Randia Fitzalana*. (Queensland lawn—dwarfed example.)
10. Red Apple Myrtle, *Eugenia brachyandra*. (Queensland lawn, by path.)
11. Brush Cherry, *Eugenia paniculata*. (Queensland lawn, etc.)
12. Smooth Fig, *Ficus glabella*. (Queensland lawn.)
13. Cluster Fig, *Ficus glomerata*. (Queensland lawn.)
14. Burdekin Plum, *Pleiogynium cerasiferum*. (Queensland lawn and beds.)
15. Brown Pine (Plum, She Pine, etc.), *Podocarpus elata*. (Queensland lawn, Prince's lawn, Aust. border, etc.)
16. Silver or Brisbane Quandong, *Elaeocarpus grandis*. (Queensland lawn)
17. Nutmeg Laurel, *Cryptocarya triplinervis*. (Queensland bed.)
18. Queensland Sour Plum, *Ocotea venosa*. (Queensland bed—three specimens.)
19. Grey Carabeen, *Elaeocarpus obovatus*. (Queensland bed.)
20. Giant Nettle-tree, *Laportea gigas*. (Queensland bed, also Aust. border.)
21. Bird-catching Tree, *Pisonia inermis*. (Queensland bed, also Aust. border.)
22. Crow's Ash ("Aust. Teak"), *Flindersia australis*. (Queensland bed.)
23. Small-leaved or Shiny-leaf Nettle-tree, *Laportea phatimiphylla*. (Queensland bed.)
24. Australian Scarlet Olive, *Cassine australe*. (Queensland bed.)
25. Sand-paper Fig, *Ficus stephanocarpa*. (Eastern lawn.)
26. White Beech, *Gmelina Leichhardtii*. (Eastern lawn—two trees.)
27. Queensland Snowdrop Tree, *Linociera ramiflora*. (Eastern lawn; Aust. border.)
28. Rose Apple, *Eugenia Moorii*. (Eastern lawn, near path.)
29. Red Cedar, *Cedrela toona* var. *australis*. (Australian border—four examples, also Prince's lawn.)
30. Northern Silver Ash ("Downy-leaf Rasp-pod"). *Flindersia subsericea*. (Aust. border.)

"SAVE THE FORESTS"

At the August meeting of the F.N.C. the following motion was carried: "That the Field Naturalists' Club of Victoria expresses itself as being in full accord with the aims and objects of the Save the Forests Campaign in Victoria, and pledges itself to support that movement by all means within its power."

FAIRYLANDS OF SILK

Travellers to Healesville by the early morning train of May 27th, 1944, enjoyed a beautiful sight. From Lilydale to the railway yard at Healesville the country from within a few feet of the railway line to a mile distant was glorified with drifts of spider-silk. River-flats looked as if family washing had been spread out to dry.

It was not the lacy network of spiderlings so often seen in the autumn, when tangled flying-cables form silky meshes on grass and bush. It appeared to be densely woven sheets of silk—rags and lawn handkerchiefs as it were, caught between, and on, tussocks and bushes. One stretch about half a mile away shimmered like a frozen lake.

The denseness of the silk suggested the close-woven fabric seen in the lining and doors of tunnels made by earth-dwelling spiders. One assumed that food conditions, present and impending, had driven countless earth-dwellers to seek safer homes. Many of these "rags" had been carried by the previous high winds and had caught on high bushes and trees. One night have gathered up great masses of silk of almost commercial possibilities.

A similar spectacle was seen in many parts of Gippsland, especially at Sale and along the banks of the Thomson River.

Gilbert White records a similar autumn story from Selborne on Sept. 21st, 1741, when, at daybreak, stubbles and clover-grounds were matted, with a thick coat of cobweb, so plentiful that the whole country seemed to be covered with two or three setting-nets drawn one over the other. Dogs attempting to hunt were so blinded and hoodwinked that they could not hunt, and were forced to lie down and scrape the web from their faces. At about 9 a.m. a shower of cobwebs fell ceaselessly until close of the day. It fell from elevated regions—not single filmy threads floating on the air in all directions, but perfect flakes and rags, some nearly an inch broad and five or six inches long. "They fell with a degree of velocity which showed that they were heavier than air."

According to White, Dr. Lister has stated that spiders have a power of coiling and thickening their webs in the air.

Other English writers have described masses of silk on bushes and hedges so dense and white that horses shy at them.

Our Australian "fall" was certainly unusually dense, and suggests that conditions which brought it to pass were similar to those in northern lands. It certainly gave a touch of fairyland almost equal to an English snow scene.

EDITH COLEMAN.

SOUTH AUSTRALIAN ORCHIDS

In the *South Australian Naturalist* for June, 1944, Mr. H. Goldsack has given a very excellent popular review of most of the South Australian orchids, omitting those that are comparatively rare and such as require more technical descriptions for identification. The text is accompanied by four full-page plates, containing accurate line-drawings of about 50 species, and Mr. Goldsack is to be congratulated on making such a valuable contribution to the literature of Australian orchids, for his illustrations will be warmly appreciated by all serious students of the *Orchidaceae*, no less than by those for whom they are primarily intended. In the same issue Mr. Goldsack gives definite records of the occurrence in South Australia of *Thelymitra carnea* R.Br. and *Caladenia Fitzgeraldii* Rupp.

H.M.R.R.

"RADIAL RAYS" AND "INSTINCT"

(To the Editor)

Sir,—It is exceedingly unlikely that many, if any, scientific people will be impressed by Mr. Mattingley's inconclusive and quite unscientific deductions; nor are they likely to use the "wordy" words "radial rays," as coined by him. None is likely to abandon the word "instinct" (which expresses the very imperfectly known hereditary characters determining the behaviour of all species) until more—much more—is known of this.

I am reported to forget that the curvature of the earth prevents a view of the tide 30 miles away. It does not do so—a bird can easily secure a view at such a distance by rising to a not-very great height. But, even so, such a view is unnecessary, for the bird—perhaps by observing the state of the tide at its feet—might surely estimate the state of the tide some 30 miles away! What is to prevent this?

What single fact is there in support of Mr. Mattingley's view?

The term "radar" is used by specialists for a particular purpose. But there is no useful use for the words "radial ray." Mr. A. A. Cook should know that directional rays do not differ essentially from other electromagnetic waves (Mr. Mattingley calls them magneto-electric). They are directed in one particular direction by physical means.

Re the flight of pigeons, Mr. Mattingley omits the most important physiological basis for their homing instinct—the semi-circular canals, well understood by physiologists for a century past, in which these organs are particularly well developed.

The brief account of the Spanish experiment quoted is, I again repeat, vague and absolutely inconclusive. I know nothing of the original experiments except what Mr. Mattingley quotes. If, as alleged, the Spanish and Germans established the effect of radiating rays on the orientation of carrier pigeons, the evidence on which such is based should certainly be published, if it is at all convincing.

To apply to birds the various applications of wireless—as used in the war, and still on the secret list—is absurd until such is available for general information, which information Mr. A. A. Cook does not possess. It is absolutely unscientific.

Yours, etc.

Cairns,

Queensland.

H. FLECKER.

LOSS OF BERLIN HERBARIUM

In No. 953 of the *Journal of Botany*, published last April, attention is drawn to a Swedish newspaper which reports the total destruction of the famous Botanical Museum at Daptem, Berlin, during an Allied bombing raid on March 3rd, 1943. Apparently all that escaped were the fern and fungus collections and a very few valuable specimens stored in cellars.

Australian botanists will join with their fellow-scientists throughout the world to mourn this tragic and irreparable damage, in which we also share by virtue of the many Australian type specimens housed at Berlin. Boeckler's sedge types were there, and, among recent collections, L. Diels' 4660 Western Australian sheets, Pritzel's and Meebold's specimens, and the many hundreds of Northern Territory plants gathered by A. Blesser, of Darwin.

Comparatively few duplicates exist in local herbaria, and the task of selecting neo-types to replace those lost will be long, difficult, and in many instances impossible. To the average man such a loss is trivial, if not meaningless, but it is such as to impose a grave handicap on critical botanic research for decades to come.

J. H. WILLS.

FOREST FIRES PROBLEM

(To the Editor)

Sir,—I read with much interest Mr. R. H. Croll's article in a recent issue of this journal, and commend him for the optimistic views expressed; one is impressed by the fine record of activities being carried out by the "Save the Forests" Campaign Council. However, I regret that I am unable fully to share in these sanguine expectations regarding the future.

The destruction of Victoria—timber, soil, scenery, and wild life—accelerates at an alarming pace, and more devastation has occurred in the last two decades than in all preceding history. Who can stop it now, and what will posterity think of us? Many of the cattlemen (our chief offenders, who draw revenue as a result of the fires) are apparently immune from correction. Utterly disregarding of the present or future national value of forests, they think only in terms of personal gain. Contacting one of these men in East Gippsland recently, I was able to sum up his attitude when he said, "Those blokes who are kicking up so much dust down in the city have got hold of the wrong end of the stick, the only way to avoid big fires is to have small creeping fires early in the season."

We have "creeping" fires indeed! I had an opportunity last season of judging what they will do when *grown up*—the innocent little toddlers!

Just before the close of 1938 I had occasion to visit Warragul, and counted about a dozen separate fires on the distant foothills as I drove along the highway. With temperatures soaring into the nineties, the prospect ahead was menacing, to say the least. I spoke to two farmers about these fires. The first man said, "Oh, they're quite a common thing down here at this time of year; it wouldn't seem like Christmas without them." The second man remarked in similar vein and seemed quite unconcerned. My bitter retort was a warning against the holocaust that must inevitably come, and almost the whole world knows the sequel to that dialogue.

Some country newspaper reporters aggravate the problem by having inserted in their columns such deplorable palliatives as, "The fires are now confined to the hills and timbered country where they can do no harm." A statement like this is distinctly harmful, implying a resignation to bush fires unless they happen to come out of the forest.

I am convinced that so long as we allow graziers and cattlemen to remain jungle-minded, just so long will the law of the jungle prevail in and blast our once glorious land.

Yours, etc.,

Toolern Vale.

V. R. DAVEY

RAVAGES IN THE FORESTS

We have before us (says the Melton *Express* of July 22) the original of a letter written by an apiarist of Tooborac, Central Victoria, who has given up bee-keeping for reasons, combined with drought, which he sets out thus:

"Insect pests have completely ruined the forest areas round this district. Green trees on the roads and in private paddocks are similarly affected. The cup-moth caterpillar will be here again next spring, causing further ruinous destruction. Eggs of the cup-moth are already hatching and there are countless millions more to hatch out, as well as millions of the moths flying about at present. Mind you, this will be the third visitation of the cup-moth caterpillars in three successive years.

"Added to the destruction of eucalypts by the caterpillars and borers is the damage caused by bush fires and soil erosion which, in certain forest gullies, has to be seen to be believed. The prevalence of insect pests is explained by the destruction of our bird-life during the past 20 years.

THE LATE PERCIVAL R. H. ST. JOHN

Percy St. John, who died on August 12, was born in Melbourne on May 11, 1872. His father was a taxidermist in Bourke Street and supplied zoological specimens to the museums of Europe.

Incredible as it now seems to me, it was from up in a tree in the Botanic Gardens that I first faced him. I was the culprit in search of the eggs of the tree sparrow, an uncommon bird forty years ago, when I was a fledgling of eight years. As the years drew on there has been a certain parallelism in our careers and I have known him in play and work, and deeply regret his death.

It is recorded in the Victorian Government Gazette that P. R. H. St. John commenced duties in the Botanic Gardens at the tender age of eleven years—July, 1883. He was apprenticed to sign- and label-writing, in which he became famous. Even as a child his love of natural history made itself apparent, and his parentage and position in the Gardens tended to foster this taste. He grew up in an atmosphere charged with the very sciences he was to do so much to advance.

Few Victorians ever have known, or ever will know, the names of plants as he did. Side by side with his self-education in botany, he became an artist skilled in black-and-white and water-colour. He was expert in the determination of birds and a skilled mimic of their calls. He had developed an uncanny sense of direction and was expert in bushcraft. As a youth he supplemented his meagre salary by collecting for the benevolent Baron von Mueller, who paid him for dried specimens and seeds collected on his various botanical explorations. With the Melbourne Walkers' Club he travelled thousands of miles, even as far as Cape Eyerdard.

He specialized in horticulture, native plants, and their economic value to the public. With the late Dr. Heber Green he did valuable researches on Eucalyptus and other essential oils; with Mr. Russell Grimwade he studied the species most suitable for garden planting. In 1910, in company with J. W. Audas, he made a botanical survey of Wilson's Promontory. Articles appearing in this journal during the years 1910 and 1911 were the outcome of his researches, whilst the material is set aside in the National Herbarium as a special collection.

He joined the Field Naturalists' Club in 1908 and became President in 1929-1930. Here he will be remembered for his artistic arrangement of the special native collections staged by the Botanic Gardens at our flower shows. Under the direction of the late J. Cronin, he greatly increased the extent of the Australian border at the Botanic Gardens. He was promoted to the position of Head Gardener in July, 1917, and later became Classifier and was in charge of the Economic Museum. After an extension of service he retired in 1938, thus concluding a faithful public career of 55 years.

The cumulative result of his knowledge, which he was ever ready to pass on, though quiet, was far-reaching and deep. P. F. MORRIS.

EXHIBITS AT AUGUST MEETING

Mrs. C. French: Bunch of native flowers (8 spp.) garden-grown at Canterbury.

Mrs. J. J. Fresnie: Marine specimens, and ebn wing showing the claw.
Mr. Tom Griffiths: Books of pressed ferns, including *Dryopteris chepheredii*, *Polystichum adiantiforme*, *Doodia caudata*, *D. media*, *Asplenium obtusatum* and many others.

Mr. Ivo C. Hammet: Garden-grown native flowers.

Mr. H. T. Reeves: Coloured photographs of native flowers.

LIST OF EXCURSIONS, SEPTEMBER, 1944 AUGUST, 1945

1944	Locality	Subject	Leader
Sept. 9—	Hurstbridge	Wattles and Birds	Messrs. Ivo C. Haunmet & A. S. Chalk
" 16—	Doncaster	General	Mr. P. Fisch
" 23—	East Oakleigh (B.O.C.)	Heathland Flora	Mr. F. Salan
Oct. 7—	Montmorency-Eltham	Birds and General	Messrs. A. S. Chalk & G. N. Hyam
" 21—	Ringwood-Heathmont (B.O.C.)	Botany	Mr. A. J. Swaby
" 29*	Lilydale-Mt. Evelyn-Lilydale	General	Messrs. R. G. Painter & A. C. Frostick
Nov. 11—	Botanic Gardens	Family Myrtaceae	Mr. P. Bibby
" 25—	Beaumaris-Fire area (B.O.C.)	Rehabilitation of area	Mr. J. H. Willis
Dec. 9—	Cohurg Gardens	Geology	Messrs. A. C. Frostick & W. Hanks
1945			
Jan. 13—	Rickett's Point	Marine Biology	Mr. P. C. Morrison
" 27—	East Kew (B.O.C.)	Birds	Miss I. Watson
Feb. 10—	Badger Creek Sanctuary	Australian Fauna	Mr. D. Fleay
" 24—	Heidelberg Swamps (B.O.C.)	Pond Life	Mr. A. J. Swaby
Mar. 3—	Yarra River Trip		Mr. H. P. Dickens
" 10—	Upper Ferntree Gully	Ferns	Messrs. A. J. Swaby & T. Griffiths
" 24—	Croydon (B.O.C.)	General	Mr. T. S. Hart
Apr. 7—	Zoological Gardens	Australian Fauna	Mr. & Mrs. Pinches
" 21—	Mooroolbark (B.O.C.)	Autumn Foliage	Mr. R. G. Painter
May 13*	Kalorama-Mt. Dandenong-Olinda	General	Mr. H. C. E. Stewart
" 26—	Queen's Park (B.O.C.)	Birds	Miss M. L. Wigan
June 10*	Kallista	Cryptogams	Mr. P. Bibby
" 23—	Botanic Gardens (B.O.C.)	Arboreal Vegetation	Mr. H. C. E. Stewart
†—	Zoology School		Prof. W. Agar
July 7—	Museum	Fossils, Rocks and Minerals	Messrs. F. S. Collier, A. C. Frostick and S. R. Mitchell
" 21—	Museum (B.O.C.)	Birds	Mr. G. Mack
Aug. 11—	Wattle Park	Wattles and Birds	Messrs. A. H. Chisholm, & A. S. Chalk
" 25—	Eltham-Greensborough (B.O.C.)	General	Messrs. A. S. Chalk & G. N. Hyam

*Sunday—all-day excursion.

†Date to be fixed.

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PROCEEDINGS

The monthly meeting of the Club was held on September 11, 1944, at the Royal Society's Hall, where the President (Mr. Ivo C. Hammet) and about 100 members and friends attended.

The President announced the death of Mr. J. Wilcox, an Honorary Member of the Club, and Mr. G. Coghill announced the death of Miss Amy Fuller, stating that she was well known for her wild flower paintings and suggesting it might be possible for the Club to purchase some of these. As an indication of their value, Mr. Coghill stated that the set of paintings of South African flora had been purchased by the Kew Herbarium, England.

Excursion reports were given as follows: Black Rock, Mr. T. S. Hart; Heidelberg, Miss Fletcher (for Mr. and Mrs. E. S. Hanks); Hurstbridge, Mr. Ivo C. Hammet.

The following were elected as ordinary members: Miss T. Scott, Messrs. R. T. M. Pescott, N. A. Hansen, G. Grant; as Country Members: Miss A. L. Laycock, Messrs. A. W. Cleaves and B. McKinnon; as Associate Member: Miss Ruth Hart.

NATURE NOTES

Mr. and Mrs. Savage reported that the *Boronia* at Bendigo is doing very well this season.

Mr. V. H. Miller reported having noted a Black-faced Cuckoo-Shrike feeding on the ground at St. Kilda.

Mr. P. C. Morrison reported that Bandicoots were plentiful in the Clarinda-Clayton area.

Mrs. Freame reported on and exhibited a starfish that had naturally broken into halves.

ANNOUNCEMENTS

A Wild Nature Show will be held at the Hawthorn Town Hall on October 23 and 24. Proceeds will go to local charities, and helpers are required for setting up and watching the exhibits.

A "Save the Forests" Exhibition will be held on November 27-29 at the Melbourne Town Hall. The Club will participate in this exhibition.

Mr. S. R. Mitchell reported that the Hawthorn Junior Naturalists' Club recently celebrated its first birthday. This club meets at the Hawthorn Free Library on the last Friday in each month.

THE ABORIGINES

An address on Kunnunya. (W.A.) and Musgrave Ranges (C.A.) aborigines and their crafts took the form of a series of motion pictures taken and commented on by Mr. R. H. Balfour. Special attention was paid to the manufacture of weapons, making of fire, spinning, food-gathering, etc., and a fine series of action pictures of the children at play was shown. These aborigines are practically untouched by white contact, and the films were a valuable addition to knowledge of our native race. Of special interest was the short film in natural colour as it portrayed the wonderful tints of the Central Australian area. At the conclusion of the films a vote of thanks was carried by acclamation.

EXHIBITS

- Mrs. J. J. Fréame: Starfish that broke in half.
- Mr. T. Griffiths: Pressed ferns—Shining Filmy Fern (*Hymenophyllum flabellatum*), Austral Filmy Fern (*H. australe*).
- Mr. V. H. Miller: Three native orchids in bloom—*Dendrobium foliosum*, *D. gracillimum*, and *D. tetragonum*.
- Mr. C. J. Gabriel: Marine Mollusc (*Siliquaria australis*, Q. and G.) in a large clump. Specimen from Bass Strait.
- Mr. H. P. Dickins: Twelve paintings of Australian wild flowers, garden-grown.
- Mr. C. French: *Pultenaea Weindorffii* (Swamp Bush-Pea), *Asterolasia Muelleri* (Lemon Star-Bush), both from near Mt. Evelyn; *Eriostemon aboualis* (double form), from Harcourt; *Prostanthera aspalathoides* (Scarlet Mint-Bush) and *Thryptomene calycina* (Bushy Heath-Myrtle) with pink flowers, from Grampians; all garden-grown at Canterbury.
- Mr. F. G. Ellford: Australite of the Core type (weight approximately 45 grms.), found at Myamyn, Western District (scientific value spoilt by being flaked by the finder); pebbles from fluvatile gravels in New Guinea; and Long-tailed Wasp (*Megalyra* sp.).
- Miss E. Colline Chugg: Water-colour drawings of: (1) Drooping Mistletoe (*Ameyena pendula*), showing seeds, pollen grains (shaped like catrops) and flowers in groups of three with the central ones typically sessile; (2) "Pink Fingers" Orchid (*Caladenia carnea*), with enlargements of the hairy vestiture and labellum glands; (3) larva of a frog-hopper (enlarged); (4) gall-making scale insect (*Asechis*) found on eucalypt foliage.

PERSONAL

The names of Messrs. D. Dickison and R. A. Dunn (ordinary members) and Sgt. H. A. Nixon (country member) were omitted from the lists of elected members in the *Naturalist* Proceedings for June and September respectively. The oversight is regretted.

PLATE IV



Mr. P. F. Morris, President I. N. C., 1943-44



Mr. J. O. Havant, President I. N. C., 1944

JOTTINGS FROM MY NEW GUINEA NOTE-BOOK

By NOEL LOTUJAN (on Service)

BOTANICAL.—Leaving the coast and tidal mud-flats with their depressing mangrove vegetation, one finds on higher flats the common Molasses Grass and after the sun has been shining a while its odour is very pronounced. Kangaroo Grass is also in plenty and many other grasses that I do not know. *Cycas* is often present in great numbers; along the north coast there are seemingly endless acres of this fern-palm. Odd specimens of *Banksia* occur, and much of a *Crotalaria*, which I think was used in the past as green manure, but is now gone "wild." Quite a number of plants had escaped from cultivation in pre-war days and it is often difficult to decide just whether a tree is native or naturalized in any area.

Hill spurs are often grassland, but, on the moister lee sides, thickets of semi-xerophytic character spring up. Bamboos and bananas are frequently present, depending on the degree of top shade. Six species of bamboo have been noted and they are most attractive in their huge clumps; a black-stemmed and very flexuose kind is to be seen at and above 6,500 feet.

Once in the mountains, extensive jungle vegetation is encountered. Lianes make their appearance, and a scrambling kind of grass. *Impatiens* is one of the outstanding ground plants, which also include ferns, clubmosses, orchids and types of *Melastomaceae*. The overhead vegetation is even more luxuriant but difficult to examine for purposes of identification. Farther up the mountains pine forests abound and are almost homogeneous in places, with the exception of a few lianes, bamboos, tree-ferns, staghorn ferns and lichens. I notice that these conifers (*Araucaria*) carry very little epiphytic growth, so different from the rough-barked trees at lower levels which are smothered with innumerable lichens, mosses, climbing ferns, orchids and at least two species of the extraordinary "ant-house" plants. *Casuarina* is to be seen, but not in great quantity, and then mainly along river courses. A rather interesting find, and quite unexpected, was a "horse-tail" (*Equisetum* sp.) which thrives in great profusion along the stony banks of creeks; I also observed it ascending to beyond 4,500 feet.

Above 5,000 feet rhododendrons appear and are still found at 7,000 feet. An arborescent species (10-14 feet high) has small dark red flowers of no particular horticultural merit, but there are two epiphytic kinds of intriguing beauty—one has large pink and white flower bells in clusters of four to six, it is not unlike our single Australian species (*Rhododendron Lochae* from North Queensland) and would be an acquisition worthy of any garden.

ORNITHOLOGICAL.—I have experienced the thrill of seeing a Bird-of-Paradise—a gold and vermillion creature with 15-inch plumes; it was indeed a glorious and unforgettable glimpse, and I longed to have been closer. A general favourite is the noisy Black Wren, about the same size as our southern Blue Wren, but he is black with white on the wings. The ubiquitous Willy Wagtail is here and as cheeky as ever; he appears a little bigger than our southern bird.

The very common Kunai Sparrow (so-called locally) is about the size of a small Blackbird—orange-brown with a white chest, black wings, and a long tail of the same colour. It builds a nest of interwoven grass strands, not unlike certain possum nests, but only about six inches in diameter.

The New Guinea Magpie is common and about the same size as a Mudlark, but with much more white than black and a less pleasing note than its namesake of the mainland. Azure Kingfishers are very tame, and there appears to be a black species. There are Kookaburras at Port Moresby, but they are very inferior to our popular "Jack."

The Swallow and Spine-tailed Swift seem to be identical with the species inhabiting southern Australia. Wood-Swallows—present in great numbers—are grey and white birds about six inches long, with very characteristic notes. Then there are Chats, Dotterels, Ground-Larks, Pigeons, many Parrots, several Hawks, and at least one type of Cockatoo.

FUNGUS LIGHTS IN THE NEW GUINEA JUNGLE

Captain L. T. Burcham (an American visitor to our club last year) writes with feeling about the natural beauties that lurk near jungle pathways "somewhere in the islands." Here is his appreciative description of *Hiabula Wynnia*, a luminous agaric that immediately captivates the interest of anyone visiting its habitat in North Queensland or the New Guinea area—strangely enough, the species was first made known to science in 1872 from specimens appearing amongst Australasian vegetation in the hot-houses at Kew, England.

"I must tell you of one of the most intriguing sights I've seen in many a day—truly something you'd never expect to see outside fairyland. There is here a small white mushroom, commonly found on pieces of very wet, partially decayed wood. It is a tiny, delicate thing, seldom more than half an inch across the cap, the slender stem no longer. Its chalky whiteness strengthens the impression of fragility.

"Beautiful as it is by day, it is infinitely enchanting by night, for then it becomes luminous with a pale green phosphorescence, so strong that a watch can be read by its glow. As youngsters we were told much about fairies, and how the toadstools spring up as tiny seats wherever they wish to sit. Having seen these, I wonder if there mightn't be just a little truth in that, and wish so much that every child could, at least once, walk in darkness along a path bordered with these tiny, glowing, fairy jewels."

SOME LIZARDS I HAVE KEPT

By H. W. DAVEY, Melbourne.

(Continued from September issue)

3. SCINCIDÆ

Australia is rich in members of this family, which is quite our largest in genera and species; the Blue-tongue and Stump-tail lizards are the commonest of the larger species, although our Rock Skink (*Egernia cunninghami*)—so plentiful in the You Yangs, Mt. Alexander, and other granitic outcrops—comes a good third. These all do well in captivity, especially the blue-tongued, *Tiliqua nigrolutea*, which breeds freely, almost embarrassingly when it comes to disposal of the young ones! I have turned numerous young loose in suitable localities as soon as they were old enough, but always far enough from the haunts of boys and motorists.

Waite, in his *Reptiles and Amphibians of South Australia* (p. 144) says in regard to the common Blue-tongue (*Tiliqua scincoides*) that the young number usually about 10 in a single clutch, though as many as 15 have been produced. This is an astonishing number compared with the very closely related *T. nigrolutea*, which never produces more than five at a birth and more often only three or four. My Blue-tongues became extremely tame, and the only occasion on which I observed anything approaching maternal instinct was when I essayed to lift a newly-born from a tussock of grass where its large yolk sac had become caught. The mother immediately swung round and would have bitten my hand had I not moved it quickly away. At birth, the large and still attached yolk sac is eaten by the young one almost immediately.

Another viviparous skink is that delightful, agile little *Himulia quoyi*, so plentiful near water in southern Victoria; only recently I saw a very fine specimen at Gardiner's Creek, Glen Iris, where this lizard would still be abundant were it not for predatory cats in the neighbourhood. *Himulia* is a bold little lizard and very numerous in the Cape Otway forests, basking in the sun on logs; it scurries into crevices when approached too closely, but will soon reappear if one remains still.

I recall an occasion when I was seated on a log angling for black-fish in the Gellibrand River; a sudden noise at my tin of worms suggested the unwelcome company of a snake, but my quick glance around revealed the culprit—a splendid specimen of *Himulia* was struggling to lift a large worm out of the tin which, had I not grabbed it, was in danger of being upset into the river. This engaging sprite was determined to have his dinner

at my expense and soon came back, so I threw him his worm and, although promptly ducking out of sight at first, he presently emerged from a crack in the log and ate the juicy morsel.

I have bred *H. quoyi* over a number of years. Ideal conditions were provided, with a pond in the enclosure wherein lived also several species of European newt. The lizards would often take a swim to floating leaves of aquatic plants, and would bask on small logs during daytime, sleeping in these at night. As far as I am aware, they have only four young at birth, but, where there are several adult females in the one enclosure, these may produce young at or about the same time and segregation would be necessary in order to determine the average family.

Another fine skink is the West Australian *Egernia stokesii*, with habits much the same as *E. cunninghamii*; it favours stony country and is chiefly remarkable for its flattened tail. This lizard did well with me during the summer months, but failed to survive a Melbourne winter.

The stump-tailed *Trachysaurus rugosus* gives birth to only two young at a time and succeeds in captivity. Unlike the geckos, which shed their skins several times during a year, this skink contents itself with an annual moult. One would not expect a skin to be shed almost perfectly from a lizard having such large scales, but successful skin-casting in any reptile depends primarily on its condition of health.

Rabbit-proof fencing causes the death of many Stump-tailed lizards which push their heads through the wire meshes and, unable to draw back again, die a miserable death. That times are often hard for them was brought to my notice on one occasion while driving in the vicinity of Horsham. Close to the road, in a paddock of stoked hay, was a *Trachysaurus* busily eating something; curious, I stopped the car and went to investigate. To my great surprise, I found that the lizard was devouring heads of wheaten hay, and, although not wanting one of this species, I brought it back to Melbourne to ensure a more satisfying diet than Wimmera hay.

These lizards frequently suffer terribly from ticks in their ears. I well remember a trip to Mt. Arapiles, when Stump-tails seemed to be unusually numerous. Upon picking one up for examination, I found its ears absolutely crammed with ticks and many more of its brethren were in the same pitiable condition. In those days I always carried forceps, so spent a considerable time that afternoon "de-ticking" lizards, whose abundance I now attribute to deafness on account of the tightly packed ticks which blocked their ear passages—the basking reptiles were unaware of my approach until they actually saw me.

4. PYGPODIDÆ

Some of the snake-like lizards comprising this family make interesting pets, but as a rule they do not take kindly to captivity and keep out of sight as much as possible. Unfortunately for these lizards, they are often mistaken for snakes and killed at once, but the differences between the two are easily discernible. Serpents have neither the eyelids nor ear-openings which are common to lizards: they have forked tongues and belly scales stretching right across the ventral surface, but these lizards possess flat tongues and several rows of small belly scales. Nearly all snakes, excepting the tree dwellers, have very short tails, whereas legless lizards have exceedingly long, fragile tails, calling for the greatest care in handling them—when bereft of his tail, one of these lizards is a poor-looking object indeed. Moreover, without a tail (having no legs) he has little chance of escaping his enemies at all.

5. VARANIDÆ

In Victoria we have only two species, but several other members of the genus *Varanus* occur in Australia. These big lizards are most commonly called "goannas," a name probably bestowed on them by miners arriving from America in the early gold-digging days, on account of a fancied resemblance to the large iguanas of their homeland.

The Lace Monitor, *V. varius*, is widely distributed throughout Australia and was at one time very plentiful in Victoria, but the giant specimens are now more commonly found in East Gippsland, the writer having seen some splendid examples about Nowa Nowa. They do well in captivity if taken small, the younger the better.

The second Victorian species is *V. gouldii*, smaller and more vividly coloured than its congener. I can not recommend it as a satisfactory pet, and it does not take as kindly to captivity as does *V. varius*.

It is a great pity that such fine lizards as these are often killed by ill-informed or stupid people and so-called "sports." Both species do far more good than harm, and, having a sensible regard to the economy of Nature, no person is justified in destroying that of which he is ignorant. I once went to Port Fairy to watch the arrival of mutton-birds, and a local, overhearing my elated description to a friend at the hotel, came to the door of the Commercial Room and said, "What a pity you didn't take a stick with you; it's great fun knocking them over." When I told him I could see no fun in knocking over a bird that had come to feed its young, the local replied, "They ain't no good, are they?"

AN EMPEROR GUM MOTH MYSTERY

By EDITH COLEMAN, Blackburn, Vic

On the evening of October 15, 1943, I liberated an Emperor Gum Moth which had apparently emerged from an unnoticed cocoon among gum-twigs on a wired-in verandah. On March 18, 1944, twenty-five nearly half-grown larvae were discovered on the stump-sprouts of a Sugar-gum. On one leaf nearby were twenty-five eggs from each of which a larva had emerged—surely a high percentage.

As the sprouting stump was only about five yards distant from where the moth was released, I assume that, even in the dark, she had found the right food-plant on which to deposit her eggs. I found no more eggs, although there were two other sprouting Sugar-gum stumps in the garden.

I had often watched isolated captive specimens, but this was far more fascinating. The gum-shoots, with their flattened-spherical juvenile leaves, reddish twigs and petioles, were at their loveliest stage. One could not fail to note how well the handsome green larvae, with their red, blue and yellow spines, harmonized with them. Most striking was their habit of clinging upside down under the twigs and petioles, clasping them with their fleshy, clinging feet, so that, to a bird's eye, they must have appeared like narrow green leaves with a reddish mid-rib. The yellow line along the sides of the body (the "sunshine line" we have always called it) appeared like streaks of sunlight, serving to break up the outline, and completing the illusion of leafiness.

The larvae were practically invisible at a short distance and always had to be sought. Daily I visited them, watching much skin-shedding; never marvelling at their escape, even in a garden full of birds, for they seemed so wonderfully camouflaged.

The larvae ate only the more mature leaves, never touching the tender reddish leaves at the tips of the branches. Voracious feeders, they soon became more exposed on denuded branches and moved along to leafy ones.

On April 26, even after two days of heavy rain, there were still twenty-five larvae, now almost fully fed. Next day two were missing. Had they pupated? On April 28 there were only eleven left, and these were in the leafy shoots, as if they sought shelter as well as fresh food. As I found no cocoons, nor dead bodies on the ground, I assumed that birds had discovered them.

On May 7 there were still eleven fine, fat larvae. It seemed surprising that even eleven could have survived after such heavy rain and intense cold. I watched the rain dripping off the tips of

limp, reflected bodies. When it ceased they commenced to feed again.

On May 8 they had disappeared. I found no dead bodies on the ground, so they had not been washed off by heavy rains. It seemed that they must have been taken by birds, unless the eleven had crawled away in a company to pupate elsewhere.

The larvae of some moths and butterflies always leave the food-plant to pupate—a wise procedure when they pupate singly, leaving others still feeding, for these would doubtless sever many leaves to which they had anchored themselves. But in this instance there was not the same necessity for such precaution, as the cocoons are usually fastened to the bark of a trunk, branch or twig. If the eleven larvae left the food-plant in a body to pupate, it suggests that the Emperor Gum Moth is gregarious to a greater degree than we have thought.

An entomologist who visited the garden at once searched the bark of the stump and other trees, but we found no cocoons, and I have searched many times since. The chance of survival, therefore, seems a very slender one. Of course it is possible that the moth had not put all of her eggs in one basket, and had deposited others which I missed, and that some of these survived.

The name Emperor Gum Moth seems now a misnomer, seeing that the larvae are more frequently found in numbers on the introduced pepper-tree (*Schinus molle*), and even on fruit trees. Why not Emperor Moth? As the moth existed in Australia many centuries before the white man introduced the alien trees, she has evidently evolved means of determining the edibility of alien leaves for larvae which she will never see. She herself has never eaten leaves, yet she deposits her eggs on only those suitable as food for her offspring, even on alien leaves. How does she recognize them? Inherited memory is out of the question. It is one more of Nature's inscrutable mysteries.

We have deeply regretted the cutting of our Sugar-gum. With its slender 200-ft. shaft and shining crown it was beautiful at all times, but never more so than when "flowering" with king parrots, gang-gang cockatoos or lorikeets, which foraged for unripe seeds, littering the ground with rifled calyces, even dropping them on our heads. The tree had pruned itself of lower branches, rising above all the other trees; but it swayed so alarmingly in a high wind that it threatened the house.

Two other Sugar-gums treated in the same way have sprouted into such beautiful branches that one wonders why they are not more often lopped to provide closer shelter than those seen round Western District homesteads, although a smaller variety is sometimes used for the wind-breaks.

Apart from other considerations, these lopped trees have shed new light on their power of regeneration—such a great asset to Australian forest trees in admittedly difficult conditions.—EDITH COLEMAN.

A NEW SPECIES OF *PTEROSTYLIS* FROM PORTLAND

By the REV. H. M. R. RUFF, Northbridge, N.S.W.

P. celans, n.sp.

Planta parva gracilisque, circiter 9 cm alta, cum foliis basalibus 3-6, petiolatis, orbicularibus vel ovatis, circiter 15-20 mm longis. Caulis bracteae latae, 2, superior florem subtendens sed distans. Flos solitarius, viridis, in ovarium aliquanto robustum. Sepalum dorsale circiter 15 mm longum, erectum per $\frac{3}{4}$ longitudinis, tum flexum ad apicem acutum et paululo decurvum. Sepala lateralibus erecta, ad petalorum bases adnata, et connata per 5 mm, tum divergentia et filiformia, super galeam extendentia, porro

curvata: sinus ad junctionem angustissimus. Petala non ad sepalum dorsale adnata, latissima, circiter 12 mm longa, dimidium interius inflexum. Labellum fere lanceolatum, sed cum apice truncato inter rugas duas, circiter 11 mm longum, 3 mm latum, floris interiorum celans: lamina longitudinalis alba cum nervo medio viridi; appendix fere obsoletus, a base 3 mm. Columna 7 mm longa, fere directa; alarum lobi superiores tereti, glandulosi, lobi inferiores aliquanto divergentes, 2 mm longi, infra cum marginibus breviter ciliatis. Stigma ovatum, magnum, latius quam columna.



KEY TO PLATE.

Pterostylis celans, n.sp.

1. Labellum, upper surface. 2. Column, side view. 3. Column, front view. 4. A petal. 5. Labellum from the side, to show appendage. ap. appendage. s. stigma.

form caudae extending above the galea and curved or hooked forward. Petals in all my specimens *entirely free* from the dorsal sepal for their whole length, about 12 mm long, nearly 4 mm wide at their broadest part, with a conspicuous median longitudinal nerve, on the inner side of which the petals are inflexed. Labellum almost lanceolate, but with a truncated apex between two minute marginal folds, about 11 mm long and 3 mm

wide at the broadest part; with the inturred petals completely concealing the interior of the flower; thin and membranous. Longitudinal labellar plate white on both sides with a green median nerve; appendage almost obsolete, unbranched, about 3 mm above the base of the labellum. Column 7 mm long, nearly straight, upper wing-lobes terete, glandular-transparent near the tips, the lower lobes broad, scarcely meeting in front, shortly ciliate on the lower margins only. Stigma large and conspicuous, ovate, wider than the column.

Portland, Victoria, 10.1943 and 10.1944. G. Bennett and Mrs K Mellblom. Specimens of this curious little Greenhood orchid, discovered by G. Bennett in 1943, were sent to me by Mrs. Mellblom. Its most obvious affinity is with *P. nana* R.Br. of which I was at first inclined to think it a teratological form; this was also the opinion at the time of Mr. W. H. Nicholls. But further examination, and the fact that 15 specimens were found, all agreeing precisely in the peculiar character of the flower, convinced me that it could not be included in *P. nana*.

I am now glad that circumstances prevented its publication as a new species in 1943, because specimens of the 1944 season have been received from Mrs. Mellblom, and they are identical in all respects with those of the previous year, thus endorsing the right of the plant, in my opinion, to specific rank. The area upon which plants were discovered is unfortunately now being cleared for agricultural purposes, but Mr Bennett has transplanted as many as possible to safer ground.

The outstanding peculiarity of the flower is provided by its remarkable membranous labellum, which might almost be described as petaloid. It does not appear to be irritable, and the appendage so characteristic of species of *Pterostylis* at the base of the labellum is almost obsolete, being represented by a single short "hair" of about 3 mm above the base. In *P. nana* the labellum is very much shorter than the column; it is thick and firm in texture, and has a branched appendage at the base. In the new species the labellum is at least 4 mm longer than the column. The petals also are remarkable. In all my specimens they are completely free from the dorsal sepal for their whole length. They are very broad, with a prominent median nerve, on the inner or anterior side of which the petal is inflexed. These inflexed halves of the petals, together with the long, wide, membranous labellum, completely conceal the whole interior of the flower, thus suggesting the name *P. celans*.

I confess that I cannot even hazard a guess at the purpose of this concealment. In every flower I examined, pollen was freely scattered on the stigma, proving that some pollinating agent had been at work. I do not think it possible for a *Pterostylis* flower to be self-fertilizing.

What is the agent in this case, and how does it go about its job? Here is a fine field for observation by our Portland friends, who are to be congratulated on the discovery of such an interesting species.

SCAVENGING BIRDS NEEDED

Corporal R. D. Kent writes from New Guinea: "There is a very noticeable lack of sea-birds and in consequence the beaches here are very dirty and 'high'."

Mr. D. J. Maloney, who retired recently from the position of Director of the National Museum, Melbourne, died on September 27. An obituary notice will appear later.

FERN FLORA OF EAST GIPPSLAND

By N. A. WAKFIELD, A.L.F. (formerly of Genoa, Vic.)

The district referred to here as "East Gippsland" is that section of Victoria east of the western watershed of the Snowy River—a roughly triangular tract of land with an area of about 4,000 square miles.

Most of the country is very rough and mountainous, and the main fern flora type is of Antarctic origin; for the district, this forms a group of about two-thirds of the local species. Nearly all of these are common in New Zealand, and extend through Tasmania, Victoria and New South Wales into the highlands of southern Queensland.

In the drier western parts of the district there appear some inland species; and on the higher land to the north there are some which are typical of the Alps. In the eastern part there is an interesting extension of sub-tropical species which are common to the lowland brushes of eastern New South Wales and Queensland, a group comprising about one-fifth of the total for the district. In the southern coastal belt are a number of littoral species, most of which range from Queensland to Western Australia. Of all Victorian vascular cryptogams, 80 per cent. occur in East Gippsland.

THE COASTAL BELT will be considered first, for the sake of convenience. It is the southern tract of low country, in some places extending well inland, and is characterized by sandy soil with a covering of Eucalypts and Banksia, extensive patches of Spear Grass-tree forming plains devoid of trees, coastal heaths, peaty swamps, and in some places low granite outcrops covered with tea-tree.

All the flat moist parts show an abundance of Swamp Selaginella (*Selaginella uliginosa*), Bushy Clubmoss (*Lycopodium densum*) and Screw Fern (*Lindsaya linearis*), all three of which may be found, too, in hollows amid the mountains, to an elevation of about 1,000 feet.

In the patches of Grass-tree, where the soil is slightly peaty, Rough Comb Fern (*Schizaea asperula*), Forked Comb Fern (*S. bifida*) and Pigmy Clubmoss (*Phylloglossum Drummondii*) are plentiful in places. The two Comb Ferns grow to a lesser extent in the more undulating sandy parts, and Common Bracken (*Pteridium aquilinum*) grows extensively beneath the forest covering.

Along many of the creeks, in the peaty bogs, Wiry Coral Fern (*Gleichenia circinnata*) forms extensive thickets; and on their borders, and in the black-soil soaks are Comb Fern (*Schizaea fistulosa*) and Slender Clubmoss (*Lycopodium laterale*). On the river-flats, where there is stagnant water, Ferny Azolla (*Azolla pinnata*) forms extensive floating patches; and it is worth recording that the commoner species of other parts of the State (*A. rubra*) has not been found in this district.

About the mouth of the Snowy River, near Ewing's Morass and Marlo, on open grassy flats, Tiny Selaginella (*S. Preissiana*) grows; Adder's-tongue (*Ophioglossum coriaceum*) is plentiful; and there is a little Meadow Moonwort (*Botrychium australe*) to be found. The two last are scattered in mossy granite country of the southern parts, and have both been found in sub-alpine localities.

Where the creeks have reached rock, they are bordered by Coral Fern (*Gleichenia microphylla*), and King Fern (*Todea barbara*), each of which extends inland to the lower mountain valleys; and Fishbone Fern (*Blechnum nudum*) and Soft Water-fern (*B. capense*) which are plentiful along open streams right up to sub-alpine parts. On rock-cliffs overlooking the sea a few miles south of Mallacoota are isolated patches of the Blunt Shore Spleenwort (*Asplenium obtusatum*), which has not been found elsewhere on the Victorian mainland.

THE INLAND SPECIES are Bristly Cloak Fern (*Notholaena distans*) and Blanket Fern (*Plenasorus rufifolius*), both of which are common on the drier limestones of the Buchan district, and on the granite of the lower Suggan Buggan and Deddick River Valleys. Rock Fern (*Christella tenuifolia*) is abundant here too, but, unlike the other two species, it is plentiful also on rock outcrops throughout Croajingolong.

SUB-ALPINE SPECIES.—These are mainly in the north. In the Ingeegoodbee, Bouang and Benlar districts, Alpine Water-fern (*Blechnum penno-marina*) is very abundant along the open streams, and it descends to as low as 2,500 feet in places. Mountain Clubmoss (*Lycopodium fastigiatum*) grows on grassy flats by the Upper Delegete River, and the Moonwort (*Batrachium hauria*) has been found on grassy slopes at Ingeegoodbee by Mr. W. Hunter.

In a stagnant pool among granite rocks of the Genoa River, near Wangrabelle, a single tuft of the Quillwort (*Isocetes humilior*) has been found; and though this plant belongs to a typically alpine genus, this habitat is at an elevation of only a few hundred feet.

On the tops and slopes of the Coast Range, Goomirih Range, and nearby mountains, is a belt of country which is locally known as the "Big Jungle," and which has a dense covering of Eucalypts and *Bodfordia*, beneath which Soft Treefern (*Dicksonia antarctica*), Hard Water-Fern (*Blechnum procerum*) and Mother Shield Fern (*Polystichum proliferum*) are extremely abundant. These three extend, too, in less abundance, to the lower mountain valleys farther south.

Common Spleenwort (*Asplenium trichomanes*), usually found on granite rocks in sub-alpine parts, is, in East Gippsland, confined to the Buchan and Gelantipy districts, where it is often plentiful on limestone. A similar case is provided by the Variable Clubmoss (*Lycopodium varium*), which is usually alpine, but which grows on mossy cliffs at 1,500 feet elevation near Genoa Peak. In both cases the particular rocks seem to suit the propagation of the plants despite their low altitudes.

RAIN-FOREST BELT.—Where the predominant plants are Acacias and Eucalypts, on the slopes of the lower mountains, there grows an abundance of Rough Tree-fern (*Cyathea australis*), False Bracken (*Culcita dubia*), Gristle Fern (*Blechnum cartilagineum*) and the ubiquitous Bracken. As well as these, there are Common Maidenhair Fern (*Adiantum acthiopicum*), Sticky Hypolepis (*Hypolepis punctata*) and Common Rasp Fern (*Doodia media*) in the open gullies, and on hill slopes.

Common Filmy Fern (*Hymenophyllum cupressiforme*), Kangaroo Fern (*Polypodium diversifolium*), Sickle Fern (*Pellaea falcata*) and Necklace Fern (*Asplenium flabellifolium*) grow plentifully on moist rocks in most parts of the district, both in the gullies and on shaded cliffs on the mountain spurs. Narrow Filmy Fern (*Mezodium rarum*), Weeping Spleenwort (*Asplenium faccidum*) and Leatherly Shield Fern (*Polystichum adamsiforme*) are plentiful on mossy rock faces and in granite crevices at Genoa Peak.

In the moist soil in the deeper gullies of the lower mountains are Bat's-wing Fern (*Histiopteris incisae*), Strap Fern (*Blechnum Patersonii*), Mother Spleenwort (*Asplenium bulbiferum*), Shining Wood Fern (*Dryopteris Shepherdi*), Tender Bracken (*Pteris tremula*) and Rufous Hypolepis (*H. rugosula*). By the larger streams, Gipsy Fern (*Polypodium grammifolius*) grows both as an epiphyte and as a lithophyte; and on the ground we find Hypolepis (*H. Muelleri*), Sfrade Spleenwort (*Diplazium australe*), Silky Fan Fern (*Sticherus tenuis*) and Creeping Lace Fern (*Dennstaedtia danaloides*), all in fair abundance.

In the gullies of the higher mountain country, mainly in the many heads of the Benm River (Arce, Combianbar, Errinundra, etc.), the Antarctic type is well developed and is almost identical with that of the Dandenong Ranges, though still lacking in some of the species of southern Victoria (*Pteris commis*, *Polystichum hispidum*, etc.). The additional species to be found here are the Austral Filmy Fern (*Mecodium australe*), Shining Filmy Fern (*M. flabellatum*), Veined Bristle Fern (*Polyphlebium venosum*), Long Fern Clubmoss (*Tmesipteris Billardieri*) and Finger Fern (*Polypodium australe*), all abundant as epiphytes on trunks of Soft Tree-ferns.

The Slender Tree-fern (*Cyathea Cunninghamii*) and Skirted Tree-fern (*C. marcescens*) are scattered through this part too; but, like many of the other species already mentioned in this section, they are more plentiful in the Mount Drummer "jungles." Where the streams are more rocky, Lance Fern (*Blechnum lanceolatum*) and Ray Water-fern (*B. swainii*) are not uncommon; but, except that the latter extends to nearly sub-alpine streams, neither of these two is found in any other part of the district.

SUB-TROPICAL FLORA.—This is in the east of the district and along the streams, and in some of the shaded hollows of the lower mountains, there are patches of vegetation often referred to as "jungles," with few or no Eucalypts, but with a forest of Kanooka, Blackwood, Lilly-Pilly, Waratah, etc., festooned with lianes and other creepers, so as to exclude direct sunshine, though it is quite open underneath. In such places, Giant Maidenhair (*Adiantum formosum*) grows by the Cann and Snowy Rivers; and in two localities the Small Shade Spleenwort (*Diplazium japonicum*) has been recently found. The "jungles" are typified by the occurrence of the terrestrial Jungle Brake (*Pteris umbrosa*), and by Fragrant Polypody (*Polypodium pustulatum*) on the trunks of Soft Tree-ferns.

Prickly Rasp Fern (*Doodia aspera*) and Spreading Fan Fern (*Sticherus lobatus*) grow on the hillsides in and near the jungles. Here the Felt Fern (*Cyclophorus rupestris*) is abundant as an epiphyte on Kanooka; and the species is frequently found too on rock outcrops in other parts of the district, even as far north as Suggan Buggan. The Small Rasp Fern (*Doodia caudata*) is scattered from Genoa to Buchan, generally in moist granite crevices along watercourses.

In the Mount Drummer area, in the heads of Karlo Creek and of other tributaries of the Wingan River and on the Howe Ranges, the fern flora of East Gippsland (and indeed of Victoria) reaches its peak, both in the number of species present and in the extent of their growth. In these isolated islands of flora, almost all the species of the last two sections grow profusely, mainly in the moister parts, and right among them, but extending up the hillsides, are large patches of sub-tropical species. The lithophytic species mentioned in the previous two sections grow here as epiphytes on the Kanookas.

Prickly Tree-fern (*Cyathea Leichhardtiana*) is very plentiful, and the ground is covered with Jungle Wood Fern (*Dryopteris tenera*). Even Rough Tree-fern here supports the growth of numerous epiphytes, including quantities of Jungle Bristle Fern (*Macraglena caudata*); Soft Tree-fern is host to many species, among which are Blunt Fern Clubmoss (*Tmesipteris ovata*) and Small Fern Clubmoss (*T. parva*). Near Karlo Creek is the only known Victorian patch of Lace Fern (*Lindsaya microphylla*).

In the far east, about Genoa, are great granite outcrops, and by one of the watercourses through them are patches of Rough Maidenhair Fern (*Adiantum hispidulum*) and Fan Fern (*Sticherus flabellatus*), the former

occurring also in the Howe Ranges, while near Malleacoola Inlet, opposite Gipsy Point, is an isolated patch of Trim Wood Fern (*Dryopteris decou-pasita*), another rarity of the extreme east.

The Chinese Brake (*Pteris vittata*) seems to favour porous rocks, for though it is a sub-tropical species, one must go as far west as the Buchan limestones before it is found. On the walls of one deep granite crevice near Genoa there are a few plants of the Willow Spleenwort (*Asplenium adiantoides*), almost the rarest Victorian fern.

It is remarkable that the sub-tropical species, *Dryopteris nymphalis* and *Dicella pyridata*, have not been found in East Gippsland, for they extend through eastern New South Wales into other parts of Victoria, apparently missing this district, although many localities here would admirably suit their growth.

Mueller had *Dicranopteris linearis* and *Asplenium nidus* on Victorian lists; but though the latter, at least, occurs within 30 miles of the Victorian border, there is no real Victorian record of either. In addition to these, there are two other species (*Arthropteris tenella* and *Platyserium bifurcatum*) which come as far south as Mount Dromedary, 80 miles from the border.

So, although East Gippsland has been fairly well explored during the past few years, it is quite likely that still further discoveries will be made, possibly in the Howe Ranges, which have not yet been thoroughly searched.

HAWTHORN JUNIOR FIELD NATURALISTS' CLUB

After considerable preliminary work and interviews with members of the Hawthorn Council and the committee of the Hawthorn Free Library, consent of the Council to the formation of a Natural History Club was obtained. An organizing committee was thereupon formed, with Mr. and Mrs. J. J. Freame, Mrs. Carbiner, Messrs. P. F. Morris, H. T. Reeves, L. W. Cooper, H. P. Dickens and S. R. Mitchell as personnel, and at a meeting held in the Free Library it was resolved to establish such a club under the name *Junior Naturalists' Club (Hawthorn Branch)*.

The inaugural meeting took place on August 6, 1943, and since then nine lectures have been given, two excursions conducted, and a "demonstration evening" arranged. The lectures, usually illustrated by lantern slides or motion pictures, have been highly educative and greatly appreciated. From October 4th to 9th, 1943, an exhibition of varied interest was staged, the Mayor, Councillors and Town Clerk attending. The club is indebted to the Hawthorn Council for the continued use of a very fine lecture room, and has received much help and encouragement from the efforts of Cr. J. Fowler in particular.

I wish to register my appreciation of the work so effectively carried out by Mr. and Mrs. Freame, the secretary (Miss L. Edgeley), Mr. P. F. Morris, and other members of the committee. To celebrate the first anniversary, Mr. and Mrs. Freame arranged a birthday party and generously provided all the refreshments, the lecture on this occasion being delivered by Mrs. Freame herself. Local support afforded the new club is so far rather disappointing, but we hope to augment the present membership of 35 when the club's activities become more widely known. However, the results to date surely justify this venture and emphasize the desirability of forming junior naturalist societies in other suburbs. Any assistance in the way of addresses by senior members will be gladly welcomed.

S. R. MITCHELL

THE FARMERS' FEATHERED FRIENDS

To anyone doubting the immense value to Australia of carrion-feeding and insectivorous birds, or to those who never think about the question at all, the South Australian *Journal of Agriculture* for August offers an illuminating article by Mr. P. J. Carnow, under the above title. The fact that many landowners are utterly oblivious of the good services rendered them by native birds is deplored, while a credit balance is made out even for the much-maligned white cockatoo and wedge-tailed eagle. Mr. Carnow's plea for better bird protection must appeal to all nature-lovers. He says, *inter alia*: "The greatest vandal in the world is the white man. He comes into a new country clothed with valuable forests, strange forms of bird and animal life, and often aboriginal life of a lower type than his own. The first thing he thinks of is to kill off any living thing he can eat, or, through the sale of furs or feathers, he can turn into cash. Before seizing a gun to shoot any bird that may be strange to you, attempt to find out if it be a useful species before you take its life. The greater number of our birds are useful, from the tiny wrens that eat up aphids on our roses to the larger kinds that help to control blowfly strike by eating up fly larvae in dead carcasses. All have a place in our economy and are worthy of preservation."

LIEUT.-COLONEL SIR DAVID PRAIN

The *Bulletin of the Imperial Institute* announces the death of this veteran botanist on March 16, at his home in Whyteleafe, Surrey, England. Sir David PRAIN, who attained the age of 86, was formerly director of the Botanical Survey of India. Returning to England, he assumed the directorship of the Royal Botanic Gardens, Kew (1905), a post that he held with conspicuous ability for 17 years. In 1926 he was appointed first chairman of the Advisory Council on Plant and Animal Products at the Imperial Institute, retiring therefrom in 1936 at the age of 79. Sir David presided over the Botany Section of the British Association for the Advancement of Science at Winnipeg (Canada) in 1909, and visited Australia with British delegates during 1914. Compared with those of his predecessors at Kew, Sir David's botanical writings are meagre, but he was a world-renowned and excellent administrator-scientist, and one of the most likeable men it has been my honour to meet.—P. F. MORRIS.

EXCURSION TO BLACK ROCK

A large number attended the outing on August 19, the locality visited being in the vicinity of Balcombe Road, from half to one mile east of the tram terminus. The eastern slope of the hill was first tried, but abundant growth of Coast Tea-tree bushes made location of other plants difficult. Burnt-over areas on the other side of the road were in various stages of recovery and gave better results. Many small plants were seen here, including the common *Crossidium* species and Scented Sundew (flowering plentifully in places). A low growth of *Banksia* was still flowering, and four species of *Acacia* displayed attractive blossoms. One of the abnormal foliage forms of the *Acacia longifolia* group (small phyllodes, and possibly a hybrid) was noted and it would be interesting to test the seed later on, when and if obtainable. Few orchids were observed in flower, but the feathery plumes of Blady Grass led to an examination of its underground method of spreading.—T. S. HART.

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PROCEEDINGS

The monthly meeting of the Club was held on October 9, 1944, at the Royal Society's Hall, where the President (Mr. Ivo C. Hammet) presided and about 120 members and friends attended.

Excursion reports were given as follows: Doncaster, Mr. P. Fisch; East Oakleigh, Mr. F. H. Salau; Montmorency to Eltham, Mr. A. S. Chalk and Mr. Hammet.

The following were elected as Ordinary Members of the Club: Misses C. O. Palmer, J. C. Burnett, Greta Scott, L. Matthews, Messrs. G. Fraser, J. H. Laver; as Country members: Cpl. R. D. Clarke, Messrs. G. H. Jennings and Edwin D. Hatch.

NATURE NOTES

Mr. Chisholm was asked why black and white birds of different species often nested close together. He said in reply that black and white birds (e.g., Magpies, Wagtail, Mud-lark, etc.) appeared to be protected by their very prominence, and there seemed to be some protective value attached to the fact that the Mud-lark and Wagtail frequently nested in the one tree. It would be interesting to know from observation which was the first species in possession in such cases.

Mr. Gates mentioned having seen in Canterbury a black and yellow bird which he had never noted in the district before. Mr. Chisholm said that the species was the Regent Honeyeater, and the birds were possibly the same pair that had recently been seen at Wattle Park.

Mr. A. J. Swaby reported that two Spur-winged Plovers had selected a nesting site on a football ground, where three school games were played each week. The eggs were laid among Cape weed, and were soon taken. A second site was selected, this time alongside a concrete cricket-pitch, and the young were successfully hatched, feeding for themselves at a very tender age. The old birds are again nesting in the same locality.

A note on a habit of the Black-faced Cuckoo-shrike was also given. It was stated that as soon as the young birds had left the nest the parents had destroyed it, and had not attempted to use the material again. Mr. Chalk stated that these birds often used old nests of the Mud-lark, and these were never destroyed.

GENERAL BUSINESS

The forthcoming Nature Show in the Hawthorn Town Hall was mentioned and an appeal made for ladies to assist in the setting up.

Mr. V. H. Miller reported that Mr. C. French had been appointed to the curatorship of Maranoa Gardens, and said he looked forward to a continuation of the good work started by the late F. Chapman. Mr. Miller further stated there were some magnificent displays in the gardens at the present time. Mr. H. T. Reeves supported these remarks and congratulated Mr. Bury on having such a fine display.

Mr. G. Coghill stated that the collection of wild flower paintings of the late Miss Fuller had been left to the Club, and he pointed out the value of them for the Club's purposes.

The President remarked that the Barrier Field Naturalists' Club at Broken Hill had issued an admirable booklet on Charles Sturt, and he exhibited a presentation copy sent to the Club.

MOUNTAIN AND BUSH

An illustrated lecture was given by Mr. Paul Fisch, who dealt with alpine scenes in Switzerland, sundry places en route to Australia, and Australian localities. A feature was the fine series of nature studies taken near his home at Doncaster. Giant fungi, new and rare forms of *Cordyceps*, orchids, etc., were among the illustrations.

Mr. Colliver asked if the lecturer could explain why many of the Swiss alpine plants were common garden plants over here now, and yet alpine plants of New Zealand, in some cases at least, would not grow below the snow-line. Mr. Fisch suggested it was possibly due to the plants not being so forceful in growth as the European forms. Mr. Hammet stated that he had grown the Alpine Lily (*Ranunculus Lyallii*) for one year but it did not flower. Mr. Hyam suggested that the plant needed a long resting period, as in its natural habitat it is covered by snow for seven or eight months. Mr. Morrison suggested that the isolated position of New Zealand did not make the plants' struggle for existence as severe as in the case in Europe, where aggressive types are bred.

Mr. Gabriel asked what was the plant mentioned as having medicinal properties. Answer: Arnica, and a tincture for wounds was commonly made from it.

Mr. A. D. Hardy asked if bush-fires in Swiss forests were ever caused by lightning. Mr. Fisch replied that fires were not common—about two a year in the north—and after a thunder-storm such a quantity of rain fell that any fire would soon be extinguished.

EXHIBITS

Mr. and Mrs. Paul Fischl: Roots of *Exocarpus cupressiformis*, enveloping but not penetrating those of a eucalypt; garden-grown specimen of *Olearia lirata*; series of water-colour and crayon drawings of Victorian orchids and fungi.

Miss L. Dyall: Large radish, weight when dug 3½ lb., grown in Glen Iris.

Mr. T. Griffiths: Collection of pressed Selaginellas and other mosses in book.

Mr. V. H. Miller: Cultivated orchids—*Dendrobium gracillimum*, *D. teretifolium*, *Cymbidium Beryl*, *C. Lowianum*, and *Cymbidium* sp.; pot-grown specimen of *Diuris punctata*; also pot-grown specimen of *Drosera binata*.

W/O. J. A. Blackburn (per O. Singleton): A perfect specimen of the giant fossil cowrie *Gigantocypraea gigas* (McCoy) from Balcombe Bay; maximum dimensions of sample are 7 in. long and 5½ in. broad. Collected by exhibitor.

Mr. J. H. Willis: A rare puffball (*Phellorina strobilina*) from near Tulla Station, Wakool Shire, Western Riverina, N.S.W. (coll. Major F. S. Wright, 3/10/44). This is probably the largest example on record: height above ground 28 cm.; girth of peridium 17 cm. (Dr. G. H. Cunningham's corresponding measurements for the largest specimens he had seen, up to 1942 was 18 x 11 cm.) The species is listed for Victoria, South Australia, Queensland, and India.

Mr. T. S. Hart: *Lepidosperma congestum*, lately added to the list of Victorian plants; examples from Highbett, Black Rock and Mornington. *Pomaderris subrepanda*, a shrubby "Hazel" (so called) from North Croydon; *Levenhookia Sonderi*, a Trigger-plant from North Croydon.

EXCURSION TO DONCASTER

About 45 members and friends attended the outing on September 16. Along Blackburn Road, Cottony Cushion scales were observed on wattle and flowering specimens of *Hibbertia* and *Daviesia latifolia*. In a cutting of the road, where roots of *Exocarpus cupressiformis* and those of a gum-tree were exposed, we searched for evidence of the former's parasitical habit, but could not find any roots actually joined, although they were growing very closely together, suggesting rather a symbiotic relationship. Along Koonung Creek, where old Paperbarks (*Melaleuca ericifolia*) and the Manua Gums provide some very picturesque settings, several flowering plants were found: about three kinds of wattles, two species of Greenhoods, a Bird-orchid and *Diuris longifolia*, also *Olearia lirata*. The biggest specimen of Yellow Box tree in the district was also admired. A good view of a pair of Frogmouths was obtained, and later one of these birds was observed sitting on its nest—very well camouflaged.—PAUL FISCHL.

PERSONAL

The Club's congratulations are extended to Mr. C. French upon his recent appointment by the Camberwell Council as curator of the Maranoa Gardens, in succession to the late Frederick Chapman. Mr. French, who has been an energetic member of the F.N.C. for 62 years and was an assistant of Baron von Mueller during the last decade of the great scientist's life, is steeped in botanical tradition and brings a wealth of plant lore, gardening experience, and enthusiasm into this responsible position.

NATURE PICTURES HERE AND ABROAD

By PAUL FISCH, Doncaster, Vic.

(An address to the F.N.C. on Oct. 9)

Under this title I shall relate some of the rambles and observations that my wife and I have made, both in our home country, Switzerland, and in this equally lovely land of Victoria where we settled down.

Needless to say, I am very interested in everything that Nature has to reveal to man. Doubtless the fact that we grew up in a most picturesque mountain valley, with plenty of unspoilt natural life around us, aroused an early interest in Nature, and both our parents and school teachers encouraged nature study. In our secondary school we kept a book where we had to enter each day an observation relating to natural history with sketch or diagram and text, and most pupils were very proud of those books. One of the most interesting observations was how the flora changed on differing geological formations, e.g., the saxifrages, certain primulas and clovers, favouring limestone country, would not invade the plant life of sandstone and conglomerate.

A unique flora is that of the high moors at an altitude of about 1,200 metres. The peat-forming *Sphagnum* moss covers the whole level area and seems to thrive in a water-logged, sour terrain. Minerals are about non-existent, a fact that causes the extremely stunted growth of the few forest trees that germinate on this land. About three different dwarf berry-bearing shrubs, including the Blue-berry, or Bilberry (*Vaccinium myrtillus*), do very well, also two insect-catching plants, one of them a sundew. All the shrubs and grass are continuously threatened by the ever growing and rising carpet of *Sphagnum* moss. Some of the grasses overcome this threat of being smothered by the formation of a new set of roots higher up along the stem every year, and one is able to trace many abandoned root sections right down into the sub-soil where the old vegetable matter is turning into peat. This same Tundra-like country I have later encountered in the Victorian Alps.

Although the rainfall of Switzerland is very substantial and agricultural lands are more than adequately watered, forests which cover about one quarter of the country are very well protected and attended. What enormous assets these forest lands are to a country!—they shelter agricultural lands, homes and towns from storms, avalanches and hail; they provide the indispensable fuel for household and industries, the timber for building; they are a natural water-reservoir, regulating the flow of springs; and last

but not least, are an everlasting beauty to the country. The indiscriminate slaughter of forests in the mountains has been the cause of disastrous landslides, with the formation of those uncontrollable torrents whose yellow, or almost black, waters tear rocks and valuable soil downstream, wreaking great damage.

The Swiss Forest Law of 1876 declared forests in the mountains, that is those in the catchment areas of the rivers, permanently protected and by 1902 all forest lands (privately owned as well) were covered by the Federal Forest Laws, which are carefully worked out, based on experience, observation and experiment. If a farmer makes a mistake in a seasonal operation it is avenged in a short time and the following season it will be eliminated. But in forestry success or failure is usually manifest only decades afterwards, when it may be too late to adjust the matter. It has been found that the healthiest and most profitable type of forest is the one with a mixed population of conifers and deciduous trees, from which always the mature trees are thinned out, so that no forest soil is exposed: a kind of self-regenerating, perpetual forest. Yes, the forests are worth protecting, in fact it is our duty to posterity.

The forests of Europe once cut down are very difficult to replant, as the soil seems to change or lose its bacterial and fungus life so beneficial and essential to the trees. After hearing the remarkable lecture in this Club, "Making the Desert Bloom," I am inclined to think that Australian species of trees may be destined to reforestate man-made deserts throughout the world.

It is believed that the treeline limit, which is at about the 1,800 metre mark, used to be about 250 metres higher up. In those regions, where now only the dwarf conifers and the glorious "Alpine Roses" (*Rhododendron hirsutum* and *R. ferrugineum*) grow, the remains of tall forest trees, cones and seeds have been found in the peaty soil, indicating, of course, that forests once flourished there. Actually, it is believed now that the belt of *Rhododendrons* once coincided with the treeline limit.

And now a few words about the alpine flora in general, i.e., plant life between 1,000 and 4,000 metre altitudes approximately: Yes, *Ranunculus glacialis* is found as high up as that.

The temperature of the air in those regions is reduced, the sun's rays are intenser, the period of vegetation is shorter, the rainfall greater, the change of temperature is severe and air currents more pronounced. All these factors influence the specific character of alpine plants. With the increasing altitude the number of species decreases and the individuals grow smaller and hug the ground for protection.

Most plants are perennials, as the short summers very often prevent the maturing of seeds of annuals. Owing to short seasons the flowers appear early, blooms of the *Soldanella* often growing through a thin layer of melting snow. Of interest are the felt coats of the Edelweiss and its relatives to hinder loss of moisture. Some of the mountain flowers have been successfully cultivated in the lowlands, such as a few gentians, primulas, saxifrages, ranunculi, campanulas, etc., but generally it must be said that they thrive only on the high mountains where conditions created their very specific character and beauty.

And now let us turn to Australia. It is rather significant that as a nature-lover I really made my first friendship here by the medium of a tree. On my search for a job, I passed by a garden where an old man attended his trees. One of these I recognized as *Abies pectinata*, the very extensively represented member of the Swiss forests. This I told the gentleman and, appreciating my interest in trees, he showed us over his whole garden and helped me to obtain employment. He thought it quite natural that I wanted to work on the land, in contrast to the young farm-worker I met (just disembarking at the port) who, when I revealed my intentions to go on the land, looked at me very critically and asked, "Can y' milk a cow, can y' plough and with 'ow many 'orses?"

A few years later, when it came to choosing a place of our own, we were again looking at the problem as nature-lovers, and never regretted having acquired a terribly dilapidated property with the bad name of being "played out," and overgrown with couch-grass. We saw that the neglected building could be straightened up, and the walls (built of Silurian bedrock) looked quite dignified; the couch-grass also was a blessing in disguise, as it held the soil, preventing it from washing away during the years nobody looked after the place. And then there were the few lovely old trees, planted perhaps fifty or more years ago, that now provide us with shady nooks around the house and are a feature of the landscape.

From this home of ours at Doncaster we have made innumerable rambles close by and farther afield, first alone and later with our children, to explore the bird, insect, orchid and fungus worlds, and whenever anything new to us is found the delight is great. I suppose Australians find our amazement hard to understand at the first meeting with *Podargus*, for instance, or the extraordinary plant family of *Proteaceae*, the quaint orchids, grass-trees and fern-trees, the *Cordyceps* or a fungus like *Boletus portentosus* weighing 12 lbs. or more, to name but a very few of the amazing objects of this land.

SOME BOTANICAL CURIOSITIES

By W. L. WILLIAMS, Melbourne.

A chance reference to etiolation in native plants led me recently to look back over a set of notes made from time to time between 1930 and 1935 on the subject of outstanding colour variation, apparent hybridization, and teratological formations in wild flowers of the Grampians district. I fear that the notes are not very scientific; they merely record curiosities that appeared to be worthy of notice, and some of the observations, a mixed bunch, are offered as a matter of interest and for the sake of recording.

In the neighbourhood of the Terraces on a north-eastern slope of the range there is, or was, a large patch of the "nodding blue lily" (*Stypandra glauca*), which straggled over rocky ribs and spread in some profusion on every terrace of soil that lay between. The mass of blue colour in the flowering season was a delight that I have never forgotten; nor have I forgotten the shock of finding in the midst of it a splash of pure white—the flowers of one plant or clump of *Stypandra* which so far as could be seen were in every other way quite normal. Three or four of these white spikes stood side by side among hundreds of blue examples.

A white flower that ought to be blue, however, is not so startling as one that ought to be red, and my notes record the same peculiarity in two of the reddest flowers in the whole bush—"flame heath" (*Astroloma conostephioides*) and the "scarlet coral pea" (*Kennedyia prostrata*). A plant of the former bearing white flowers was found among acres of the usual scarlet-flowered heath in open country close to Stawell, while a runner of what must be incongruously described as "white scarlet coral pea" crept among the brush on the flat below Red Man's Bluff.

Two orchids appear in the list too, though in neither case was colour entirely absent. Beside the Western Highway, a few miles beyond Ararat, there used to grow a small colony of the "tall diuris" (*Diuris longifolia*) of which every flower, instead of being orange splashed with brown, was of a uniform pale yellow without darker markings of any kind. In colour they resembled very pale forms of *Diuris pedunculata*, though the form of the orchids, even from a distance, shouted aloud *Diuris longifolia*. Their constant pallor, however, was so remarkable that specimens were sent to Dr. Rogers in Adelaide, who was good enough to check the identification. The second orchid noticed was a fine specimen of the "fringed spider orchid" (*Caladenia dilatata*) which was morphologically normal, but, lacking any touch of colour even on the labellum, usually so brilliant, was of a uniform pale

cream. This specimen was not observed *in situ*, unfortunately, but was being carried in a bunch of orchids said to have been gathered at Pomonal. Whether the paleness was a permanent characteristic in the flower of that particular tuber and its descendants was therefore never established. In none of the cases mentioned did lack of sunlight appear to have anything to do with the matter.

No special reference is of course made to the more commonly known colour variations, such as the pale and dark forms of the "horned orchid" (*Orthoceras strictum*), the stout sun orchid (*Thelymitra epipactoides*), the "common spider orchid" (*Caladenia Patersonii*), or such leek orchids as *Prasophyllum Frenchii* and *P. Brainsii*, of which extraordinary extremes were occasionally found.

At least two examples of hybridisin, both in orchids, are noted. One of these was a fine double-flowered spider orchid collected by the Rev. Clarence Lang. It had the size and general appearance of *Caladenia Patersonii*, but the pale labellum had mingled characteristics of both *C. Patersonii* and *C. dilatata*, including a short but characteristically "dilatata" fringe. The other record involves two or three specimens of an orchid lying apparently somewhere between *Diuris maculata* and *D. palachila*, in all of which a broad but not entirely characteristic "palachila" tongue seemed to have become accidentally attached to an otherwise typical specimen of the former orchid. This form, which for want of a better explanation was written down as a hybrid, appeared occasionally in the same locality (near the turn-off from the Pomonal road to the Terraces) over two or three seasons.

But the prize curiosity of all was a teratological form of "blotched sun orchid," *Thelymitra fusco-lutea*, one of the most beautiful kinds, and one which gives me always a slight feeling of incredulity. That the broad leaf and the succulent stem and the delicate bloom should belong to a genus that prefers its sunshine oven-hot seems on the face of it ridiculous. However, so it is. The specimen in question had a spike of three flowers, in each of which a toothed excrescence, originating at the base of the labellum, rose in front of the column, practically concealing it from view. This example was the first of the species that I had seen, and I collected and pressed it without recognizing its teratological condition. Fortunately in a letter to Dr. Rogers concerning another orchid I described my specimen in some detail. Never, I think, was a letter answered more speedily. The Doctor's anxious inquiry as to the fate of the curiosity caused me to remove it from the press and send it at once to Adelaide, where he employed

methods of his own to restore, mount, and examine the parts of the flower.

The plant, whose position I had noted, bloomed again during the two next succeeding seasons, and each time the flowers had the same curious structure—a partial survival of the missing authers that, thousands or millions of years ago, once graced orchids generally. Then one season no green leaf appeared and there was no strange bloom in the spring. Perhaps it flowered again after I left the district; perhaps it is about to bloom at this very moment.

WILD LIFE IN THE WEST

By E. M. WEBB, Melbourne.

During half a dozen years in the outback of Western Australia, some forty years ago, I was in daily touch with wild nature. The country was primitive and largely unfenced. My one regret is that I did not "take in" more of it.

This was land thrown open to selectors at the beginning of the century. The best of it grew raspberry jam trees, york gum and salmon gum, with occasional poots or morrels. The worst of it was sand-plain and stony rubble that grew blackboys, a stunted sort of useless herbage and poisonweed. The proportions of good and bad were about 50-50.

The poison weed killed stock that ate it. It was easy enough to grub and it would not grow again unless a fire passed over the area.

This was waterless country with the exception of a few soaks and tanks sunk by sandalwood gatherers of a previous age. No water was accessible to the bush animals, which seemed to get on very well without it.

The region was well endowed with possums, kangaroos, tamma (wallaby), boodie rats (kangaroo-rats of some kind) and warungs. Thrushes, crested bell-birds, parrakeets, ring-neck parrots and brown magpies ("squeakers") were the most noticeable birds. The banded anteater was quite common.

Bell-birds had the loveliest song—three or four beautiful pipes finishing with a deep chime an octave lower. I have followed them many a time thinking their notes came from horse-bells. The similarity was apparent only at a distance. I never heard a horse-bell close up that could compare with the bell-bird. He was the last singer at night.

The ring-neck parrots ate the wheat-crop as fast as we sowed

it. They came in great flocks and we had to poison them or go without wheat. They and the "squeakers" died by hundreds.

One midday I had been working out in the open bush alone and was seated having lunch when a banded anteater came into view. The place was a sandy rise growing white gums and there was a lot of dead white gum sticks rotting on the ground. I kept very still because, although anteaters were fairly plentiful, they were desperately shy and would go for their lives if they saw a man.

I suppose I watched this chap for half an hour and this is the way he went about things. Having nosed into a small piece of rotting wood, he would burrow underneath it. Then by means of the burrow he would get his forepaws under the stick, raise it underneath his chin, rise on his hind legs and let the stick fall. It always seemed to fall bottom up. Then out would go his long red tongue along the stick and in would go the white ants.

This little chap was having a great feed when a gust of wind disturbed the paper in which my lunch had been wrapped. He gave one look in my direction and promptly disappeared.

The kangaroos were light brown creatures that made very good eating if they were young. I have always regretted shooting them because they were lovely, harmless things; but when your daily meat comes out of a tin the chance of a little fresh kangaroo is too good to be missed. I salve my conscience these days by reflecting that I shot them only for food. Cooked in a camp oven with a bit of bacon, kangaroo steaks were very appetising.

As far as I know, these kangaroos, in common with the rest of the fauna, never drank. The soaks had all fallen in long since and the tanks were inaccessible. In summer the only source of moisture was a species of corkscrew-grass, the roots of which were always green.

The possums, of the ordinary grey variety, had voices that I have not heard in other States. One used to sit in a jam tree (raspberry jam) above my tent and wait for my light to go out. He would give me about half an hour to get to sleep and then come down into the tent and steal my jam. I would wake up to see a little round ball of fur on the table by my bunk. Its nose would be deep in the jam. The voice was a sort of "chut-chut." That and a kind of wheeze which I have heard elsewhere made up the possum's conversation.

Speaking of voices, the Western Australian crow has one all his own. It is the usual "Caw-caw" followed by a horrible, ghoulisn chuckle. Crows were very scarce in those parts. I suppose I saw no more than six in as many years.

PLATE V



Large clutch of Emu eggs at the Wild Nature Park at Ararat.
They took eight weeks to hatch.



Five days after hatching the young Emus still remained at the nest.
On the sixth day they walked off, led by the male parent, who had brooded the eggs.

One of them gave us an insight into the crow's uncanny instinct concerning a possible meal. We had a chestnut mare that went sick one day. We put her in a loose box and gave her various remedies. In that loose box she was out of sight of everything. Later in the day we went to the box to give her one more remedy. Having done so we went back to the hut. As we left the box a crow came flying slowly over an adjacent hill and perched on a dry tree close to the loose box. Half an hour later one of us went back to the box and found the mare dead. If the place had had plenty of crows one would have taken little notice of this incident, but we hadn't seen a crow for a year and I am convinced that this one knew in some way that the mare was going to die and came over for the feast.

The tamma (wallabies) were found only in sheoak thickets. These were clusters of sheoak saplings never more than 10 or 12 feet high and packed closely together. The tamma were good eating. To get them a man with a gun stationed himself in the middle of a thicket while another beat the bounds and drove the animals toward the centre.

I mentioned the warung because, although in the small kangaroo class (he was smaller than a tamma) he always ensconced himself in a squat like a hare and was always seen alone. His meat was white, something like chicken, although more like rabbit to the taste.

There were no rabbits then. The last erected Government rabbit-proof fence ran along our boundary and bunny had not got past it.

At intervals along the fence were traps of wire-netting built on the principle of being easy to enter and impossible to vacate. We thought we had found a rabbit once in one of these but it turned out to be a dalgite, a nocturnal animal which we never saw in daylight.

The hoodie rats haunted stables and haystacks at night. They were a kangaroo-rat a little smaller than the warung and they attacked the haystacks for the grain in the wheat-cars. In one place, I remember, they got to the settler's self-raising flour. They were all found in the morning dead and considerably blown up with gas.

There were no kookaburras then but I believe they have been imported since. Emus were very few in those parts, but there were plenty of dingoes. These were mostly the pure ginger type but some of them showed evidence of being crossed with other dogs. I laid hundreds of baits for them but never saw a dead one although the baits would always be taken. These animals had

the real dingo howl. It used to make my blood curdle at first, yet it is a strangely appealing although melancholy sound.

Once while driving through the bush, on a moonlit Christmas Eve, I saw a dingo come out of the scrub and run along the track ahead of me. He kept this up for several miles before disappearing in the scrub again. I rather appreciated his attention and would not have shot at him even if I had carried a rifle.

On another moonlit night (it was morning actually) I heard a dingo patter up the track by my tent and lap at the muddy soak. I could not have brought myself to shoot that fellow, either, because I was living alone and felt very lonely.

There were large granite outcrops all over this country and some of them contained what we called night wells. These were holes in the rock into which water began to flow soon after sundown and stopped flowing at sunrise. The explanation is that there was some aggregation of water around the rock which seeped in through a crack. As soon as the sun got up the rock expanded and the crack closed. Whole teams of horses could be watered from a night well at night, for the hole always kept full until morning. These night wells are somewhat rare. The nearest to us would have been about 30 miles.

Earlier I mentioned sandalwood. This tree must have grown prolifically in southern Western Australia at one time. Horse teams used to come up from Albany in the very early days and take away great loads of the timber. First they went through and took the trunks of the trees, leaving the stump and the little branches. Then, when the trees were cut out, they came through again and took out the stumps. All over the country I saw the holes where the trees had been once.

I was over many hundreds of square miles of bush in those days but in all that area I saw only one sandalwood tree growing. I don't know whether it has re-established itself, but it did not seem to be doing so in my time.

NATURAL HISTORY MEDALLION, 1944

The fifth recipient of the Australian Natural History Medallion will be Mr. John McCormell Black, our F.N.C. nominee. Born in Scotland, Mr. Black migrated to South Australia in 1877. He left the Press in 1902 and turned his attention to botanical research, contributing over forty papers to the S.A. Royal Society, of which he was President, 1933-4. As a Vero (1930) and Mueller (1932) medallist, with honorary lectureship in Systematic Botany at Adelaide University, Mr. Black's greatest triumph was the modern, well illustrated *Flora of South Australia*, in four parts (1922-29). At present he is writing a second edition and, while congratulating him on the present award, F.N.C.V. expresses the hope that his ninetieth birthday on April 28 next will see completion of the new Part II (*Casuarinaceae* to *Euphorbiaceae*).

THE ORCHID *ACIANTHUS FORNICATUS*

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

This little orchid has not yet been recorded in Victoria, but I shall be surprised if it is not discovered before long in eastern Gippsland, for it is very common in New South Wales, where it is known to extend well down the South Coast. The vernacular name "Pixie Caps," for which we are indebted to Mrs. Hilda Curtis, of Tamborine Mountain, Queensland, suits it admirably, the broad "cap" of the dorsal sepal readily distinguishing it from its near relative, *A. exsertus*.

Its affinities are chiefly with the species just named and with the rare *A. Ledwardii* of southern Queensland, and it is also very close indeed to the smaller *A. Sinclairii* of New Zealand. But it is, I think, a more variable species than any of these, and some account of its habits and characteristics may be of interest to orchid-loving readers.

It is very often found in association with *A. exsertus*, and as the two have exactly the same kind of leaf and stem, they cannot be distinguished until the budding racemes appear, except that the leaf of *A. exsertus* is green on both sides and that of *A. fornicatus* is usually (but not invariably) reddish underneath. It also appears in company with *A. caudatus*. Its range of habitat as known at present reaches from southern Queensland along the New South Wales coastal belt at least as far south as the Moruya River; while inland it has been recorded as far west as Molong on the Central Western Slopes, and Barraba on the western fall from New England. In the coastal area between the Manning and Shoalhaven Rivers—a stretch of country about 200 miles long—it is probably by far the commonest orchid of the open forests and scrub-lands, often literally carpeting the ground.

An excellent illustration of what may be called the typical form is given by Mr. G. V. Scammell's plate on p. 47 of the present writer's *Orchids of New South Wales*. But variations from the type are abundant. In Mr. Scammell's enlarged flower the petals are scarcely one-fourth as long as the lateral sepals. In the text I have described them as "half as long"; perhaps it would be more accurate to say that they vary from half to less than a quarter. As a matter of fact, all the floral segments vary in their relative lengths. The dorsal sepal, though typically slightly shorter than the laterals, frequently equals them. The labellum, instead of being shortly acute as shown by Mr. Scammell, may be definitely acuminate. Its margins are most commonly entire, but sometimes they are irregularly serrate for the anterior half of their length; I have observed this chiefly in flowers with an acuminate labellum.

The papillose area of the upper surface of the labellum, too, is liable to variation. Typically, in front of the two blunt basal calli there are two broad longitudinal papillose ridges; but these are frequently ill-defined, the papillae being scattered rather densely on both sides of the median line.

The lateral sepals are peculiar. From a filiform point they are suddenly broadened, at a variable distance from the apex. Just where this broadening occurs there is usually a notch in the outer margin, or not infrequently a notch in both margins. In *A. Ledwardii*, these notches are extended into filiform lobes, so that the sepal becomes a sort of 3-pronged fork.

The colour of the flowers of *A. fornicatus* ranges from deep red-brown (rare) through duller shades of brown to a sort of translucent pale green. In most areas the flowering period extends from May to August: as a general rule *A. fornicatus* may be expected when *A. exsertus*, decidedly an autumn flower, is going off. But orchids, like humans, are apt to break rules. In the Mount Irvine area of the Blue Mountains, *A. fornicatus* comes along early in March, and is followed, not preceded, by *A. exsertus*! I could scarcely credit this reversal of procedure until it was demonstrated to me *in situ* by the Misses Scrivener of Mount Irvine.

The dimensions of plants and flowers, and the number of the latter, are also subject to much variation. In my herbarium there are specimens from Bullahdelah, Paterson, and Woy Woy, which measure almost exactly 30 cm. (1 ft.) in height; and such "giants" are by no means rare in those localities. On the other hand, in most districts the average height would probably be less than 15 cm., and many plants do not exceed 6 cm. The flowers of tall and robust plants are correspondingly large. Inland plants are usually small. At Woy Woy, 50 miles north of Sydney, I sometimes found plants with a solitary flower, which was always accompanied by a rudimentary bud that never developed. The average number of flowers to a plant would probably be about five, but I have seen as many as twelve.

The solitary leaf of *A. fornicatus* may be either close to the base of the stem or as much as 9 cm. above it in tall plants. Leaf dimensions are variable, but the cordiform shape—with occasional minor modifications—is fairly constant. There is frequently a tendency to lobation. Now and then one may find a leaf green on both sides; but the general rule is green above and red below.

These observations may, I hope, serve to stimulate search in the forests and scrubs of at least eastern Victoria for evidence of the presence of the dainty little "Pixie Caps."

PLANT NAMES SUB-COMMITTEE

Second List of Recommended New and Changed Vernaculars

Since the previous report on its activities which appeared in the *Naturalist* for December last year, the Plant Names Sub-committee has continued to meet every month. The present year has been wholly occupied with a careful revision of the large family *Gramineae*—surely the most difficult in our flora. So extensive are the nomenclature changes (still being effected) in this group, and so numerous the introduced grass species, that the committee has had to adopt a "global strategy," as it were, and virtually comb the current literature of both hemispheres in order to keep pace with authoritative work overseas—several enquiries have been addressed to grass specialists in other States and even to Kew (England) concerning involved issues on identity and nomenclature. A few species (unsubstantiated by actual Victorian material) have been struck out of the Census.

Adherence to the principle of retaining oversea names for naturalized plants has led to some regrettable, but inevitable, changes; for instance, the attractive, familiar and very apt names of "Shell Grass" and "Shivery Grass" for *Irisa maxima* and *B. minor* must give place respectively to "Quaking" and "Lesser Quaking Grass," because these are the names by which the species are known in their native lands. With a feeling of relief the sub-committee views the early completion of *Gramineae* as this Second List goes to print! No other group of plants is likely to entail such a tedious or long-drawn-out revision.

It is desirable that a time limit be fixed, up to when (after publication of the sub-committee's proposals) club members may consider the names put forward, criticizing any that they deem unsuitable and suggesting better ones for substitution. Accordingly, if no comments are received within three months, then the sub-committee will interpret their absence as an expression of approval, and adopt the new or amended vernacular names that it has agreed to recommend.

Lt. Noel Lothian was obliged to relinquish his position on the committee early this year, and though fellow-members regret the loss of his helpful collaboration and balanced judgment, they wish him well in other avenues of useful scientific endeavour.

After publication of the First List (Dec., 1943), a letter was received from Mr. N. A. Wakefield, with suggestions for more appropriate naming of certain ferns. These were reconsidered by committee and the following alterations recommended in the vernacular names of six species, viz.:

- In *Metodium australe*, restore "Austral Filmy Fern."
- .. *Macroglena caudata*, replace "Narrow-lobe Bristle . . ." with "Jungle Bristle Fern."
- .. *Cyathea nureescens*, replace "Giant-frond . . ." with "Skirted Tree-fern."
- .. *Hypolepis Muelleri*, replace "Pale . . ." with "Swamp Hypolepis."
- .. *Lindsaya microphylla*, replace "Lacy Wedge Fern" with "Lace Fern."
- .. *Dryopteris tenera*, replace "Broad Wood Fern" with "Jungle Wood Fern."

The Second List of recommendations is submitted as hereunder, all additions and alterations being those that are desirable in the *Flora of Victoria* by A. J. Ewart (1930).

PTERIDOPHYTA (Ferns).

Add *Dryopteris pennigera*, "Naked Wood Fern."

For *Polystichum proliferum* (not *P. aculeatum*), change "Common Shield . . ." to "Mother Shield Fern."

GYMNOSPERMEÆ (Conifers).

For *Callitris calcarata*, change "Red Cypress . . ." to "Black Cypress Pine."

.. *Callitris glauca* (not *C. robusta*), change "Murray Cypress . . ." to "White Cypress Pine."

.. *Callitris tasmanica* (not *C. cupressiformis*), change "Cypress Pine" to "Oyster Bay Pine."

NAIADACEÆ

For *Naias tenuifolia*, change "Water Nymph" to "Thin-leaved Naiad."

SCHUCHZERIACEÆ

Add *Triolochin hexagona*, "Six-point Arrow-grass."

HYDROCHARITACEÆ

For *Vallisneria spiralis*, change "Eel-grass" to "Eel-weed."

GRAMINEÆ

For *Eulalia fulva* (formerly under *Pollinia*), change "Sugar Grass" to "Silky Brown-top."

Add *Sorghum leiocladum*, "Wild Sorghum."

.. *Cymbopogon obiectus*, "Bent Silky-heads."

For *Bohreria ambigua* (not *Andropogon pertusus*), change "Pitted Beard-grass" to "Red-leg Grass."

For *Zoysia Matrella* (syn. *Zoysia pungens*), change "Prickly Couch-grass" to "Manila Grass."

Add *Zoysia macrantha*, "Prickly Couch."

For *Paspalum distichum*, change "Silt Grass" to "Water Couch."

.. **Paspalum dilatatum*, change "Golden Crown Grass" to "Dallas Grass."

.. *Entolasia marginata* (syn. *Digitaria marginata*), change "Bordered . . ." to "Marginate Panic-grass."

.. *Digitaria Brownii*, change "Cottony . . ." to "Cotton Panic-grass."

.. *Digitaria divaricatissima*, change "Spider Panic-grass" to "Umbrella Grass."

.. *Paspalidium gracile*, change "Graceful Panic-grass" to "Slender Panic."

.. *Panicum decompositum*, change "Umbrella Grass" to "Native Millet."

.. *Panicum prohitum*, change "Pallid Panic-grass" to "Coolah Grass."

.. **Setaria geniculata*, change "Bent Pigeon-grass" to "Knot-root Pigeon Grass."

.. **Cenchrus tribuloides*, change "Burr Grass" to "Dune Sand Burr."

.. *Pseudoraphis paradoxa* (formerly under *Chamaeraphis*), change "Thorny Mud-grass" to "Mud Grass."

.. **Ehrharta longiflora*, change "Veldt Grass" to "Annual Veldt Grass."

Add **Ehrharta colycina*, "Perennial Veldt Grass."

N.B.—Species marked with an asterisk (*) are naturalized aliens.

J. H. WILLIS, Secretary, P.N. Sub-committee.

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PROCEEDINGS

The monthly meeting of the Club was held on Monday, November 13, 1944, at the Royal Society's Hall, where the President (Mr. Ivo C. Hammet) and about 100 members and friends attended.

A letter was received from Mr. J. M. Black, of Adelaide, thanking the Club for nominating him for the Australian Natural History Medallion, and thanking the Selection Committee for awarding him the medallion.

Excursion reports were given as follows: Ringwood-Heathmont, Mr. A. J. Swaby; Lilydale-Mt. Evelyn, Mr. R. G. Painter; Botanic Gardens, Mr. P. Bibby.

The following were elected as Ordinary Members of the Club: Mrs. G. McGlynn, Misses F. Smyth, V. Andrews, M. H. Bishop, M. Green; as Country Members: Messrs. P. Richardson, A. C. Ebdon, K. Simpfendorfer, G. W. Althofer; and as Associate Members: Misses Janice McMahan and Betty McKenzie; Masters John Court and Ian Wallace.

GENERAL BUSINESS

A report on the Wild Flower Show recently held in the Hawthorn Town Hall was given by the President, who thanked members for the support given, and especially thanked Mr. and Mrs. Freame, Mr. A. D. Hardy and Mr. H. P. Dickins for the work of organization. Mr. Dickins in turn gave a report on the show and the results expected financially.

Mr. A. H. Chisholm reported on the recent formation of a Field Naturalists' Club at Portland.

PERSONAL

The Secretary announced that Mr. Noel Lothian, recently Assistant Secretary, and more recently in charge of the 3rd Army Farm in New Guinea, had been released to take up duty as Senior Lecturer in Horticulture at Lincoln College, Christchurch University. On behalf of members, Mr. Colliver expressed good wishes for the future of Mr. Lothian, and stated he would be looked upon now as a valued country member. Mr. Lothian suitably replied.

QUESTIONS BY MEMBERS

Mr G. N. Hyam asked if flies were repelled by light blue colours, stating that recently in the Riverina district station hands were all wearing pale-blue shirts for this reason. Mr. Painter mentioned having noticed that flies were rarely seen on light materials of blue colour, and further said he had read that some hospital walls in America were painted light blue for this reason.

FLOWER PERFUMES

A very interesting lecture on this subject, illustrated by a large variety of flowers, was given by Mr J. H. Willis (see summary in this issue).

Following are some questions (and discussions) raised at the conclusion of Mr. Willis's address:

Mr. P. C. Morrison stated (a) that the purple colour of the Indoloid group closely approximates decayed flesh; (b) red flowers were never found with heavy scents; such scented flowers were either yellow or white to attract night-flying moths, (c) insignificant flowers have strong scents in order to survive; (d) red roses have the best scent because they rely upon it to attract bees, which are colour-blind to the red part of the spectrum. Question: Why was it that the Musk (*Mimulus moschatus*) suddenly lost its perfume all over the world? Mr. Willis replied that it was a fact that by 1909 *Mimulus moschatus* had lost its perfume, but it was still not known why.

Mr. R. G. Painter: *Acacia pendula* has a violet-scented timber, not evanescent; how do you account for this? Mr. Willis replied that this was purely imitative of the true violet odour in flowers.

Mr. Ros. Garnet asked why the Geraldton waxflower was infested with blowflies. Mr. Willis replied that he was unable to trace any perfume, but *Erica canaliculata*, a South African plant of similar colour-type, had a rather indoloid smell. In this matter it was of interest to note that *Kleimia articulata*, better known as "Candle Plant," had the indoloid smell, yet the flowers were a dirty white, whilst *K. acaulis*, from a locality only a few miles away, had a definite rosy perfume. Mr. Hammet stated that the Geraldton Waxflower has aromatic leaves.

Mr. Morrison suggested that some of the so-called blowflies noted as infesting plants without apparent smell, might be flies of some other type, e.g., hover-flies.

Mr. H. C. E. Stewart asked how to classify wattle-trees as regards perfume. Mr. Willis replied that wattles varied considerably, and there were several groups of smells: *Acacia montana* suggested caramel, Cootamundra Wattle was heavy-scented, *A. Farnesiana* violet-scented, etc. It was not known in what part of wattle blossom the essential oils were secreted.

FLOWER PERFUMES AND THEIR CLASSIFICATION

By JAMES H. WILLIS

(Abstract from an address to the F.N.C., Nov. 13)

"And Quoodle here discloses all things that Quoodle can,
They haven't got no noses, they haven't got no noses,
And goodness only knowes the noselessness of man!"

G. K. Chesterton's *Song of Quoodle* expresses a canine contempt for the human olfactory apparatus. Sense of smell may be very unequally developed among higher animals and, although man is perhaps unresponsive to parts of the "odour spectrum," he can at least detect the presence of 1/120,000th of a grain of rose oil essence, whereof the dog fraternity seems oblivious. The faculty for detecting odours is said to be more delicate among males than in females of the human species. Insects are particularly acute, and bees will smell out a flowering bush from a distance of a quarter of a mile.

Writing in *New Flora and Silva* (Vol. 12, No. 3, p. 198, 1940), Mr. F. Ballard describes an interesting experiment carried out on 15 people who were asked to close their eyes, smell a flower of the *Narcissus poeticus*, and then describe its perfume. Here are some of the comments: "Delightful, something like jasmine"; "a pleasant narcissus smell"; "slight vanilla smell"; "slight lily-of-the-valley"; "like a lily, but with an unpleasant background"; "sweet, but unpleasant." Two of the number detected an unmistakable odour of rice-pudding in the flower, while two others could find no smell at all!

Two facts emerge from this experiment—the widely divergent interpretations of individuals in regard to odours, and the difficulty of describing them in any precise language. If a blindfold person be asked to smell an unknown blossom and name its odour, as often as not he will be unable to do so until his eyes act as a guide to its identity. Just as high-pitched notes are beyond the audibility of certain people, so can some odours be outside the range of one's olfactory sense; a British ornithologist could distinguish species of birds by their characteristic smells and yet fail to notice the bitter-almond tang in crushed peach and cherry shoots. Most people find the scent of tansy, fennel, African marigold, saffras, and mint-hush quite pleasant and even refreshing, but to some individuals these are repugnant in the extreme.

A few people are unconsciously deficient in sense of smell and in sense of flavour which depends on it, in the same way as others are colour blind or tone blind. Usually flavour is similar to smell, but not invariably so—the tropical *Durio* (durian) possesses a stench like had flesh or rotting onions, yet, if eaten, this fruit has all the qualities of whipped cream and *blanc-manger*!

No external sense can receive such delicate, enduring impres-

sions as that of smell. Musical sounds will conjure up visions of the past, but a stray whiff of wood-smoke, flower, or moss can transport us to scenes long since forgotten. The subtle, warm, friendly exhalation of leaf-mould and moist earth is due to minute traces of a highly odorous compound—one trillionth of a milligram will afford a perceptible smell.

Leaves, timbers, resins, and roots may secrete certain essential oils and often give out a strong perfume that is not duplicated in any flower. Among such scents are: tansy, lavender, rosemary, eucalyptus, winter-green and sassafras in foliage and bark; the characteristic smells of camphor, teak, cedar, rosewood and Lawson Cypress timbers; myrrh, sandarach, and grass-tree among fragrant resins; and the odours of ginger, anise, spikenard and orris root. Some of these have been sought and highly prized since the dawn of history. The grass genus *Cymbopogon* embraces several ginger, or lemon-scented species, collectively known as "Indian Oil Grasses," which have been used in drugs and perfumery for several millenniums; *C. Schwananthus* has particularly fragrant roots and stems, reminiscent of rose, geranium, and mint when fresh, and Schweinfurth found pieces of it in a tomb at Thebes (about 1100 B.C.), which were still odorous after 3,000 years!

Unlike most leaf scents which are comparatively durable, the perfumes of flowers (our immediate concern) are evanescent and emerge only during a stage of development—very few (e.g., rose) outlast the fading of the petals. It is generally conceded that the pleasant aromas of blossoms are there for one purpose: to attract the attention of insect visitors in order to ensure effective pollination. Some flowers rely upon their bright colouring as a bait, and in these the scent factor is either absent or feebly developed.

It is natural that we should attempt to classify in some way the innumerable floral perfumes that exist. A colour may be defined with scientific exactness, its wave length indicated, and a visual comparison made against some standard. Odours, on the other hand, are extraordinarily difficult to express and there are no constant standards available for comparison. Any perfume is usually the sum-total effect of a whole suite of complex organic compounds, some of which may not be identifiable. Again, the quality of an odour will change remarkably with dilution: the substance *indol* is an important constituent of putrifying organic matter and has a most revolting smell, but when rarified it is sweetly fragrant and contributes to the agreeable scent of jasmine and many other flowers.

A critical analysis of the essential oil is not of much use in specifying a perfume, since the distinctive quality of a mixture cannot be gauged from the odours of its component parts—what

would be the use of describing *Jasminum grandiflorum* scent as the sum of the smells of methyl anthranilate, indol, benzyl alcohol, benzyl acetate, linalol, and linalyl acetate?

Several classifications have been propounded in the past, some by chemists, using the principal constituent of the essential oil as a criterion, and others by perfumers who were guided more by aesthetic considerations. It has even been attempted to arrange perfumes in a series like the notes of a musical scale, dull indefinite odours corresponding to low notes, and sharp keen smells to those of high pitch; such schemes, however, are in the nature of curiosities rather than useful contributions to scientific thought.

Rimmel's classical *Book of Perfumes* divides pleasant odours into 18 classes, including scents not found in flowers; his "mint" group embraces such differing entities as halm, sage, and rue. Kerner has said that at least 500 distinct floral scents have been distinguished and these he would apportion in five main groups based on the type of essential oil, viz., *Indoloid*, *Aminoid*, *Benzeloid*, *Paraffinoid* and *Turpenoid*. Hampton improved on the work of Kerner and proposed an amended system with ten principal classes, but even this is unsatisfactory, especially to an Australian who will find few, if any, of our familiar bush aromas exemplified.

Having given some attention to the scents of both native and exotic (garden) flowers, I venture to submit a new tabulation which will include about 100 conspicuous representatives of both. Hampton's divisions, with some minor rearrangement, form the basis of the following scheme to which are subjoined explanatory notes on the primary groupings employed. Eight major classes are here recognized and there are five minor classes, to which one could add almost indefinitely, for the number of delicate floral scents which defy accurate grouping are legion—where are we to place the subtle fragrance of the Freesia, Solomon's Seal, Wild Raspberry and many of our terrestrial orchids? Plants which are permeated throughout by a strongly odorous principle, as in many *Labiatae* (e.g., *Salvia*, *Prostanthera*, *Mentha*), are deliberately excluded from the present compilation.

Where the concrete ottos are too difficult or expensive to extract, chemists have aimed at copying natural flower perfumes by means of synthetic mixtures. It has been found, for instance, that the odour of Hawthorn blossom is fairly well reproduced by *anisic aldehyde*—the foundation of all hawthorn perfumes and fancy preparations. *Styryl* (or *cinnamyl*) alcohol has a powerful odour resembling Hyacinth, while *terpineol* is the base of Lilac perfumes, usually modified by the addition of other fragrant oils according to taste. In 1893, after years of patient research, Tiemann and Krüger succeeded in preparing a good artificial

Violet perfume which they termed *ionona*. Most artificial products of this kind, however, are poor substitutes for the subtle aromas of Mother Nature.

I regard fragrance as of equal importance with colour and form in the flower garden; the pity is that intensive breeding and selection toward *bigger, brighter blooms* so often means a progressive degeneration of the scent factor. What satisfaction is there in a perfectly shaped rose of gorgeous colour, if it has no trace of perfume?

Odour (and taste) often furnishes the botanist with a useful clue to the identity of a plant, but, to anyone with a flair for classifying things, it is quite a pleasant exercise to try and arrange the myriad floral scents experienced into some kind of orderly scheme: you will probably differ as much from your neighbour's opinion as the botanists differ about the affinities of the very plants themselves!

A CLASSIFICATION OF FLORAL SCENTS

(Australian examples indicated thus †)

MAJOR GROUPS

1. **INDOLOID:** Certain Aroids (*Amarophallus*, *Dracunculus*); *Stapelia*; *Sterculia foetida*; *Kleinia articulata*; *Erica canaliculata* (?); †*Hydrocotyle laxiflora*.
2. **AMINOID:** *Crotægus*, *Pyracantha*, *Photinia*, *Sorbus*, *Spiræa* and many other *Rosacæe*.
3. **HEAVY:**
 - Gardenia type: *Gardenia*; *Datura arborea*; *Nyctacereus*, *Epiphyllum crenatum*, and many other cacti; *Gladiolus tristis* (nocturnal); *Amaryllis*, *Lilium* spp.; *Narcissus* spp.; †*Crinum floccidum*; †*Stachousia monogyna* (nocturnal).
 - Bouvardia type: *Bouvardia longiflora*, *Luculia*, and *Viburnum* spp.
 - Nerole type: *Citrus* spp.; †*Atherosperma moschatum*.
 - Champaca type: *Michelia Champaca*; *Pandanus odoratissimus* ("Keora"); †*Pittosporum undulatum* (?).
 - Jasmine type: *Jasminum* spp.
 - Privet type: *Ligustrum* spp.; *Ailanthus*.
4. **AROMATIC:**
 - Spicy type: *Dianthus* (Pinks), *Matthiola* (Stocks), and †*Helichrysum ferrugineum* var. *Gravesii* (cloves); *Eupatorium* spp. (cinnamon); *Rhododendron fragrantissimum* (nutmeg); †*Pimelea octophylla*; †*Lomandra* spp.; *Muscari botryoides*; *Tilia cordata*; *Catolpa bignonioides*.
 - Vanilla-Chocolate type: *Vanilla* spp.; *Orchis fragrans*, *O. odoratissima*, and *Nigritella angustifolia* (Swiss alps); *Watsonia* spp.; *Asara microphylla*, *Heliotropium peruvianum*; *Petasites fragrans*; *Cheiranthus Cheiri*, *Choisya ternata* (?); *Errobotrya japonica*; *Iris germanica* (?); †*Dichopogon strictus*, †*Solanum esuriale*, †*Pimelea curviflora*, †*Acacia montana*.
 - Nutty-Clover type: *Ulex*, *Trifolium* spp., *Spartium*, *Genista* spp., *Vicia Faba* (Broad Bean—ecstatic to some people), *Lathyrus odoratus* and *L. pubescens*, *Loburnum*; *Trachelospermum jasminoides*; *Salandra nitida*; *Leucocoryne izioides* var. *odorata*.

Rose type: *Rosa*, *Prunus mume*; *Mohonia Bealci*; *Kleinia acanthis*;
Convallaria majalis, *Cypripedium Calceolus*.
Lilac type: *Syringa vulgaris*; †*Melia Azedarach*.
Mignonette type: *Reseda odorata*; *Vitis amurensis*.

5. ALCOHOLIC-FRUITY: *Mitchelia figo* and *Antirrhinum majus* (wine);
Salix raprea (brandy); *Nuphar lutea* (paw-paw); *Philadelphus
microphyllus*, *Cytisus filipes* and *C. Battandieri* (quince); *Gail-
lardia scabiosoides*, *Iris graminea*, and *Tulbaghia alliacea* (apricot);
†*Hymenoporus flavum*, *Olearia fragrantissima* (peach); *Phila-
delphus coronarius*; *Lonicera* spp.; †*Cynoglossum suaveolens* (?).
6. HONEY: †*Encalyptus*, †*Melaleuca*, and †*Kunzea* spp.; †*Hakea sericea*,
†*H. suaveolens*, and †*H. pugioniformis*; †*Banksia* spp.; †*Leuco-
pogon* spp.; †*Tetragonia implexicoma*; †*Diplarrhena Moraea*;
†*Anguillaria dioica* ("Early Nancy"); *Buddleja* spp.; *Senecio* sp.
7. MUSKY: *Rosa moschata*; *Achillea moschata*; *Herminium Monorchis*
(or as of ants); †*Caladenia angustata*; †*Melaleuca pungens* var.
obtusifolia and †*M. nodosa*; *Centaurea gymnocarpa* (?).
8. ANIMAL: *Codonopsis*; *Cimicifuga*; *Orychis hircina* and †*Callicoma
serratifolia* (goats); †*Melaleuca exarata* (sheep); †*Encalyptus
tereticornis* var. *latifolia* (bugs); *Chrysanthemum lacustre* and
C. frutescens (sweaty feet); †*Brachylova daphnoides*.

MINOR GROUPS

9. SEA-WEED: †*Hakea nodosa*; †*Liparis reflexa* (?).
10. POPPY: *Papaver nudicaule* and other spp.; *Eschscholtzia*.
11. VIOLET: *Viola odorata*; *Alocasia odora*; †*Acacia Farnesiana*; *Malus
ioensis*; *Iris* spp. (some,—odour also present in rhizome, i.e., "Orris
root").
12. BORONIA: †*Boronia megastigma* and †*B. heterophylla*.
13. LEMON (of foliage) *Magnolia grandiflora* (slight ?); *Daphne odora*
(slight ?); *Brasero-Cattleya* spp.

EXPLANATORY NOTES

In the foregoing classification, where nearly all members of a genus have like odours, that genus is cited without mention of any particular species; where several representatives have a distinctive perfume, the letters "spp." are written after the generic name. The interrogation mark, following certain species, indicates doubt as to their correct placing.

1. The *Indoloid* group includes flowers, which, on account of their pollination by carrion flies, give out an evil stench: some of them (chiefly tropical) even rival the animal putrescence that they seek to imitate, and they commonly have deep, purplish-red flower parts resembling the colour of decayed flesh. *Indol* is the determining substance of the bad odour which is well exemplified by giant s.e. asiatic members of the *Arum* family.

2. In the *Aminoid* group belong flowers which, though sweet enough, have an unpleasant, disturbing background—ammoniacal or distinctly "fishy." The principal constituent is an *amine*, related to ammonia, and arboreal members of the *Rose* family (hawthorn, rowan, firethorn, etc.) are conspicuous in this category.

3. The *Heavy* class is an enormous assemblage of species, having blooms with intense "heavy" perfumes of often almost overpowering sweetness. They are sometimes described as "tropical," and indeed many tropic flowers belong here—frequently with thick white or yellowish petals which emit their strongest fragrance at night time, obviously with a view to

pollination by nocturnal moths. The Keora (*Pandanus odoratissimus*) has been claimed as "the most delightful, rich, and powerful of floral perfumes." For convenience, the group has been divided into odours of six types, but others are recognizable and; even among the lilies, many distinct qualities are found, as for instance the scent of "Madonna Lily," "Christmas Lily," "Regal Lily" and the various kinds of Narcissus. *Indol*, but in very dilute quantity, is an important factor.

4. The preceding group passes almost imperceptibly into, and is often difficult to separate from, the *Aromatic*. Here, however, are blossoms that are sweet-smelling, and sometimes strong, but refreshing and exhilarating rather than "heady." The section is also a large one and at least six types of odour have been listed, all being most agreeable—spicy, nutty and caramel scents come into this group. Broad Bean is particularly uplifting.

5. *Alcoholic* and *Fruity* odours are discernible in some blossoms, but are usually masked by other more aggressive smells; they generally depend upon organic esters (e.g., *amyl acetate*, which is present in ripe bananas). Two outstanding examples of the class are Port-wine Magnolia (*Michelia figo*) and Giant Atlas Broom (*Cytisus Baltandieri*), which is a striking simulation of quinces. Again, the group grades almost insensibly into aromatic scents on the one hand and those of honey on the other.

6. Australia is unusually rich in *Honey* scented flowers, some of our eucalypts, honey-myrtles, heaths, and hakeas smelling deliciously and exactly of "honey-in-the-comb."

7. There is no vegetable facsimile of animal Musk (from the Tibetan Musk deer), but many flowers have a *Musky* quality, described as a "mixture of beeswax and honey." In some orchids (e.g., *Caladenia angustata* and *Herminium Monorchis*) the musky odour has a tendency to unpleasantness, like that of ants, while in *Centaurea gymnocarpa* there is a tang of curry also present.

8. A few flowers emit unmistakable *Animal* smells, which may be quite disgusting—*Orchis hirsuta* reeks of "billy-goat," whereas the Shasta Daisy clan smell like "unwashed or sweaty feet." Other plants change to animal odours only in winter, e.g., the Early Purple Orchid begins with a sweet vanilla fragrance, but at length develops a cat-like effluvium.

9. Rarely, there is a *Sea-weed* or "kelpy" exhalation from small greenish flowers and one could cite the swamp-loving *Habenaria nudosa* (which flowers in May or June). The orchid *Liparis reflexa* I would also place here, though some regard its odour as animal-like.

10. *Poppy* or *opium* smells are most distinctive, but seem to be restricted to the family *Papaveraceæ*; they are excellently rendered by the familiar Iceland Poppy.

11. Pure *Violet* perfume (as found in *Viola odorata*) is comparatively rare and shared by few other flowers; it induces olfactory fatigue, so that a hearty and repeated sniffing of a bunch of violets appears to rob their fragrance, whereas the fault is with our nasal nerve endings. The aroid *Alocasia odora* has greenish, cowl-like spathe with a violet scent. Certain irises have a trace of it, but it is more strongly developed in their rhizomes (whence "Orris root"). The violet-scented blooms of *Actaea Farnesiana* inflict a garlic breath on whoever essays to chew them, and this curious transformation of a violet into an onion odour is by no means isolated.

12. *Boronia* is a glorious, fresh perfume of unique quality; it was esteemed by the aborigines of Western Australia who, took little notice of other floral scents.

13. The *Lemon* scent of foliage is attributable to the sharp-smelling aldehydes *citral* and *citronellal*, but is not paralleled among flowers. The large and cream-flowered *Magnolia grandiflora* and, perhaps, *Daphne odora* have a fragrance that could be described as "lemony."

LIZARDS UNDER DOMESTICATION

By EDITH COLEMAN, Blackburn, Vic.

Mr. Davey's articles on lizards (*V.N.*, Sept. and Oct., 1944) were especially interesting to me. His reference to the tail-shedding habit of Geckos recalls an incident which has some bearing on the habit in other lizards.

When weeding the garden at Healesville (30/5/43) my daughter unearthed a "nest" of four or five small lizards. Keeping their bodies perfectly motionless they all raised their tails and waved them to and fro for a moment or two, disappearing when the "danger" was averted. We assumed that this was a protective measure of great survival value, developed along evolutionary lines. A bird might sight and seize a wriggling tail which, in the circumstances, its owner would be happy to leave behind. The early bird is bluffed into capturing a "worm" instead of a lizard!

Returning from Marlo (Feb., 1933) we saw a large Blue-tongue on the road near Orbost. As it appeared to have been hurt, we brought it home and proffered hospitality. Next morning she rewarded us with 13 small replicas of herself, seven of which were still-born. Two days later the mother disappeared, leaving six very lively babies on our doorstep, so to say. They fed and lived lustily for some months, but died during some cold days in August. A surprising feature of those lizards, when newly born, was a great show of ferocity. With gaping mouths they "charged" us in a most alarming manner, a ferocity which was soon dropped. While yet only a few hours old they were running up and down our bare arms, "all passion spent."

Here, indeed, was a wonderful protective measure. Few birds would care to invade the arena in face of a dozen gaping and charging mouths. Under natural conditions, in a few hours they would have developed their trump protective cards, a flattened body and swift disappearing trick. Although Blue-tongues are rather sluggish in their movements, it is surprising how quickly they can get out of sight when the need arises. With body flattened to the ground they move off with an almost sliding action. The menacing attitude appears to be a useful piece of "bluff" which safeguards them while getting their first wind in the very dangerous world they have entered. The blue tongue, too, is a surprisingly startling piece of "bluff," when displayed by older lizards.

Having entertained some of the larger lizards I know a little of their fascinating ways. They make charming and mostly harmless pets, splendid subjects for budding naturalists. The Shingle-back and Blue-tongue, being less exacting in the matter of diet than the Jew, or Bearded Dragon, were more readily domesticated.

The Jew (*Amphibolurus barbatus*) lived with me for 14 months. It was an object lesson to see him stalk and seize an insect, with almost imperceptible movement.

His threatening colours, open mouth, distended throat, and lashing tail, are not all bluff, for his teeth are sharp enough to demand respect. He would make a startling leap at any object of his distrust or swing round, with a lashing tail, that should be most terrifying to a timid enemy. At one-thirtieth of a second my photographs of this "attack" were always blurred.

The "double-headed" Shinglebacks, or Stumptails (*Trachysaurus rugosus*) were gentle pets. They walked backward or forward with equal facility, which made the stump ends of their bodies seem even more head-like, as puzzling as the old "fore and aft" caps! The feet, too, being often turned "every which" way, did not help one to anticipate the direction of their movements.

Soft fruits, dandelions and other flowers, as well as snails, eggs (first broken) and milk, were relished by both species. It was pretty to see a blue tongue sliding through the milk, then the raised head, as if an owner were enjoying the taste, as it ran down his throat. Bananas were swallowed in goodly mouthfuls as well as raw beef; but if too-large pieces of beef were given they were first well licked, as if to facilitate swallowing. Is this the origin of an old belief that snakes slime their prey?

My lizards loved a bath and on hot days would lie in the water for long periods. Skin-shedding was a fascinating thing to see. I watched it many times, making notes on January 7th, 1941, January 24th and December 9th, 1942, and January 10th, 1943. Here are those of 27/1/42: "At 1.30 p.m. skin loose and ragged about the ears; a few flakes on head. Fragmentary shedding from right leg and almost free from left foreleg. By 3.30 p.m. the lizard was free of the body-skin, which lay in a small moist heap. The new skin was much darker, the patterning very bright and clear. Like Pliny's sloughed snake, the owner appeared sleek and young again, but crept off into a dark corner."

The skin of the body is shed in one piece, like a waistcoat, or sleeveless cardigan, with pathetic little "armholes" through which the limbs have been drawn.

The soft hollow body is alternately lumped and flattened in the centre to achieve the first slit, when the now loose coat is easily shed: but from the solid tail it is "peeled" off in a tubular piece, leaving a few concertina-like wrinkles at the extreme tip (such as one may see in the finger-tips of a kid glove when "peeled" off inside out), the "honeycombed" inner surface being now outside. It was scraped off by being pushed into and withdrawn from the straw of his bed—a modified form of snake sloughing.

A REMNANT OF THE SNOWY RIVER JUNGLE

By N. A. WAKEFIELD, A.I.F.

On the west bank of the lower Brodribb River, between Lake Curlip and the Snowy, is to be found the last remnant of the liane jungle which formerly covered practically all the present Snowy River flats.

The patch is roughly triangular in shape and occupies only about fifty acres, but, by good fortune, it is completely isolated with tea-tree swamp on all sides, the Brodribb River to the south and east, a flowing creek to the west (Mille Inlet) and Lake Curlip to the north. Access to the jungle can be gained either by boat from the Brodribb River or from the cleared flats to the west; the latter course, however, entails a search through the swampy scrub to find one of the only two crossings over Mille Inlet.

The tea-tree swamp is covered by a dense stand of Swamp Paperbark, sheltering a few small semi-aquatic plants such as Water Buttons, Water Buttercup and Swamp Weed, with the Common Reed in dense stretches in the wetter parts.

The jungle itself consists of great spreading *Mahogany Gums (*Eucalyptus bokryoides*) and a dense stand of Lilly-Pilly (*Acmena Smithii*), Blackwood and Sweet Pittosporum (*P. undulatum*), supporting tangled masses of a dozen species of lianes and climbers, and sheltering numerous ferns on the ground beneath.

The *Staff-Climber (*Celastrus australis*), *Stalked Doubah (*Marsdenia rostrata*), and *Jasmine Morinda (*M. jasminoides*) are very plentiful, ascending the larger trees to a height of fifty or a hundred feet. The four climbers of the Lily family—*Wombat Berry (*Eustrephus latifolius*), *Scrambling Lily (*Geitonoplesium cymosum*), *Austral Sarsaparilla (*Smilax australis*) and *White Supplejack (*Rhipogonum album*)—are all very abundant on the smaller trees, their rough wiry stems forming such a tangle as to defy intrusion in many places. The White Supplejack is very rare elsewhere in the district, but has been noted also at Lockend, a few miles further west.

The large creepers in less abundance are: *Water Vine (*Cissus hypoglauca*), Twining Silk-Pod (*Parsonsia Brownii*—syn. *Lyonsia straminea*), *Erect Clematis (*C. glycinoides*) and *Big-Leaf Vine (*Sarcopetalum Harveyanum*). The clustered pink pear-shaped berries of the last were in evidence in one place—an occurrence rarely, if ever, noted before in Victoria. Wonga Vine (*Pandorea pandorana*—syn. *Tocoma australis*) and Common Apple-Berry (*Billardiera scandens*), though plentiful in the Orhost district, are rare here, occurring on the marginal parts of the main jungle patch. Smaller twiners are represented by the *Bearded Wart-flower (*Tylophora barbata*) in great abundance,

Forest Bindweed (*Calystegia marginata*) in more open places, and a few seedlings of Clematis (*C. aristata*).

Epiphytic on the trunks of trees, and on fallen logs, is an abundance of Fragrant Polypody (*Polypodium pustulatum*), Common Filmy Fern (*Hymenophyllum cuspidatum*) and Necklace Fern (*Asplenium flabellifolium*), with also a few small patches of Kangaroo Fern (*Polypodium diversifolium*). On the jungle floor are masses of Creeping Lace Fern (*Dennstaedtia davallioides*), Shining Wood-Fern (*Dryopteris Shepherdii*), Common Rasp-Fern (*Doodia media*), and Swamp Hypolepis (*H. Muellerae*). The Soft Tree-fern (*Dicksonia antarctica*) and Gristle Fern (*Blechnum cartilagineum*) are apparently each represented by a single plant on the butt of a fallen tree. In some of the marginal parts the Sickle Fern (*Pellaea falcata*) and Common Maidenhair-fern (*Adiantum aethiopicum*) are also to be found.

The dense scrub gives way in places to shaded depressions where there are thickets of Tall Sedge, Tall Sword-sedge and Common Leaf-rush. Here, on the edges of the denser scrub, are patches of Prickly Currant-bush (*Coprosma quadrifida*), which together with many trees is beautifully hung with Festoon Moss (*Weymouthia mollis*) and covered with lichens. These mossy trees are hosts to the Butterfly Orchid (*Sarcochilus australis*), and the Lilly-Pilly harbours the quaint little *Jointed Mistletoe (*Korthalsella opuntia*), which was first recorded for Victoria by Mr. Frank Robbins from Pipeclay Creek, a dozen miles to the west.

Perhaps the most interesting feature of the jungle patch is the occurrence of *Cabbage-tree Palms (*Livistona australis*) west of the Brodribb. There are three fine specimens growing in the dense thickets, and probably a further search would reveal more. The other recorded locality for the palms is on Cabbage-tree Creek, where, happily to relate, numerous seedlings have appeared beneath the old ones in the past few years.

About the rather indefinite eastern and southern margins of the jungle, in the somewhat open parts towards the river bank, *Blue Olive-berry (*Elaeocarpus cyanus*), Mutton Wood (*Rapanea Howittiana*), Hazel Pomaderris (*P. apetala*), and an interesting shrub form of the Staff Climber begin to appear. The Tree Violet (*Hymenanthera angustifolia*) and Boobialla (*Myoporum insulare*) with the Spiked Dodder Laurel (*Cassytha phaeolasia*) are quite plentiful, and Common Bracken and Hop Goodenia (*G. ovata*) form dense patches. The Scrub Nettle (*Urtica incisa*) is abundant and there are a few plants of both the Kangaroo Apple (*Solanum aviculare*) and Toothed Nightshade (*S. xanthocarpum*), the latter rather downier and less prickly than usual, recalling that rare and beautiful species, **S. violaceum*, which is recorded for

Victoria only from Mount Drummer, where, the plants have presumably suffered extermination by bush fires. The *Leguminosae* are represented only by Blackwood in this particular jungle patch, while the only grass is *Bordered Panic Grass (*Eulalia marginata*), and there is very little of that.

The rare *Yellow Doubah (*Marsdenia flavescens*) evidently does not occur here but favours rather steeper gully-scrubs as at Lakes Entrance and Pipeclay Creek; and other eastern jungle creepers which have not been noted are *Tape Vine (*Stephania hernandiæfolia*) and *Gum Vine (*Aphanopetalum resinolum*)—they evidently reach Victoria only in the extreme east, about Mallacoota Inlet.

There is plenty of evidence to show that numerous wallabies, bandicoots and possums make this jungle their homes, and the waterways round about shelter black duck, teal and other water-birds. The whip-bird can be heard now and again in the thickets, but there is no evidence of the lyre-bird being present. Many other birds would doubtless come for the seasonal harvest of jungle berries.

This jungle patch is, remarkably enough, still unalienated Crown land, and its swampy surroundings would render it safe from fire were it not for the hand of man. There has been at least one attempt at burning, but it is to be hoped that none will ever be successful, and that destruction will never find the last stand of the Snowy River jungle as it has tragically overtaken Sperm Whale Head National Park.

Note.—The species bearing an asterisk (*) are exclusively East Gippsland plants of the sub-tropic extension from New South Wales. Lilly-Pilly and Sweet Pittosporum extend (in isolated pockets) as far west as Wilson's Promontory and Western Port Bay, respectively.

EXHIBITS AT NOVEMBER MEETING

Mrs. Fenton Woodburn: Marine shell (*Cerithium sp.*) from Geelvinck Bay, Dutch New Guinea.

Mrs. C. French: Vase of seven species of *Leptospermums* (Tea-trees), garden-grown at Canterbury.

Mrs. M. E. Freame: Seaweeds, mounted and wrapped in the *Argus* of November 10, 1879, *Illustrated Australian News*, March 10, 1881; and *World*, September 29, 1882.

Miss E. Raff: Abnormal flowers of Cream Marguerites, garden-grown in Hawthorn East. The bush has only a few normal flowers.

Mr. E. Muir: Native flowers, including *Pimelea octophylla*, *Callistemon rugulosus*, *Melaleuca acuminata*, *Billardiera cymosa*, *Eremophila longifolia*, *Nicotiana glauca*, *Stylidium graminifolium*, *Bursaria spinosa*, *Eucalyptus leucocylon*, *Myoporum platycarpum*.

Mr. T. Griffiths: Adder's Tongue (*Ophioglossum soriaceum*) from Sandringham. (This is not *O. vulgatum* of Europe.)

Mr. C. J. Gabriel: Marine shell (*Magilus antiquus*, Mart.—from Mauritius) found living in coral.

Mr. J. H. Willis: Large Sclerote of the subterranean "Blackfellows Bread" fungus (*Polyporus mylittæ* Cooke et Masee) from Sassafras.

COLOUR PREFERENCES OF THE SATIN BOWER-BIRD

By ARNOLD HIRST, Sydney.

Having for the past ten years given considerable time to the study of the Satin Bower-bird in captivity, and in the process achieved the distinction of being the first to have bred and brought to maturity a splendid male specimen of this remarkable bird,* I feel that my observations on many biological and other matters relating to this species may be taken as authoritative. It therefore occurred to me that it may be helpful to give the result of a series of tests that I made in 1941 at the request of Mr. A. J. Marshall, who was enquiring at the time into several aspects of the birds' economy.

There were six tests in all carried out with the young bird, which being then only in his fourth year had not undergone his colour change, which occurred some eight months later.

For the purpose the following cards were used, each being 3 in. in length by $\frac{3}{4}$ in. wide and divided into the following colour groups.

Card No. 1	$\frac{2}{3}$ Blue	$\frac{1}{3}$ Red
" No. 2	$\frac{1}{2}$ Blue	$\frac{1}{2}$ Red
" No. 3	$\frac{2}{3}$ Red	$\frac{1}{3}$ Blue
" No. 4	$\frac{2}{3}$ Grey	$\frac{1}{3}$ Red
" No. 5	$\frac{1}{2}$ Grey	$\frac{1}{2}$ Red
" No. 6	$\frac{1}{2}$ Green	$\frac{1}{2}$ Red
" No. 7	$\frac{1}{2}$ Yellow	$\frac{1}{2}$ Red
" No. 8	$\frac{1}{2}$ Blue	$\frac{1}{2}$ Yellow
" No. 9	$\frac{1}{2}$ Blue	$\frac{1}{2}$ Green

It should be mentioned that in carrying out these tests I varied the placement of the cards in the following order:

No.	Test	Order of Selection
1	Scattered	No. 1, 2, 8, 9.
2	"In" row not in numerical sequence	" 1, 9.
3	In row in numerical sequence	" 1, 2, 8.
4	Reversed in numerical sequence	" 1, 2, 9.
5	In form of square	" 1, 3, 9, 8.
6	In form of square, but with numerical arrangement varied	" 1, 8, 9.

In collecting the cards it was observed that, although no single card was taken and all were collected and carried together to the bower, No. 1 was found in every instance to be the bird's first choice. It may be of further interest to add that although the hen bird revealed a definite interest in the cards and also collected several in each test, they were invariably carried only a short distance away and dropped.

Summarizing these tests on a percentage basis it will be seen, therefore, that the score of each card was as follows:

Card No. 1	$\frac{2}{3}$ Blue	$\frac{1}{3}$ Red	was 100%
" No. 2	$\frac{1}{2}$ Blue	$\frac{1}{2}$ Red	" 50%
" No. 3	$\frac{2}{3}$ Red	$\frac{1}{3}$ Blue	" 16.6%
" No. 4	$\frac{2}{3}$ Grey	$\frac{1}{3}$ Red	" nil
" No. 5	$\frac{1}{2}$ Grey	$\frac{1}{2}$ Red	" nil
" No. 6	$\frac{1}{2}$ Green	$\frac{1}{2}$ Red	" nil
" No. 7	$\frac{1}{2}$ Yellow	$\frac{1}{2}$ Red	" nil
" No. 8	$\frac{1}{2}$ Blue	$\frac{1}{2}$ Yellow	" 66.6%
" No. 9	$\frac{1}{2}$ Blue	$\frac{1}{2}$ Green	" 83.3%

* See *Vict. Nat.*, Nov., 1940.

Having completed this series of tests with the immature male it was a matter of considerable interest to me to observe the reaction of the adult male to the same stimulus, and on comparison with that of the young bird it was found to be remarkable, as the following extract from my records discloses:

Time, 10 a.m. Weather, calm and sunny. For each of the tests the cards were placed some distance from the bower, but where the actions of the birds could be clearly observed. In the first test the cards were scattered within the compass of a couple of square feet. Immediately following my withdrawal, Cards Nos. 1, 8 and 9 were picked up by the male and carried together to the bower.

For the second test I placed the cards in this arrangement:

6
4
35127
8
9

On this occasion two visits were paid, the first resulting in Nos. 1, 2, 8 and 9 being carried *together* to the bower!

On the second visit, following a short display before the female in the adjoining aviary while holding Card 8 in his beak (the bower being so situated that this was possible); Cards Nos. 3, 5 and 6 were carried and deposited with the others.

In the third test the cards were placed numerically in line resulting in Nos. 1, 2, 8 and 9 being again taken. The old hen now appeared for the first time and collected Nos. 3 and 4, which she carried a little distance away and deposited on the ground.

In the fourth test the cards were placed in a circle, again the blue bird made two visits; collecting Nos. 1, 2, 8 and 9 on the first, and Nos. 3, 5 and 7 on the second occasion.

It was here noted that while making his first selection, which on every occasion was with *greater deliberation than in the case of the young bird*, the female again visited the cards, but apart from causing the male to stage a short display before taking off with the cards, nothing was observed in her actions to suggest more than a mild interest in the cards that remained.

In test five the cards were again scattered, and being called to lunch I left them until 3 o'clock in the afternoon when on my return it was found that all the cards had been removed; Nos. 1, 2, 3, 7, 8 and 9 being placed about the bower, and 4, 5 and 6 *together* some little distance away.

Reduced also to a percentage basis the result of these tests works out as follows:

Cards Nos. 1, 8 and 9	100%
" " 2	80%
" " 3	60%
" " 4	nil
" " 5 and 7	40%
" " 6	20%

There can, I think, be little doubt from the foregoing that these birds have a definite preference for blue in their decorative schemes, but whether this colour attraction is indicative only of their artistic genius or is associated also with their breeding habits, I am unable to say. It would appear from my experience, however, that there is nothing to support the theory which has been advanced that the exteroceptive stimuli provided by either blue or blue-green has some influence on the normal breeding of the birds as I have never until the occasion of the test referred to provided my birds with any coloured ornaments, yet without them the hen has each year regularly laid and hatched her eggs.

THE STORY OF ELIZABETH GOULD

For something approaching a century, the name of John Gould shone almost in solitary glory as the father of Australian ornithology. Other workers before him—Latham, Lewin, Viellot, and Vigors and Horsfield, to name the most important—had shown the world something of the wonders of the birds of Australia, but it remained for John Gould to make the detailed study which stands to this day as the classical foundation for all modern work.

Until the centenary of Gould's visit to Australia in the late eighteenthirties, little was known of his faithful and talented helpmeet, Elizabeth Gould (née Coxen). Yet Mrs. John Gould was in many ways as remarkable as her husband. Imagine, if you will, a young woman still in her middle thirties, the mother of a young family, anchored by strong family ties to the soil of England—a woman of homely instincts, married to a man fired with almost fanatical enthusiasm for his life's work, the study of birds of far lands.

Imagine her, filled with a deep and abiding love for her man, struggling to find time adequately to mother her children and at the same time to help her husband by the exercise of her artistic talents. Imagine her, torn between conflicting calls of duty, reluctantly leaving part of her young family in the care of others, leaving the soil she loved, setting out for high adventure in a land across the world, patiently working in the background while the more mercurial John was charging round the Australian countryside collecting new birds and bringing them home to her to paint.

Imagine her, further, wearing herself out in her double task until she finally wears herself to death at the early age of 37 years. . . . Such, very much in brief, was the life of Elizabeth Gould.

Beyond the fact that she had painted many of the plates for Gould's *Birds of Australia*, and transferred them to the stone for lithographing, little was known of her until Mr. Alec H. Chisholm, visiting England in 1938 (the centenary of the Goulds' coming to Australia) discovered a wealth of unpublished (and largely unread) Gould material in the possession of the few descendants of the family. This was generously given to him to be returned to Australia. The story of the Gilbert Diary has already been told in these pages and, more fully, in *Strange New World*. The material also included a number of Mrs. Gould's letters written from Australia, the originals of which are now in the Mitchell Library, Sydney. The letters are published for the first time in *The Story of Elizabeth Gould*, by Alec H. Chisholm, together with a complete account of the members of her family, both antecedent and subsequent.

Born at Ramsgate in July 1804, Elizabeth Coxen was married to John Gould (who was two months younger) at the age of 24. Gould at this time was already launched on his life's work, and soon his wife's aid in figuring and lithographing his birds became indispensable. If John were to go (as he felt he must)—to Australia to cover worthily the field of Australian ornithology, they both realized that Elizabeth must make the visit too.

They sailed, in the little vessel *Parsee*, of 348 tons, in May, 1838, taking their eldest boy, John Henry, with them and leaving the three younger children with Mrs. Coxen, senior. They reached Hobart in September of that year, and were the guests of the Governor, Sir John Franklin, and his lady. Lady Franklin became very attached to Mrs. Gould, as the letters show, and after the fifth Gould child was born, in Hobart, Lady Franklin wanted to adopt him, but Mrs. Gould would not consider the proposal. Indeed, her letters show in every page that her scientific keenness and zeal never abated one whit her motherly love and care for her

children. Her constant yearnings for a sight of the little ones left at home; her concern for their welfare in spite of her confidence in their grandmother's care for them; and her pride in them all, would do justice to a mother to whom motherhood was the only care in the world.

But she worked by day and far into the night on her beloved John's plates, and in addition found time to develop a very penetrating interest in the country and people around her. It appears, too, that she attended to some of her beloved John's duties in the matter of correspondence. . . . "In the first place he has desired me to say he would write but for his constant occupation" . . . "He wished me to say for him everything that was kind to all, especially to his mother, sisters, and Mrs. Cleave and Mrs. Stuart, also Mr. and Mrs. Mitchell. He is extremely occupied. His not writing more frequently is really excusable, as you would acknowledge could you follow his movements as he slaves all day with untiring perseverance . . ."

And of her sketching "Just now during John's absence I find amusement and employment in drawing some of the plants of the colony, which will help to render the work on Birds of Australia more interesting. All our sketches are much approved of and highly complimented by our friends. I wish you could hear some of the magnificent speeches that are frequently made us, because I know you like dearly to hear your daughter praised. But at the end of it all I sigh and think if I could but see old England again, and the dear, dear treasures it contains, I would contentedly sit down at my working table and *stroke, stroke* away to the end of the chapter . . ."

The Goulds returned to England in 1840, and the sixth child was born shortly afterwards. Then, at the early age of 37 years, Elizabeth Gould died (in August 1841) before her eldest child had reached his 11th birthday.

Such was the life of a noble, zealous, remarkable woman to whom Australian bird-lovers owe so much. Wisely, Mr. Chisholm has left her letters to speak for themselves. They are published complete, the only annotations being in the form of brief remarks preceding each letter. The introduction, however, is a masterpiece of biographical research, of which the author may well feel proud.

The Story of Elizabeth Gould, with a portrait and two small wood-cuts, is only a slender volume of 74 pages. It is published in a limited edition of 350 copies, of which only 300 are for sale, at £1/1-. The production, by the Hawthorn Press, is in keeping with its status as a collector's piece. If one were disposed to search for a point to criticize, it would be that the edition should have been limited so strictly as to place the book, by reason of its cost, beyond the reach of so many who would enjoy it.—C.M.

AN ORCHIDOLOGIST'S LUCK

Requiring a few specimens of *Pterostylis musica* for exchange, last August, I went to a Sydney western suburban area where I had seen this species previously. Greenhood rosettes were numerous, and I dug up six which looked promising, and put them all into one pot. Two developed into fine specimens of *P. musica*. Three proved to be *P. pusilla* var. *prominens*, which I had not seen for some years, and which I was anxious to study critically because opinions have been expressed as to its meriting full specific rank. The sixth plant has now come to maturity, and revealed itself as a tall, well-developed *P. Mitchellii*. Can anyone better this lucky performance?—H. M. R. RUFF.

RADIAL RAYS AND BIRD BEHAVIOUR

(To the Editor)

Sir.—It is not my desire to try and impress "scientific" people with the theory of electro-magnetic waves controlling the actions of birds and animals, but to give the ordinary layman a line of thought—which can be supported by many natural examples—along which to observe and study, with the object of getting a clearer knowledge of what is the base of the faculty possessed by birds and animals which we designate "instinct"—a word which explains nothing. We know the reception usually meted out to any new theory, by "absolutely scientific" circles, through examples recorded in the past. The names of Robert Koch and Louis Pasteur—among many others—will bring to mind how their, at that time, unorthodox theories were received by the "ultra scientific." If nothing is known by Dr. Flecker, as he states, of the Spanish and German experiments with electro-magnetic waves and pigeons—the accounts of these have been published—how can he justify his astonishing statement that they were "vague and absolutely inconclusive"?

Yours, etc.,

ALBERT A. COOK.

Walkerston,
Mackay, Queensland.

(To the Editor)

Sir.—In dealing with the effect of the action of radiating rays in so far as they affect certain birds, Dr. Flecker has, in his replies, drifted into mere irrelevant quibbles regarding nomenclature. He has produced no evidence of the researches of physicists or of his own to refute my thesis wherein I postulated the effect of rays in their action in the orientation of birds.

He now cites the well known structure of the ears of the carrier pigeon, thereby suggesting that this is the cause of the orientation of birds. Were this a fact, then the question of the orientation of birds would have been settled years ago instead of being still undecided. Having failed to advance any scientific cause for the orientation or to add one more brick to the house of knowledge, he now asks for my authority for the proven effect of rays in such orientation. Georges Lakovsky, an eminent French physicist, who is engaged in scientific research with rays, records the following in his book entitled *The Secret of Life*. This book, on account of its great scientific value, has been translated into several languages. To end this discussion I herewith quote what Lakovsky records amongst other things:

"A most interesting observation made July 2, 1924, at the radio station at Paterna, near Valencia, came to my notice. A flock of pigeons had just been released near an aerial of this station at the time of transmission. It was observed that these birds could not manage to find their bearings and kept on flying in a circular fashion as if completely disorientated. This experiment was repeated several times and always produced the same result, that is to say the disappearance, or rather a very marked perturbation, of the sense of direction in carrier pigeons under the influence of electro-magnetic waves.

"The experiments were taken up again at Paterna at the radio station of Valencia, under the control of the Spanish military authorities, and also at Kreuznach (Germany). These fresh experiments fully confirmed my views concerning the influence of Hertzian waves on the instinct of orientation. A Spanish scientist, M. J. Casamajor, wrote a detailed report on the Paterna experiments. The Spanish carrier-pigeon service installed a

military carrier-pigeon station at Valencia at a distance of about 8 kilometres from the radio station of Paterna. At the time of the experiment in question pigeons were released one by one at regular intervals of three minutes near the station while transmission was taking place continuously.

"It was observed that all the pigeons began to fly by circling round for some time, but without succeeding in finding their bearings as they usually do after having flown round a few times. In spite of a change of way-length in the course of transmission no return to the normal condition was observed, and so long as transmission occurred, and it lasted more than half an hour, no pigeons succeeded in flying in a definite direction.

"It is important to note that barely a few minutes after the transmission was over the released pigeons flew towards their dove-cot without the least hesitation, even those which had taken part in the first experiment.

"Another series of experiments which took place on November 7th, 1926, in the same locality, produced the same result. The original experiments at Paterna put investigators on their mettle, for they could not understand the relation existing between the instinct of pigeons and the transmission of electro-magnetic waves. The German technicians hastened to verify and control Casanajor's observations. In March, 1926, they initiated a series of experiments similar to those carried out at Kreuznach. The conditions, however, were different and more rigorous. A site was chosen so that the dove-cot and radio station were diametrically opposed. Consequently this station was situated exactly as the crow flies on the course that the pigeons were bound to take. On arriving near the radio station it was noticed that the pigeons changed their flight, were losing their bearings, and appeared to be definitely disorientated. They did not succeed in resuming their course towards the dove-cot until their flying had brought them outside the intense electro-magnetic field surrounding the aerial of the radio station."

Further on Lakovsky states: "The observations made on carrier-pigeons appear to hold good for nocturnal birds also. It seems obvious, *a priori*, that the sensibility of these birds to electro-magnetic waves in general is different from that of diurnal birds by virtue of their special adaptation to light or darkness. These two species of birds, however, show a common feature: they feed on the same insects. We are led to believe, as we shall see later, that they are attracted to their prey by radiations."

This should be conclusive evidence of my thesis, quite apart from other records of the effect of rays on animal life by other physicists.

Yours, etc.,

ARTHUR H. E. MATTINGLEY.

Melbourne.

A NEW COMBINATION OF *HELICHRYSUM*

By P. F. MORBUS and J. H. WILLIS

Helichrysum thyrsoideum (DC.) comb. nov. (*Ocoteanthus thyrsoideus* A. P. De Candolle in *Prodronus Syst. Nat.* VI, p. 165, 1837).

When discussing the just claims to specific rank of *H. thyrsoideum* (*Vice-Nat.* LIX, p. 86, Sept. 1942) and using this binary name for the first time, we unfortunately neglected to comply with Article 37 of the International Rules of botanical nomenclature, which states, *inter alia*, that a name is not validly published unless it is "accompanied by . . . a reference to a previously and effectively published description of it."

In order to validate our new combination, we give above the reference to De Candolle's original diagnosis, which concludes with the remark (in Latin): "a most ornamental species, differing from all of this section in its glabrous character."

MUSEUM EX-DIRECTORS DIE

Mr. Daniel James Mahony died in Melbourne on September 27, soon after retiring from the position of Director of the National Museum. He was 66. Born in Melbourne, he graduated in science at the University of Melbourne, became lecturer there in geology, mineralogy and palaeontology 1902-4, and at the age of 28 became Victorian Government petrologist at the Mines Department in Melbourne. As an author of many scientific treatises, he enjoyed respect in many research centres abroad. Adelaide knew him, too, both as University examiner and as *locum tenens* for Sir Douglas Mawson at the Adelaide University during the first Mawson expedition to the Antarctic in 1912. It is, however, for his work at the Melbourne-National Museum that he will be most remembered. He wisely built on the sure foundations established by his famous predecessors, Sir Frederick McCoy and Sir Baldwin Spencer, carrying on in that respect the policy of Mr. J. A. Kershaw, whom he succeeded. But he was courageous enough to break from tradition whenever he considered the change to be in the interests of the institution. Mr. Mahony served with the British Expeditionary Forces in the last war with the rank of Captain of Royal Artillery. He was a member of the Council of the Royal Society of Victoria and of the Zoological Board. His most recently published work, which aroused great interest abroad, was a survey of the antiquity of man based on the discovery of an aboriginal skull in a sandpit at Keilor.

Dr. Charles Anderson, who retired from the position of Director of the Australian Museum (Sydney) a few years ago, and who has latterly been employed in censorship, died in Sydney on October 25. He was 67. Born in the Orkney Islands, Dr. Anderson brought to Australia a keen interest in science and a strong sense of humour that made him a good companion. Like Mahony, he was a geologist and palaeontologist, and he carried out much useful research work in the fossil beds in various parts of N.S.W. He had been an officer of several scientific societies, and in general had given much effective service to natural history in this country. His daughter married Harry C. Raven, the distinguished American zoologist who did good work in Australis some years ago, and who, we regret to learn, died in April last.

ORCHID MATERIAL WANTED IN EXCHANGE

In an endeavour to revise the New Zealand orchidaceous flora (75 species), Mr. E. D. Hatch, of Laingholm P.O., via New Lynn, Auckland, S.W.4, N.Z., would be glad to receive Australian specimens of any of the following 29 "trans-Tasman" species (common to New Zealand and south-eastern Australia). In return, he would be happy to supply workers here with orchid information or material from his Dominion: *Thelymitra isoioides* Sw, *T. longifolia* RetG.Forst., *T. aristata* Lindl., *T. pauciflora* R.Br., *T. carnea* R.Br., *T. Matthewii* Cheesem. (syn. *T. d'Altonii* Nicholls.), *T. venosa* R.Br., *Orthoceras strictum* R.Br., *Micratis unifolia* (Forst.f.) Reichb.f., *M. parviflora* R.Br., *Prasophyllum patens* R.Br., *P. Rogersii* Rupp., *P. nudum* Hook.f. (= *P. rufum* R.Br.?), *Calceana minor* R.Br., *Chiloglottis formicifera* FitzG., *Acianthus veniformis* (R.Br.) Schlechter, *Calochilus Robertsonii* Benth; *C. paludosus* R.Br., *Caladenia minor* (Hook.f.) Rupp. (syn. *C. carnea* var. *pygmaea* Rogers), *Townsonia viridis* (Hook.f.) Schlechter, *Corydalis aconitiflorus* Salisb., *Pterostylis furcata* Lindl., *P. nutans* R.Br., *P. foliata* Hook.f., *P. nana* R.Br., *P. mulica* R.Br., *P. barbata* Lindl., *Gastrodia sesamoides* R.Br., *Spiranthes sinensis* (Peters.) Ames.

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PROCEEDINGS

The monthly meeting of the Club was held on December 11, 1944, at the Royal Society's Hall, the President (Mr. Ivo C. Hammet) presiding over a large attendance.

A letter was received from the Forests Commission of Victoria notifying that Messrs. H. W. Beck, A. G. Campbell, A. D. Hardy, R. T. Littlejohns and A. J. Swaby had been accepted as an Advisory Committee for Sherbrooke Forest.

Excursion reports were given by Mr. J. H. Willis (Beaumaris burnt area) and F. S. Colliver (Coburg Lake).

The following were elected as Ordinary Members: Mrs. W. G. Beavis, Miss M. Owen, Mrs. H. Oaks, Messrs. J. C. Le Souef, A. S. Brown, and E. M. Fyson; as Country Members: Messrs. Sheldon (Lilydale), B. Tindale (Yarra Junction), J. J. Johnston (Rockdale, N.S.W.), and A. G. Hatcly (Stawell).

BEEES AND FORESTS

Mr. Turlton Rayment gave an illustrated lecture on this subject. He held the audience closely interested by a general discussion of the importance of bees in fertilizing forests, in producing honey (especially valuable at present) and in promoting bees-wax, which was now used in munitions. What first attracted him to the study of bees, Mr. Rayment said, was the constructive ability of the insects, combined with their strong social sense. The beautiful social system of the bees was evolved by Nature long before man came with his stupidity to upset it.

Mr. Rayment, who was cordially thanked on the motion of Messrs. Hyam and Chalk, gave further information in reply to questions. He said that the first honey-bees were brought to Australia in the convict ship *Isabella* in 1822. There is at least one native species of honey-bee (*Apis*), a rare inhabitant of the east Victorian highlands.

In reply to other questions the lecturer said that bees undoubtedly were attracted by the odour emanation from some animals (including man) and repelled by others; in one instance bees flew 200 yards to attack a man—why, no one could say. Odour, Mr. Rayment thought, was a stronger factor with bees than sight.

NATURE. QUERIES

Question: The Plain Turkey (Australian Bustard) lays one and sometimes two eggs to a clutch. Bushmen in North Australia state that when two eggs are laid one is infertile and never hatches, consequently the parent bird is seen with one chick only. When several adult birds are together, no one bird has two chicks of its own. Are there any accredited instances of two chicks in a clutch?

Reply (by Mr. A. H. Chisholm): It is an odd thing that although the Bustard when inhabiting Victoria was found usually to lay only one egg to a clutch, in Queensland the clutch is usually two and sometimes three. There may be something in the statement regarding the infertility of one egg, but certainly two chicks to the one mother have been recorded—and photographed. A singular consideration is that whereas the Bustard is so restricted in its breeding, the Emu, which lives in the same type of country and has similar habits, has as many as eight and ten eggs to a clutch. The Bustard is now protected throughout the whole of Australia and strong efforts are being made to safeguard it. In this servicemen, who formerly killed the bird, are co-operating.

Question: Mr. J. H. Willis reported having observed a wingless female of the Sydney "Blue Ant" (*Diamma bicolor*) on one flower spike of the Crimson Bottlebrush for two hours, apparently busily engaged in seeking nectar. Was this usual for a wasp that is habitually an earth dweller?

Answer (Mr. T. Rayment): *Diamma* belongs to the *Thynnidae* family of "flower wasps" and, although wingless, it is only to be expected that females of the species should visit native blossoms for their nectar. As a predator, this handsome metallic-purple insect has been known to attack mole crickets and partially paralyse them as food for the young wasps, which hatch out in about a week.

EXCURSION TO RINGWOOD

The large party of excursionists on October 21st included members of the Bird Observers' Club. It was intended to study insect visitors to flowers, Trigger-plants in particular. Sultry morning weather was followed by a cold change, and very few insects were moving in the afternoon. A few small bees were found huddled in bluebells; two flies, one in Manuka, the other in a buttercup, constituted the only other records. Members dispersed in small groups and followed their particular interests.

At the Hawthorn Nature Show, a few days later, Mr. Fulton mentioned having found three small grey wasps in Trigger-plants—one even held down by the beat column. He did not know of our quest and had not captured a specimen. As far as I know, the actual springing of the column by an insect remains to be observed.

A. J. SWANN.

A NEW QUEENSLAND PHREATIA (ORCHIDACEAE)

By W. H. NICHOLLS, Melbourne

PHREATIA CRASSIUSCULA, sp. nov.

Plant epiphytica humilis, circa 4-5-6 cm. alta. Foliis crassiuscula, glabris, erectis vel sub-patentibus linearibus, canaliculatis, circa 2.5-5.5 cm. longis. Inflorescentia erecta, 2-5 cm. longa. Flores minuti albi. Bractea angustelanceolata acuminata, circa 1.5-2 mm. longae, marginibus serrulatis. Perianthii-segmenta patentia, marginibus integris. Sepalum-dorsale erectum, ovatum, obtusum, circa 1 mm. longum. Sepala-lateralia sepalo-dorsali aequalia sed paulo latiora. Petala oblonga obtusa, circa $\frac{1}{2}$ mm. longa. Labellum basi concavum, rhomboide-ovatum; marginibus integris, apice recurvata. Columna brevissima et lata, calcar obtusum. Pollinia 8.

A dwarf plant, epiphytic on the stems of forest trees, also on palms. The very short stem covered at the base with the persistent bases of fallen leaves. Leaves several, fleshy, crassula-like, glabrous, semi-terete, equitant, erect or somewhat spreading, channelled on the upper side, 2.5-5.5 cm. long. Inflorescence erect, in axillary racemes, shorter than the leaves, 2-5 cm. long. Flowers minute, white or cream (Bailey describes the flowers as yellow—as in *Ph. limenophylax*), rather crowded, almost sessile. Bracts longer than ovary, the margins briefly and somewhat irregularly serrate. Perianth-segments spreading with entire margins; dorsal sepal erect, ovate, obtuse, about 1 mm. long; lateral sepals free, about same length as dorsal sepal and wider at base. Petals oblong obtuse, shorter than sepals; labellum nearly as long as sepals, very concave at base, the lamina spreading ovate-rhomboidal, entire; disk with a longitudinal raised line not extending along the lamina. Pollen-masses 8, minute. Column short and broad, produced forward into a mentum. Capsule shortly pedicellate or nearly sessile; ovate-oblong.

Oberonia crassiuscula, F. Muell. Herb'm. Flowering during January, February.

Habitat: Rockingham Bay (Dallachy); Mount Bartle Frere (via Ingham) (A. Glindeman); Root's Creek (Carr).

The TYPE material (from Mount Bartle Frere) is in the present writer's herbarium.

The first description of this misinterpreted Australian orchid (under *Phreatia limenophylax* Reichb.f.) appears in Bentham's *Flora Australiensis*, Vol. VI (1873), p. 290, and is transcribed in F. M. Bailey's *Queensland Flora*, Vol. V (1902), p. 1542.

Ferd. Bauer's original *Plexaura limenophylax* from Norfolk Island, though agreeing as to genus, is very distinct specifically.

Dr. R. S. Rogers gives some most interesting and informative data on both plants in *Transactions Royal Society South Australia*, Vol. LIV (1930), p. 40. He writes of *Phreatia* (*Plexaura*) *limenophylax*:

"It was originally discovered by Ferdinand Bauer on Norfolk Island, and was carefully illustrated by him in a plate now in possession of the Vienna Herbarium. It was described by Endlicher under the name of *Plexaure limenophylax*. Subsequently, when writing the sixth volume of the *Flora Australiensis*, Bentham became the innocent victim of a discreditable deception by H. G. Reichenbach which led him to publish his belief that the mainland plant found by Dallachy at Rockingham Bay, Queensland, was identical with Bauer's Norfolk Island plant. This belief was founded upon error, an error which was accepted and followed by Pfitzer and many eminent botanists until the true facts of the case were published by F. Kränzlin in 1911, in his prefatory remarks to the *Dendrobinae*, Part II, p. 12, and again in his Monograph on the genus *Phreatia*, in the same work (pp. 20-21), where he also published Bauer's original illustrations."

Dallachy's specimens in the National Herbarium, Melbourne, were collected in the year 1870; they were in a state of bad preservation. It was on this material Bentham based his description in the *Flora Australiensis*. He was unable to define the particulars of the column, including the pollinarium.

Rogers further states:

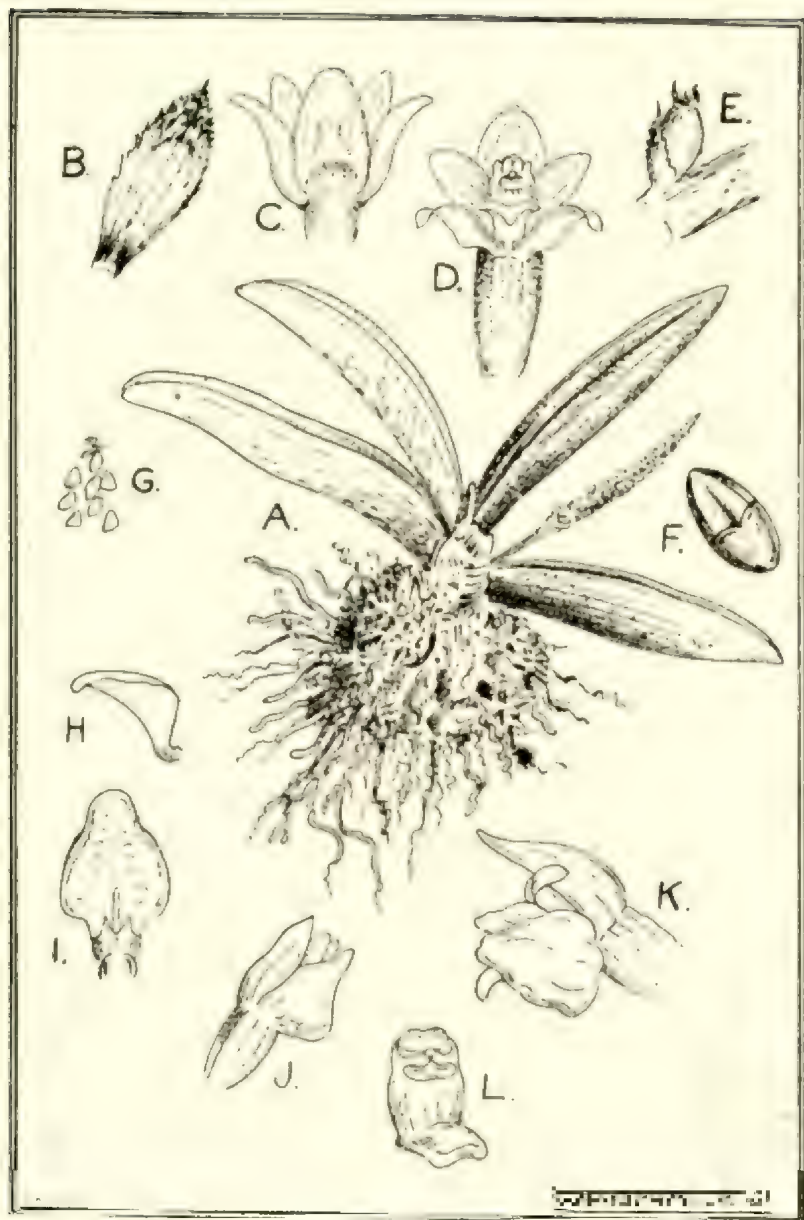
"Kränzlin is of opinion that this plant was an *Oberonia*. In the most promising of the three flowers still intact, the upper portion of the column, and of course the pollinarium, were absent. There is no indication of a column-foot or of a mentum. This lends colour to Kränzlin's suggestion,* which he reached for other reasons. Taking all the circumstances into consideration, it is at least a very doubtful member of the genus to which it has been ascribed and should be deleted from our census."

The present writer has in his possession a copy of Bauer's plate of the true *Phreatia limenophylax* Reichb.f., and it is thus abundantly clear the Queensland plant is an unnamed species.

The exhaustive examination of fresh flowers—from three racemes—produced on three plants from the Mount Bartle Frere district in North Queensland (via Ingham) showed definitely the presence of (contrary to Rogers' conclusion) a well-formed chin (mentum) or column-foot. It may be of interest to mention here that among the material of the Queensland plant in the National Herbarium, Melbourne, there are the remains of several racemes of flowers (only the bracts and uppermost buds are intact). Among the few expanded blooms still remaining in the same folder, the mentum is clearly visible, more so when the flower is softened. In the undeveloped buds on the racemes this feature is difficult to define. Bailey was right in estimating the number of pollen-masses as eight.

Even with the aid of a powerful magnifier the sacrifice of many fresh flowers was necessary to define every character correctly, as they are so very minute. The blooms of this new species, also those of *Phreatia Baileyana* Schlechter (*Bot. Jahrb.*, 1911), are excellent representative types of the world's tiniest orchid flowers.

*Kränzlin writes, "*Non est P. limenophylax nostra, sed certissime Oberonia miniata*, Lindl.," which is no "suggestion," but an unequivocal statement of his belief.



KEY TO PLATE

Fig. A.—Typical plant. B.—Floral bract. C.—Flower and ovary from front. D.—Flower and ovary from front. E.—Capsule. F.—Transverse section of leaf. G.—Pollen masses. H.—Labellum from side. I.—Labellum from above. J.—An undeveloped flower. K.—Flower from side. L.—Column from front.

The Mount Bartle Frere specimens were collected by Mr. A. Glindenman, the well-known collector of tropical orchids. These plants readily responded to hot-house treatment in Melbourne, producing the three racemes of flowers already mentioned. A colour plate executed by the writer, with full dissections of the floral characters, etc., was subsequently loaned to Dr. Rogers, who agreed that the species there depicted represented the same orchid which was collected by Dallachy at Rockingham Bay, and so long misrepresented as Reichenbach's plant. Dr. Rogers expressed a wish to put matters aright but unfortunately died before doing so.

Identical specimens in the Herbarium of F. v. Mueller are labelled "*Oberonia crassiuscula*," but this Queensland plant is definitely a species of *Phreatia* Lindl.!

I have adopted Mueller's Herbarium name *crassiuscula* for this plant. It is, I consider, an eminently fitting one, referring as it does to its salient characteristic, namely, the thick fleshy *Crassula*-like foliage.

It is difficult to understand why *Phreatia crassiuscula* (*sp. nov.*) should have been identified so definitely by certain botanists with *Oberonia miniata* Lindl. (Edwards, *Bot. Reg.*, 1843, Vol. xxix, p. 6), which is described as a "singular epiphyte with the habit of *Aporum anceps*; its flowers are extremely small, very brittle, vermilion-red and loosely arranged in a nodding spike, sometimes as much as eight inches long (approx. 20 cm.)" H. N. Ridley, in *Flora Malay Penins.*, Vol. 4, p. 16 (1924), describes *O. miniata* as having "sepals ovate, ciliate."

A SPARROW-HAWK INCIDENT

About mid-morning on the 26th September last, the pupils of S.S. No. 3792, Kilmany South (Mr. A. A. Lind, Head Teacher), had a Nature-study lesson that had not been planned for them. The normal routine was suddenly disturbed by the entrance, through one of the windows, of a sparrow pursued by a hawk. After wheeling round the room for a few minutes, the hawk perched on a bar across the room and the sparrow hid beneath a desk.

Suddenly the sparrow made a dash for one of the windows, but crashed into a pane and fell dead. Shortly afterwards the hawk also flew at a window and was stunned by its impact with the pane.

A very good description of this bird identified it as the Collared Sparrowhawk. It is probable that the commoner hawks in the district are Nankeen Kestrels, often erroneously known as Sparrowhawks. After completing their observations, and after the bird had recovered, the pupils, to their credit, liberated it.

F. G. ELFORD (Teachers College)

FURTHER REMARKS ON HERBS AND BIRDS

Part I.—Medicinal Use of Leaves.

By, EDITH COLEMAN, Blackburn, Vic.

But ask now the fowls of the air, and they shall teach thee.

(Job 12: 7).

For the third year in succession, on October 22, 1944, I found my Canary Islands Pyrethrum greatly mutilated. I watched the plant and saw, not goldfinches this time, but sparrows, pulling off leaves, carrying them into two of a little colony of nests in an old rose climbing ten to fifteen feet high on a dead gum tree. I also saw them take leaves away to nests in other parts of the garden. Few birds would care to push their way in and out of the tangle of dead, thorny twigs beneath the crown of this old rose.

Some of the twigs were cut away to enable me to put a hand into one of the nests. I withdrew leaves and leaf-stems of the Pyrethrum. They appeared to be lying among the eight or ten eggs I could feel.

The choice of this herb is puzzling. Why did the birds not take the downy leaves of the far more aromatic Peppermint-pelargonium, which grows abundantly at the base of the gum tree? I scattered some of these leaves on the ground under the Pyrethrum. They were not touched, although I saw sparrows pick up fallen Pyrethrum leaves.

Says Topsell (1658-81), writing of cats and Valerian: "Cats dig it up for love thereof, as I myself have seen in my own garden, for it smelleth moreover like a cat." Does this explain the passion of sparrows for Pyrethrum? Has it the odour of their kind?

A beautiful Blue Petrel washed up on the ocean beach at Sorrento in March had the smell of Oak-leaved pelargonium, even after hanging in the breeze for three weeks. It has since been hanging out of doors at Blackburn, and still has the same odour.

The use of leaves and flowers to adorn nests has been recorded; so too has their use by birds as food and medicine. In this garden large pieces are torn from the leaves of such narcotic plants as Belladonna and Henbane. I found it difficult to establish the tobacco plant (*Nicotiana tabacum*) owing to depredations in the early stage of growth.

Since watching the sparrows my thoughts have run back to the many old writers who recorded the use by birds of aromatic or acrid herbs, either as medicine or for some supposed magical property. Some of these records are fantastic in the extreme, for few of the ancients appear to have been accurate observers.

Many of them held a strong belief that birds are gifted with a knowledge of the virtues of herbs. Recalling the names of men, regarded as great scholars in their day, who have handed on these beliefs, one feels that they cannot have been without some foundation.

Was the Scriptural association of the dove with the olive purely fortuitous, or were doves known to seek its leaves?

Although the story of the Babes in the Wood is an ancient one, an even older story records the good work of both robin and wren in covering with leaves "the friendless bodies of unburied men." Many writers refer to this. Herrick, Pope and Shakespeare make use of it. In *Cymbeline* the ruddock (redbreast) is to cover the supposed dead body of Imogen with pale primroses, harebells, leaf of eglantine, as well as fur and moss. Does the redbreast seek Eglantine (Sweet-briar), to-day? Old authors state that pigeons and doves use the herb Vervain for dimness of vision.

"Stock-loves, jays, merles, and blackbirds use Laurel (Sweet-bay) to recover their appetite to meate and to sharpen their vision."

In Italy doves are said to seek the herb Cumin, which probably explains why the Java doves haunted mine. In common with other birds, they love asafoetida (*Ferula foetida*) and are destructive to crops in the seedling stage. Worlidge (*Systema Agriculturae*, 1681) alludes to the custom of exploiting this passion by washing the dove-cotes with asafoetida water: "Their feathers will bear the scent thereof about them, so that whatsoever company they light into will be pleased to bear them company home, to the great increase of your stock." Asafoetida contains a volatile oil, resin and gum. It is still official in pharmacy. Because of its disagreeable odour it is usually administered in pill form. Yet, despite the odour, which out-ouions the whole of the onion clan, it is much relished in eastern countries.

How Kipling's Kim and his lama enjoyed their meal of warm cakes well scented with hing (asafoetida)! Plantain (Waybread or Cuckoo's-bread) is both bread and medicine to the cuckoo, as is Cuckoo's-sorrel. In my childhood I knew no other name for this wild sorrel. It gave me pleasure to learn that it is so called in other countries.

The list of authors who refer to the use by birds of herbs to restore sight is a long one. Goldfinches, linnets, eagles and swallows are said to use Eyebright, Rue, Fennel and Celandine.

A belief that the eagle's power of vision is so great that he is able to look at the sun undazzled is of great antiquity; so too is the legend that he sharpens his sight and that of his nestlings with wild lettuce. The hawk uses Hawksbit (*Hieracium*) for the same purpose. The generic name, as well as the popular

PLANTS



C. *laevigata*



Sweet-Bay (*Laurus nobilis*)

Photos. by Edith Coieman.

names used in England, France, Germany, Italy and Spain, all have reference to the belief that birds of prey made use of this herb to sharpen their vision.

Turberville recommends "the juice of Swallowes-herbe (Celandine) conveyed to the eyes of hawkes if they be hurte by some mishappe." (*Book of Falconry*, 1611.) The raven uses Sweet-bay; the stork and ring-doves use "organ" (Wild Marjoram or Origanum). It is remarkable that in widely separated countries, long before travel facilities brought them into easy communication, Celandine (*Chelidonium majus*) was believed to be employed by swallows to restore their sight and that of their nestlings—a belief that dates back to the first century, probably earlier.

The generic name *Chelidonium* is derived from the Greek for swallow, and the names Swallow-wort and Swallow-herb are common in many European countries.

In an original treatise on herbs, Bartholomew (thirteenth century) wrote: "Celidone is an herbe with yellowe floures; the fruit smorcheth them that toucheth it; it helpeth swallowes' birdes (nestlings) if their eyen be hurt." In another rare old herbal (Lyte's translation of Dodoeus, 1578) we read: "Chelidonium; that is to say Swallow-herbe; because it was first found out by swallows and hath healed the eyes and restored sight to their young ones." Gerard, 1597, reporting earlier writers, says: "It will restore the eyes of divers young birds and soonest of all, the swallows." The great herbalist Parkinson (1643) alludes to its use by partridges, doves and swallows.

It seems strange that so many bird-favoured herbs possess aromatic oils, acrid juices or narcotic properties, and are still employed by herbalists, or in domestic practice, for the very ills to which birds were believed to apply them.

Rue, Eyebright and Fennel have a centuries-old reputation for helping the eyes. With the two latter Milton's Michael purged Adam's sight; Fennel was even believed to restore lost sight, as Longfellow sings in the Goblet of Life:

Above the lowly plants it towers,
The fennel with its yellow flowers,
And in an earlier age than ours
Was gifted with the wondrous powers
Lost vision to restore.

Many of the buttercups (*Ranunculaceae*) contain acrid juices which inflame and blister, and these are still used for that purpose in treating gout, rheumatism, and even shingles. Cuckoo-buds, Crowfoot, the Lesser Celandine (all "buttercups") and the Greater Celandine (a "poppy") are all called Tetterworts and their acrid juices were once employed by beggars to raise tethers (sores) on their faces, to excite pity and gain alms!

It seems incredible to us that the unopened eyes of nestlings should have been regarded as an ill. The fact that they were open soon after parent birds were seen to carry herbs into the nests was sufficient to invest those herbs with medicinal and even magical powers; and man, who learned the use of herbs from watching birds and animals, applied bird-chosen leaves to his own needs, sometimes with success. As Kipling sings:

Nothing in life has been made by man for man's using
But it was shown long since to man in ages
Lost as the name of the maker of it.

To this day Celandine is employed in treating eye trouble. Its yellow juice, on the Doctrine of Signatures, is good for jaundice! Dropped into green wounds it effects a rapid cure! It is used in milk as a lotion and, as the names Pilewort and Itchwort imply, for other troubles. In Russia it is said to have been effective in treating cancer. Why did the birds choose it? Did they test it, with success?

With Celandine swallows were said to unlock their nests, if they were plastered up, or to remove obstructions. Hence its use by man to remove obstructions of the liver. It was prescribed for Tudor Queen Elizabeth, who was reluctant to have a tooth drawn. It was to be sealed up in the tooth with wax. This would loosen the tooth, which might then be pulled out with the fingers! Larkspur or Larksheels, another "buttercup," probably so called from a fancied resemblance of the flower-spur to the long nail on a lark's "heel," has a long medical reputation of some significance in the present discussion. It was used by ancient Greeks, in the form of an ointment, to destroy body vermin, and to heal wounds. A tincture, said to be a fine insect-bane, was used with success in the trenches during the last war.

Laurel (*Laurus nobilis*) (Sweet-bay), another "bird-herb," yields an aromatic oil which is still employed in veterinary practice. The leaves, familiar to us in curry powder, are packed between layers of dried figs and liquorice sticks, probably to impart flavour and scent, perhaps also as an insect repellent.

After all, these strange beliefs regarding the use of herbs were not more curious than many others which persisted to the nineteenth century. For my part, as I dip into the vast literature of legend and myth that has gathered round the association of herbs and birds I feel that they were not without some foundation. I am wholly with Raring Gould, who traced many myths of the Middle Ages, when he states that there must be some verity upon which so vast a superstructure of legend has been raised, and before closing I should like to suggest one for our herb and bird myths.

Kipling (*Eye of Allah*) puts his pen on the spot. He is

referring to an old belief handed down from Apuleius in the fifth century. In his *Herbarium*, a little Latin treatise mainly derived from Dioscorides, Apuleius says: "If a man eat fasting the juice of the cut-leaved buttercup (*R. sclerotus*) his soul will leave his body laughing." "This," says Kipling's Roger of Salerno, "is a lie more dangerous than the Truth, since truth of a sort it is: for the juice of this herb burns, blisters and wries the mouth—the rictus or pseudo-laughter on the face of such as have died of poison by herbs of the Ranunculaceae." To this John of Burgos, who admits that, when a boy in convent, he made letters round his mouth and on his neck with the juice of this buttercup, to save going to prayers on cold nights, makes reply: "I'm no doctor, but I'd say that in all these years Apuleius might have been betrayed by his copyists. If Apuleius wrote 'the soul seems to leave the body laughing' there's not three copyists in five would not leave out the 'seems to.'"

Probably many of the old authors have been betrayed by their copyists. Birds were seen to carry leaves. Being inedible they were assumed to be medicinal or magical, and as the eyes of nestlings were open soon after they were placed in the nest, they "seemed" to restore sight. As the legend travelled down the centuries the "seemed" was omitted.

EXHIBITS AT DECEMBER MEETING

Mrs. M. E. Freamé: Examples of the various tropical sea-shells illustrated in December *Wild Life*, also a living specimen of the fragile "Lantern Shell" (*Laternula ericcina*) from Port Phillip.

Mrs. D. W. Lyndon: Representation of the Altona salt-marshes, by use of actual glass-worts, coloured sea-blite foliage, sea-heath in flower, shells, and sparkling salt-encrusted sponges.

Miss Colleen Chugg: *Xylostroma* or mycelial pad of the "White Punk" (*Polyporus eucalyptorum*), forming white and felt- or chamois-like sheets in the cracked wood of old trees, logs, etc.

Miss M. L. Wigan: Unusually long, thick aboriginal axe-head from McKenzie Creek, lower Bemm River, East Gippsland.

W/O J. A. Blackburn (par J. H. Willis): Mounted collection of nine common but colourful "bracket fungi," taken from a North Queensland rain-forest last winter.

Mr. C. French: Specimens of *Eucalyptus viridis* (Green Mallee) and *Acacia Mitchellii* (Mitchell Wattle—smallest pinnate species in Victoria), cultivated at East Camberwell and Canterbury respectively.

Mr. T. Griffiths: Fern prothalli, two months old.

Mr. A. H. E. Mattingley: Male of the Golden Beetle (*Lamprina latreilli*).

Mr. Ivo Hammet: Garden-grown native flowers (*Hibiscus Hucyellii*, *Melaleuca pulchella*, etc.).

MARINE LIFE AT PORT MORESBY

By N. A. WAKEFIELD, A.I.F.

Except for a few conservative individuals who stick to the use of their multi-pointed spears in the shallows, natives of the Moresby area do their fishing by taking parties of army personnel to the outer reefs, where they drop "depth charges" of usually a couple of six-ounce plugs of "jelly," and then dive for the dead or stunned fish. The outrigger canoes* used are very manoeuvrable, being able to beat out to sea against a stiff wind, and the divers have closely-fitting goggles with which they can see clearly under the water. The main types of fish so caught are snapper and a weed-eating species resembling the luderick.

The shallow waters of the coral reefs teem with innumerable kinds of small but exquisitely beautiful tropical fish, which one can observe easily by standing still in a few feet of water on a calm day: the fish swim quite close, attracted by the whiteness of one's feet. The Banded Sea-Snake (*Platyurus*) is common, and there is a large kind of starfish—rather solidly built, with big blunt spikes above, and in colour from dark brown to blue.

Sea-slugs (*Bêche-de-mer*) are very plentiful, one kind exuding long white streamers of a very adhesive material if disturbed, and marine worms attain a length of several feet. The sea-urchins are represented by at least three species, the commonest being quite safe to handle, but the other two are armed with sharp, finely barbed spines over six inches long which will penetrate one's flesh at the slightest touch.

The broad wavy blue, green, or brown lines make clams the most conspicuous shell in the coral masses; and the crevices contain large Trochus shells (*T. niloticus*) and Ear shells (*Haliotis asininus*), adhering to the rocks. The Cone-Shells are represented by several species—*Conus textile*, *C. marmoratus*, etc., and one is reputed to have the ability of inflicting a poisonous sting, dangerous to man.

Under every rock at low tide level are hundreds of tiny narrowly conical shells inhabited by small dark Hermit Crabs, and there is a larger form which carries roundish shells up into the scrub of the dry cliffs overlooking the beach. A third kind is a great red and hairy species which occasionally brings larger shells from the outer reefs; one brought in a good example of the Egg Shell (*Ovulum ovum*), and another a perfect example of the beautifully ribbed *Tonna fimbriata*. The large green crab, common in wet

*The local canoe, with its double-ended narrow hull and square sail rigged away from the single outrigger, is a *managi*, though it is generally referred to by soldiers as a *lakam*, which name really applies to larger double-decked craft with crab-claw sails.

rock crevices, is often overtaken seeking refuge in shallow pools at daylight and is rooked by the heat of the sun. Beneath small boulders are little jewel-like maroon-coloured crabs, smooth and round, and another spiky, light grey species which camouflages itself with an accumulation of rubbish. On the mud flats, too, is a medium-sized species, with one large bright-red nipper held aloft as it moves about.

The Jumping or Climbing Fish is a feature of rock pools and mangrove swamps, where it perches on tree roots or rocks, and goes skipping over the surface of the water when disturbed. The smaller green crayfish, with long white antennae, which inhabits weedy shallows, is regarded as a very toothsome morsel by the natives, who will spend hours patiently hunting and stalking one from point to point.

Most interesting perhaps are the Cowries,* which range in size from a fraction of an inch to several inches long, and in colour from white to blue, brown or orange. *Cypræa annulus*, a small white species with a pink ring-like mark, is the most plentiful; and next comes *C. arabica*, much larger and darker, with intricate markings forcibly resembling Arabic script. The large and popular *C. tigris* is very plentiful on the outer reefs; it is commonly known as "Tiger Cowrie," though "Leopard" would be a more appropriate epithet. Both the "Tiger" and *C. arabica* are to be found in the juvenile form, when they are very fragile and beautifully painted in shades of soft greyish-blue.

C. orriones, a small grey-blue species with dark dorsal patch, is common on the underneaths of small rocks; *C. erosa*, with its white-dotted surface and two lateral dark patches, is not uncommon either. *C. vitellus*, brown with large light-blue spots, and *C. varnelli*, mottled tan with darker spots, are two medium-sized and very attractive species. The small finely mottled *C. sophia* and the pinkish-tan *C. carneola* are rather uncommon, while the beautiful, irregular, cream or orange Money-Cowrie (*C. moneta*) is perhaps the rarest near Port Moresby. *C. staphylæa*, a very small species, blue with raised white spots and brown marginal ribs, has, in this area, jet black feeding mantles which distinguish it from the Queensland form. One of the tiny Ribbed Cowries (*Trivia edgari*) was found several times washed up on the beach, but it was not seen in the living state. It is interesting to note that the same species of cowries at Kila Beach, just east of Port Moresby, are invariably deeper in colour than those towards Idlers Bay, across Halifax Harbour to the west.

*The genus *Cypræa* is used here in the old, wider sense, because opinions at present differ considerably as to the generic status of the various groups of cowries.

EXCURSION TO BEAUMARIS

(Regeneration of plants on fire area.)

On Saturday afternoon, November 25, some forty excursionists (including members of the Bird Observers' Club) visited the scene of last January's disastrous scrub-fire at Beaumaris—the worst ever experienced there. A sandy rise of uncleared tea-tree scrub, less than half a mile along Cromer Road from the beach, was selected for observation, and here the party split into several groups, each with a botanist to identify all seedling plants. Such seedlings, as had appeared since the burn, were listed by each group under two categories, viz., regrowth from seed of permanent local plants, and inquiline species (carried from neighbouring areas by wind or birds).

A half-hour's scouting was sufficient time for the several groups to note down almost every kind of seedling present within about an acre of scrubland; the lists were then correlated and gave the following total result of 53 different seedlings:—

INQUILINES

(mostly wind-blown annuals)

Grasses—

- **Annual Veldt Grass*
- **Hare's-tail Grass*
- **Silvery Hair Grass*
- **Yorkshire Fog Grass*
- **Quaking Grass* ("Shell Grass")
- **Lesser Quaking Grass*
- **Annual Poa*
- **Bromus Ivesiae*
- **Rot-tail Fescue*

Coarse Club-rush

- **Moose-ear Chickweed*
- **French Catchfly*
- **Fumitory*
- **Indian Hedge-mustard*
- Austral Stonecrop*
- Rufous Stonecrop*
- Stalked Stonecrop*
- **Scarlet Pimpernel*
- Black Nightshade*
- **African Box-thorn*
- **Buck's-horn Plantain*
- Tiny Blue-bell* (not in Census)

Composites—

- Common Cotula*
- **White Cudweed*
- Cotton Fireweed*
- **Groundsel*
- **Cape-weed*
- **Spear Thistle*
- **Sow Thistle*
- **Cat's-ear* ("flatweed")

PERMANENT LOCAL FLORA

Climbing Lignum

- **Red-ink Plant*
- Angular Noon-flower* ("pigface")

Legumes—

- Spike Acacia*
- Late Black Wattle*
- Pale Wedge-pea*
- Showy Bossca*
- Creeping Bossca*
- **Tagasaste*
- **Orse* ("furze")
- **Clustered Clover*
- Scarlet Coral-pea*
- **Dolichos*

*Creeping Wood-sorrel**Wedding-bush***Carolina Mallow**Bundled Guinea-flower**Silky Guinea-flower**Manna Gum**Coast Tea-tree**Common Beard-heath**Kidney-weed**Kangaroo Apple**Stinkweed*

In the foregoing table, the predominant seedlings are indicated by italic type and naturalized aliens by means of an asterisk. Seedlings *only* are

given, not shoot regrowth from perennial root-stocks, rhizomes, or tubers which outlived the fire. It is to be noted that, among the inquilines, annual grasses and composites occupy a prominent position (16 species, or more than half); members of these two large families are always among the first plants to populate a sterilized region—by virtue of their very small, light seeds, so readily carried away in air currents. Of the permanent local flora, the comparatively heavy seeds of legumes (in the germination of which fire is even beneficial) account for nearly half the species recorded, viz., 10 out of 24; these were doubtless already in the soil before destruction of the overhead cover.

SOME GENERAL NOTES ON POST-FIRE PIONEERS

Writing in the *Naturalist*, June, 1940, Mr. W. L. Williams reports on the regrowth at Dromana throughout 16 months following the holocaust of January, 1939. He, too, divided the young plants into two classes and found both introduced and native grasses to be early colonizers among wind-blown annuals; there were later abundant seedlings of Coast Tea-tree and Swamp Paper-bark, with some Drooping Sheoak, but no sprouts were discernible on any of the damaged, blackened spars—rather a helpful factor, as they afforded considerable protection to the seedlings during tender infancy. Mr. Noel Lothian (also in 1940) discussed the astonishing spread of Onion-grass and Cape-weed within six months of the bushfire which wrought such havoc in Torquay.

Recolonization by plants of areas from which the natural vegetation has been completely erased by intense heat (fires, volcanic action, etc.) has always been a subject of great interest to the ecological botanist. It is only at such a time that questions as to the vitality of seeds, speed of dispersal, survival power, aggressiveness or competitiveness of different species can be studied in detail.

A classical opportunity was provided on a grand scale between May and August, 1883: the worst series of volcanic eruptions within human knowledge then visited the densely-forested tropic island of Krakatoa (between Java and Sumatra) and completely obliterated every vestige of plant life. Less than a year afterwards the French scientist Cotteau landed on the island, but he failed to find a single living plant. Treib, however, who made a close survey two years later (1886), discovered not only lower cryptogams but 26 different vascular plants, including eleven ferns, four composites and one grass (all wind-borne), and several trees of the strand (from spongy, sea-borne fruits).

Victorians allowed a golden opportunity for carrying out similar detailed surveys to slip away after the unprecedented bushfires of January, 1939. But our British friends have been busy since 1940 listing plants that have come up on bombed-out areas in the heart of London. Commonest among the bomb-crater pioneers are Annual Poa, Willow-herb, Flea-bane, Groundsel and Colt's-foot—again a high percentage of wind-borne composites.

J. H. WILLIS.

ERRATA

In "Flower Perfumes and their Classification" (*Vic. Nat.*, Dec. 1944) the following typographical errors call for correction, viz.—

Page 134, fifth line from bottom, for *Sportium* read *Spartium*.

Page 136, first line, for *adoratissimus* read *odoratissimus*.

Page 136, note 8, second line, for *hirsma* read *hircina*.

J. H. W.

NATURE NOTES FROM WAGGA

By SAPPER P. R. McFARLANE

For nine months I have been a sojourner at Wagga, N.S.W., the surroundings of which, at first glance, appear monotonous to the nature-lover from southern Victoria; yet this district has a charm all its own. True, there is little to offer the geologist beyond a prevailing country rock of what seem to be Silurian shales and occasional hills of granitic rock which in places yields orthoclase crystals an inch or more long; schists and cherts appear in close proximity to the granite, but nothing further enlivens one's interest.

The most striking feature is the almost complete absence of shrub growth and small plants, due, no doubt, to the close-grazing habit of sheep which are masters of all they survey. Only in a few isolated and accidental sanctuaries can one visualize the appearance of the original landscape. Arboreal vegetation consists almost entirely of the Grey Box (*Eucalyptus lamiphloia*), White Cypress Pine (*Callitris glauca*), Kurrajong (*Sterculia diversifolia*), *Casuarina*, and a small white gum restricted to the rocky knolls—probably "Tumble-down Gum" (*E. dealbata*). The Cypress Pine occurs frequently in small almost pure stands; Kurrajong and *Casuarina* favour rocky positions, but their present disposition may be artificial, as the land was settled so long ago.

Red Gum (*Eucalyptus camaldulensis*) and River Sheoke (*Casuarina Cunninghamiana*) hold dominion along the Murrumbidgee and attain enormous size. In a few spots, inaccessible to sheep, Flax-lilies, Purple Coral Pea, Parrot Pea, various everlastings, numerous acacias, and two shrubby species of *Grevillea* (one with red and the other with woolly brown flowers) may still be found.

To atone for the lack of variety among native plants, there is quite a large bird population: along the river, and among the red gums fringing it, I have seen White-faced Herons, White-necked Herons, Egrets, Black and Pied Cormorants, Black Duck and other water-fowl, and large flocks of White Cockatoos which do not range far from the river trees. Back toward the hills are Noisy Miners, Galahs, Butcher-birds, Magpies, Currawongs and numbers of different parrots. The two-chambered nests of Yellow-tailed Thornbills and large unshapely structures of the Zebra Finch are fairly abundant in patches of pine scrub. Red-capped Robins, Blue Wrens, Tree-creepers and Choughs also favour the pine. Welcome Swallows, Fairy Martins, and both White-browed and Dusky Wood-swallows, represent the swallow and swallow-shrike families, the curious retort-shaped mud nests of the Martins being frequent in suitable locations.

FOOD URGENTLY NEEDED AT SANCTUARY

Owing to exceptionally dry conditions in the forests surrounding Badger Creek Sanctuary, Healesville, the small staff is extremely hard pressed to obtain sufficient earthworms for its platypus charges or enough insects and crustacea for the lyre-bird community—slaters or any other "crawlies" of the forest floor would be most welcome. Members of the F.N.C., if not able to help in this direction themselves, may be able to contact friends who can. Mr. David Fleay, Director of the sanctuary, would gladly receive such contributions and suitably remunerate anyone willing to assist.

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PROCEEDINGS

The monthly meeting of the Club was held on January 9, 1945, at the Royal Society's Hall, the President (Mr. Ivo C. Hammet) presiding over an attendance of about 100 Members and friends.

Letters were received from Mr. Noel Lothian, now in New Zealand, conveying New Year greetings to Members; from the Secretary of the Sir Colin Mackenzie Sanctuary, at Badger Creek, returning thanks for a donation, and stating that the money would be used as the Club had suggested; and from the Town Clerk at Hawthorn, thanking the Club for a donation received from the Exhibition recently held in the Hawthorn Town Hall.

The following were elected as Ordinary Members of the Club: Mrs. G. Fraser and Miss Chisholm; and as Country Member: Mr. H. L. Tucker.

SYMPOSIUM ON "RED RAIN"

This was given under three headings:—"Geological Aspects of Red Rain," spoken to by Mr. F. S. Colliver; "Organic Contents of Red Rain," spoken to by Mr. A. D. Hardy; and "The National Significance of Red Rain," spoken to by Mr. P. C. Morrison.

Mr. Colliver stated that his remarks were mainly based on an article by Chapman and Grayson on "Red Rain," published in the *Victorian Naturalist*, volume 20. He emphasized that dust, as represented by "Red Rain," constituted an erosion factor very much under-estimated by the man in the street. Calculations made by W. H. Ferguson, then of the Mines Dept., of the dust brought down by a rain storm toward the end of 1902 gave a figure of 50 tons per square mile, based on samples taken in South Gippsland. A similar fall on March 28, 1903, from samples collected by Chapman and Grayson, gave 35½ tons per square mile; and another fall on December 31, 1927, was calculated by Chapman to have left 51½ tons per square mile in the Balwyn district; and by Hunt to have left some 24 tons per square mile in the Elsternwick district. A fall on November 3, 1920, was calculated to have left something like six million tons over Victoria. In giving these figures, Mr. Colliver suggested that "Red Rain" was shown to be an erosion factor of considerable importance.

Mr. Hardy stated that a considerable change in the organic contents of "Red Rain" could be noticed from the 1903 fall, so well worked out by Chapman and Grayson. The 1903 fall had a very large amount of diatomic material mixed with the dust, and the recent fall of red rain (1944) showed very little in the way of diatoms; these by the way, were the empty skeletons only. The 1903 rain showed protozoa and bacteria, and the diatoms, in many cases, were complete enough to list the genera. In the recent rain (1944), the diatoms were so badly damaged that determination even of genera was difficult, if not impossible. Mr. Hardy showed that in many cases the good soil had gone completely and the dust samples now showed only sand. Of particular interest, however, was the fact that collected samples of the 1944 red rain developed an interesting little microscopic object known as the "Water Bear."

Mr. Morrison, discussing the national significance of the problem, suggested that we must follow the course of red rain back and find where it originated. This was either the Mallee or one of seven or eight places in Australia. Dust would not drift if adequate vegetational cover and wind-breaks were on the area. In Central Australia, no doubt, large areas were sterile even before white men came on the scene, but overstocking and rabbits now had produced even larger areas where the wind had free play. In the Mallee dry fallowing was one factor that produced dust, and the removal of all vegetable cover was a common feature of farming in that area. With the removal of the good soil, the subsoil remaining was of little use for crops, and practically all that could be done was to plant the area with some hardy cover such as trefoil burr, and thus prevent further soil drift. The Soil Conservation Board had calculated that from the Mallee area some 11 million tons of soil were lost in one dust storm of average intensity. At Tocumwal, recently, the R.A.A.F. tested the height of dust during a storm, and the aeroplane had to rise 10,000 ft before the dust thinned out. A west wind prevailed the whole time, and there were no reports of dust in South Australia or Central Australia then, so it was practically certain that this dust had originated in our Victorian Mallee.

DISCUSSION AND QUESTIONS

Mr. Colliver, replying to a question as to how samples were taken, stated: The first sample was taken 20 minutes after the rain had started, thus allowing normal dust to be washed away, and five fluid ozs. of sample gave 17 grains of dried residue. The time then was 4.30 p.m. Sample 2 was collected at 6.30 p.m.; sample 3 at 7.30 p.m.; sample 4 at 7.45 p.m.; sample 5 at 8.30 p.m. A further sample collected after 9 p.m.

contained no appreciable sediment. The sample was not examined for bacteria straight away and it is quite possible that only the more resistant types were developed during the tests.

Mr. Morrison, in reply to a question concerning the different colours of dust at various places, stated that the wind was a winnowing agent; the lightest materials went the greatest distances, and certainly differing mineral content was sufficient to justify colour differences.

Question: Has a sample of dust from the last storm been analysed? Mr. Morrison suggested that probably the Weather Bureau would do this. Mr. Colliver said he had collected a sample but could not be sure of its being a pure rain deposit.

Miss Ina Watson mentioned that, in November, 1944, a plane from Broken Hill reported that Mildura and Kerang were invisible from the air.

Mr. Morrison stated that a Broken Hill storm recently coincided with the Canberra dust storm.

Another member remarked that recently a sandhill or dune at Lake Hindmarsh, some 50-60 feet high, had been shifted 300 yds. by the wind.

Mr. Owen Singleton asked Mr. Colliver where he thought the rocks occurred that gave rise to the dust—did he not think the Broken Hill area was more likely than Victoria? Mr. Colliver, in reply, said that apparently he had wrongly quoted Chapman and Grayson, who stated, "The mineral fragments from the Victoria red rain sediment have undoubtedly been derived from the disintegration of the rocks ordinarily met with in the Victorian area, in the country to the north and west. The accessory silicates and the other rarer and heavier minerals were most likely derived from granitic and gneissic rocks, and from the disintegration of lodes and veins."

Mr. Singleton asked Mr. Hardy if he had ever found sponge spicules and Foraminifera in rain samples?

Answer: Spicules of the fresh water sponge "spongilla" were very common, but Foraminifera were very uncertain.

Miss Wigan remarked that in N.S.W. dust storms continue day after day.

Miss Raff asked: Should not regular tests be made to determine surface, otherwise, how can you achieve finality by weighing samples?

Mr. Morrison, in reply, said it was not possible to prove the origin of a dust storm by a stain on a leaf, but such a stain backed by meteorological evidence can make a near scientific certainty; the rain washes the dust-laden atmosphere clean, and from the precipitated mud the proportions of organic and mineral materials can be calculated.

Mr. Colliver stated that, with respect to the 1903 sample previously mentioned, the successive samples taken showed a diminution of solid material.

A member remarked on the recent method of erosion control as tried out in Russia, where a thin sheet of bitumen and grass-seeds is sprayed out from an aeroplane, and suggested it would be worthy of trial in Australia. Mr. Morrison, in comment, said that the Soil Conservation Board suggests wind-breaks, planting of burr clover, etc., and deep furrowing at right angles to the prevailing winds, a method used in Kansas in 1935, as well as contour ploughing of deep furrows if the land has slopes.

Mr. A. A. Brunton suggested the time would undoubtedly come when methods for bringing down the rain-clouds that now often pass over the dry areas would be devised, and he further suggested that this was a matter worthy of experiment by scientists.

Speakers in the symposium were accorded the thanks of the Club for their informative and interesting addresses.

EXHIBITS

Miss M. L. Wigan: "Witches Broom," from Heathmount.

Miss E. Raff: Flower of *Tropaeolum pentaphyllum*, from South America; also *Oenothera* (Evening primrose), which opens pure white and changes to pink next day.

Mrs. Fenton Woodburn: "Hands" of copra, dark (native cured) and light (plantation cured).

Mrs. J. J. Freame: Marine specimens.

W/O J. A. Blackburn (per J. H. Willis): Collection of native stone implements from South-eastern Papua, including a "Didiwai" or ceremonial adze head and a holed club head resembling a giant bead.

Mr. J. H. Willis: A genus of lilies new to Victoria, represented by *Chlorophytum alpinum*, from Dandongadale Falls, on the Mt. Cobbler Plateau (3/1/45).

Mr. A. D. Hardy: Samples of sand from the Mallee drift areas and hummocks.

Mr. C. J. Gabriel: Rare Australian marine shell, *Pterospora roud-nightae*, McCoy, from the Great Australian Bight.

Mr. T. Griffiths: Box of beetles and other insects from Wathalla and Aberfeldy River district.

Mr. H. P. Dickins: Four studies in colour of *Brachycliton*, from Geelong Botanic Gardens.

Mr. H. T. Reeves: Coloured photographs of Australian native flowers.

SAWFLIES: INFORMATION WANTED

Sgt. M. F. Leask, a Club member on service, is anxious to hear of anyone investigating *Phylacteophaga eucalypti*, the leaf-blister sawfly, or breeding any to match the larva with the imago. Would readers who can offer information please communicate with Mr. F. G. Elford, Teachers College, Carlton, N.3?

FURTHER REMARKS ON HERBS AND BIRDS

Part II.—Magical Use of Leaves.

By EDITH COLEMAN, Blackburn, Vic.

There are many curious legends regarding the magical use of herbs, not only by swallows but by many other birds, chiefly to remove obstructions from their nests or to unlock them if they have been closed up by human agency.

The woodpecker uses Springwort, which Grimm identifies with Caper-spurge, but other authors with a fern. It is known in Germany as the Blasting-root, and has power to force the strongest lock! Unfortunately, it is very rare. One must seek it in the woodpecker's nest. If a nail be driven into her nest (so runs the tale), she flies off for a piece of Springwort. This she places in the bottom of her nest, and soon both leaf and nail drop on the red cloth which must be spread below it! She also uses *Herbameropsis*, which is called woodpecker plant, or woodpecker herb.

The hoopoe uses Sainfoin and the lark, Larkspur. Albertus Magnus (13th Century), says that the magpie brings a herb to release her nestlings if her nest be tied up with new cords, but does not specify the herb.

Not to labour the point, I think we must accept some of the statements regarding the placing of herbs in the nests, but not the curious explanations that accompanied them. I think we can presently offer a twentieth century solution—without stretching imagination.

Yet, after all, those curious beliefs were not more fantastic than many other long-accepted bird legends, such as that of the raven which leaves her nestlings to starve. According to Izaak Walton, they are kept alive and fed by dew, and worms that breed in the nest, "or some other ways that we mortals know not."

Then there is the story of the pelican which feeds its young on its own blood: "The pelican turneth her beak against her body and therewith pierceth it till the blood gushes out, wherewith she nourisheth her young." (Brand's *Antiquities*). Three times Shakespeare alludes to this old belief: in *King Lear* ("whose flesh begot those pelican daughters"); *Richard II*, Act. II Sc. 1; and *Hamlet*, Act. IV, Sc. 5.

Strangest of all was the story of the barnacle-geese, those "birds without father or mother." This legend, first promulgated in the 12th Century by Gyraldus Cambrensis, travelled strongly down the centuries until 1783, when it was once again published as a fact, reported in all good faith by scholars renowned in their day: Sebastian Munster (who gives a sketch of the

bird-tree, with water-birds escaping from its fruits, or trying their newly-born swimming powers on the water below; Aldrovandus (1599) most learned ornithologist of the Renaissance; Gesner, renowned zoologist of the same period; William Turner (1544), Dean of Wells, who accepts the story "on good authority," and who suggests that the geese were generated from a sort of fungi, which broke out on masts and planks of ships that had rotted in the sea, "in which one may discern evident forms of birds which afterwards are clothed with feathers, and at last become alive and fly!"

Gerard (1597), who first wins our confidence by stating that "what our eyes have seen and our hands have touched we shall declare," describes how the goose "cometh to maturitie and falleth into the sea, where it gathereth feather and groweth to a fowle bigger than a mallard and lesser than a goose. For the truth thereof, if any doubt, may it please them to repaire unto me and I shall satisfie them by the testimonie of good witnesses."

And we have the first-hand testimony of Sir Robert Murray (*Philosophical Transactions*): "In every shell I opened I found a perfect sea-bird; the bill like that of a goose; the eyes marked, the head, neck, breast, wings, tail and feet formed; the feathers everywhere perfectly shaped and the feet like those of water fowl."

Long after the legend was refuted by Willoughby (1678), and Thompson (1835), and Darwin had published his researches on the barnacle, there were still people who adhered to the old belief.

It is not easy to discern a verity as foundation for the barnacle-goose and pelican legends. They were probably flights of imagination of simple folk who had witnessed the feathery "feet" of barnacles "kicking food into their mouths", and the feeding of young birds on regurgitated food. I think we may offer a more convincing verity as foundation for the herb-and-bird associations. One thing stands out. The leaves were not used as nesting material. When 30 ft. of one of our gum trees at Blackburn crashed in a storm, 15 ft. of the hollow fallen limb was found to be closely packed with nesting material, the accumulation of many years. It included many chocolate and cigarette cartons as well as cards of a brand long since discontinued—surely uncomfortable bedding for baby birds. Did the parents choose them for their scent (nicotine and vanilla)—as insect repellants? While the old saying "No bird fouls its own nest" cannot be applied to all species, it is strictly true of a large number, in which species the parent birds anticipate, even encourage, the avoidance of excrement which they carry away from the nest.

I have done little bird photography, and most of my pictures are of garden birds; but, taken at close quarters, they represent fairly complete stories of Blackbird, British Song-thrush, Yellow Robin, Harmonious Thrush, White-shafted and Black-and-White Fantails, White-plumed and Regent Honeyeaters. Many of my negatives, quite unintentionally on my part, show the removal of excrement, a matter of wonder and admiration to every bird-student, demonstrating clearly that birds realise the importance of nest hygiene. Although the capsules which enclose excrement must be of greater strength than is apparent, doubtless a few are broken on the floor of the nest.

Still keeping an open mind, I suggest that in these somewhat rare instances leaves are placed on the soiled floor for comfort of the nestlings, and as some precaution against flies. I suggest that this procedure, witnessed in a more unsophisticated age than ours, elucidated those more attractive, but less convincing explanations of the use of leaves.

I have seen both green and dry tea-tree leaves in the nest of the Yellow Robin, while occupied by eggs only. Ten years ago (16/6/34), I related in a Melbourne newspaper the story of a British Song-thrush which carpeted its nest with three broad *Lasiandra* leaves. I mentioned that it is unusual for the thrush to use other than a mud lining. In that instance there was an easy explanation. Doubtless the click of my camera-shutter caused a parent bird to hesitate at the critical moment, and excrement was voided into the nest. The complete removal of a broken capsule is difficult. I have seen it attempted. I think the *Lasiandra* leaves were placed in the nest after the event.

I have a photograph of a White-plumed Honeyeater upside down, spearing the floor of the basket-nest in endeavouring to remove a capsule which she failed to receive when voided, for which the camera must again be blamed. One wonders what explanation would have been offered in Pliny's day. I offer it now as the "verity" upon which those fantastic legends were built. The herbs were employed as removable bedding, or insect repellants. Imagination supplied a more attractive explanation.

After writing at such great length, I feel I have touched only on the fringes of a fascinating subject. Dipping only into authors at my hand, the list of birds believed to employ herbs is a long one. More thorough research should reveal matter of more than ordinary interest to us at the present day, when plant drugs have an increased importance.

(Concluded.)

NOTES ON THE OLIVE-BACKED ORIOLE

By C. E. BRYANT, Melbourne.

In that class of local migrants, as distinct from visitors from overseas, that come to Victoria each spring, the Olive-backed Oriole (*Oriolus sagittatus*) is prominent. The numbers of the birds vary from season to season, so that in some years the gullies and hillsides ring all day with their notes, but during others only occasional pairs call. In Southern Victoria the birds arrive, as a rule, about the end of September or beginning of October, but, as they do not always call frequently at first, many may be unobserved for a time after reaching us. This season (1944), the birds arrived early and the first Oriole I heard was calling on September 24.

Mathews and North both state that the sexes are similar. As a general statement that may be substantially correct, for, seen in the tree-tops, the sexes appear alike. Noted together, or at close quarters, however, the female will be observed to differ in the very much duller green of the back and wings. "Olive" scarcely appears to be the most apt description, the back of the male, at least, being of a vivid green. Gould remarks on the plumage distinction in his reference to the "yellowish-olive of the upper surface of the male of a deeper tint than the female."

Nest-building is commenced with little delay. The nests are pendent structures slung from slender twigs and are invariably constructed of coarse reddish-brown bark, with a lining of grass. A little wool or the cotton-like "down" that envelops the reeds of creepers, such as the clematis, may be added. Taken over a number of years I have noted a decided partiality for lightwoods as nesting trees. There is, however, much variation from year to year, and according to the particular habitat and the trees available, although the type of country frequented by the Oriole is always more or less the same, that is, lightly-timbered undulating areas. Last summer (1943) at Mitcham, Vic., all of several nests which I found, or of which I had knowledge, were built in lightwoods, but this season I have noted one only in a lightwood, with others in eucalyptis (most), wild-cherry and sweet bursaria. Few nests that are built in gum trees are readily accessible, but the first nest of the species I ever encountered was built in a drooping gum at a height of only four feet from the ground.

Nest completed and eggs laid (three normally, but often two—and this year nearly all pairs have only a brace), the female settles down to brood and thereupon practically ceases to call. Her quietness serves little purpose, however, for the male usually discloses the nest site by his continued calling nearby.

The "song" of the species most usually heard is the rolling, mellow and far-sounding call that indicates the bird's own name—"oree-oree-ole"—in which there may be some slight variation in different districts. The resonance of this call has given rise to the name "Echoing bird" for the species among bush boys. There are additional calls, usually given in alarm or when the nest is approached, and a purring succession of squeaks that advises the young of the approach of the adults with food.

All accounts of substance refer to the bird as a mimic, but this aspect, with nearly all birds, is subject to a certain amount of conjecture. Personally, I have usually demanded more convincing proof than a resemblance of one bird's notes to those of another to establish that there is actual mimicry, conscious or unconscious. The Oriole occasionally utters, for example, a series of chuckling notes that suggest the laugh (in a minor form), of the Kookaburra. Maybe others have heard such notes under other circumstances, but I have heard them only in the nature of alarm calls or notes of apprehension at the proximity of a human to the nest, and I think it may be doubted that the mere resemblance necessarily connotes mimicry.

Gould refers to the Oriole's imitating of other species, "including the *Zosterops*." Whilst the bird-observer will readily recognize the notes of the Silvereye, those same notes given by the Oriole, possibly in a medley of calls, are surely somewhat inconsequential sounds upon which to found a definite assertion of mimicry.

These statements do not amount to an avowed disbelief in the Oriole's ability to imitate, but suggest caution in assuming all unusual notes to be proof of such ability.* Notes rendered in more normal and unemotional circumstances than in association with alarm or concern might better serve to establish mimetic effect, especially if given as a "series," though there are definite records of birds mimicking vociferously under emotional stress.

Perhaps one of the most apt of colloquial names for the Oriole is that of "Green Thrush," used by Wheelwright ("Old Bushman") in his *Bush Wanderings of a Naturalist*. Incidentally, he considered the Oriole's notes as amongst the liveliest of bush sounds and instanced the species as an example to disprove the calumny of Australia's "songless bright birds" and "scentless bright blossoms." It is interesting to note that Wheelwright's comment on the misconception pre-dates Gordon's

*This suggestion is timely. It is true that a relatively large number of Australian birds (more than 30 species) are more or less competent vocal mimics, but listeners frequently tend to mistake casual resemblances for imitations. Vocal mimicry should not be ascribed to a bird unless the point is taken on something more than, say, a "Pretty Joey" note. The Oriole is in fact a borrower of other birds' notes, but apparently not with consistency.—Editor.

reference to it by ten years or so, though most people ascribe the libel to Gordon.

Once established, Orioles are very local. They build in close proximity to their nests of previous years and will pull former nests to pieces and use the material to fashion new homes. If the eggs or young are lost and a second nest is built, the same season's earlier nest may be dismantled for re-building. The young birds remain in the nest for nearly three weeks, that is, if they reach the fledgeling stage. Too often the Kookaburra snaps them up shortly after their appearance. The nestlings are clothed, at first, with a fine soft down of a vivid carrot colour. Is there any connection between this hue and the reddish-brown bark used in nest construction? Before the young leave the nest they assume the black flecks on the breast of the adult livery.

With some Oriole pairs, the male shares in feeding the young, but with others the hen appears to carry out all such duties. Insects comprise the bulk of the diet of young birds. I have seen adults feeding them on cicadas and, as the insects were not always completely battered to death before presentation, the young sometimes had quite a struggle before they could consume them. A photographic negative in my possession, useless as a picture of the bird, on account of general movement, shows clearly a small frog in the bill of a parent Oriole at its nest with young, and one wonders just how the capture was made and how the young were expected to cope with the amphibian.

The Mitcham district, where I have concentrated on the species, is largely planted with orchards, and cherry-growers tell me that the Oriole makes itself a nuisance when cherries are ripening. Keartland (as recorded in North's *Nests and Eggs*) was told of an unusual bird frequenting the Clayton district, near Oakleigh, Vic. It was described as being "all crimson and very wary." After a couple of hours spent chasing the bird from tree to tree, Keartland secured it and found it to be an Oriole stained from bill to tail with mulberry juice, an indication of its late activities.

Photographing Orioles may well entail a considerable amount of labour, for often the construction of a substantial staging is necessary in order to obtain the requisite height. From my experience, however, results justify the trouble, for the birds are usually excellent subjects for photography and mostly return readily to the nest. Some birdmen have not had this experience, but I consider their birds exceptional. The willingness to face the camera applies almost as readily when eggs are in the nest as when the young have hatched, though personally I do not worry birds sitting on eggs if the opportunity to picture them with young is likely to occur later.

PLATE VII



Oriole (female) approaching nest.

Photo.: C. E. Bryant.



"Lilac Berries" (*Trochocarpa Clarkei*), from sources of the Yarra, Toorongo Forest. (See p. 178.)

Photo.: H. T. Reeves.

Orioles have a great hazard to contend with in the shape of high winds that toss their nests around on the swaying branches, and seemingly a number of them do blow down and become destroyed when storms and strong winds combine.

The eastern mainland States constitute the principal habitat of the Oriole, thence extending across northern Australia to the north-west. The species does not occur in Tasmania, and South Australian records are few, chiefly in the South-eastern corner. Some years ago I considered I heard an Oriole calling on Mt. Remarkable, near Melbourne, but, not realizing at the time the significance of the record, I did not follow up the call. I may have been mistaken, of course, although one accustomed to the notes of the species comes to know them well, but I have never really recovered from the accusation of a South Australian birdman that the bird I heard calling was "probably a Peaceful Dove."

MORE BOTANICAL "BULLS"

In volume 59, page 72, of this journal (1942), I pointed out that three ostensibly new genera published by Alfred J. Ewart in *Flora of the Northern Territory* (1917) were quite untenable. It now appears that a fourth Ewartian "new" genus must fall.

Honouring Bertha Rees, one-time Botany lecturer at the University of Melbourne, there was described and figured in 1913 (*q.v. Proc. Royal Soc. Vic.*, Vol. 26 New Series, p. 9) a monotypic genus *Reesia*, based on material collected at Pine Creek, N.T., in 1904. Ewart placed it in the *Amaranthaceae*, between *Alternanthera* and *Gomphrena*; but Dr. Hans Schinz, when monographing the family in 1934 (*Pflanzenfamilien* Band 16 c.), relegated *Reesia* to a "genus of doubtful position," emphasizing its departure from all other *Amaranthaceae* in the possession of stipules and a many-seeded, three-valved capsule—he could do no more, with only the fragmentary material that Ewart had sent to Zurich.

Reesia erecta has everything in common with members of *Polycarpeae*—a tropical genus of *Caryophyllaceae* with about a dozen representatives in Australia, some having attractive papery purplish flowers—and indeed the type accords perfectly with that of Mueller's *Polycarpea longiflora* described in 1858.

In 1926 Ewart once more ventured to publish "new" genera, viz., *Wychiffia* (said to be in the *Caryophyllaceae*) and *Scorpio* (supposedly a unique member of *Leguminosae* with bicarpellary ovaries)—see *Proc. Royal Soc. Vic.*, Vol. 38 New Series, pp. 167-171. Apparently someone apprised him of the *faux pas*, for within the next two years both genera were synonymised under *Glanis Spergula* (*Aizoaceae*) and *Corchorus vermicularis* (*Tiliaceae*) respectively—*l.c.* Vol. 39, p. 157, and Vol. 40, p. 85. After this debacle he was prudent enough to desist from further new genera, since none are put forward in later writings.

J. H. WILLIS.

CORRECTION

It was stated in this journal for December, in an obituary notice of Charles Anderson and H. C. Raven, that Raven married Anderson's daughter. Actually he married her friend, a daughter of G. H. Arousseau. Miss Anderson married E. C. Ballek, who was a member of the Czechoslovak Consular Service.

TOORONGO SUB-ALPINE FLORA

BY J. H. WILLIS

In his address to Melbourne Club Rotary on July 7, 1943, Sir Herbert Gepp made reference to the virgin forest of titanic Mountain Ash which covered the Toorongo River catchment, north-east of Noojee, until the fateful month of January, 1939. His glowing description, coupled with the fact that Baron von Mueller had long ago delighted in this botanic paradise, led me to hope that some remnant of its grandeur might still exist; so, I welcomed a recent opportunity to visit the region. The experience, though inexpressibly sad, has enabled me to take stock of what vegetation still persists there, and to place on record a list of the higher plants at October 1, 1944.

THE SITE.—For purposes of recording, I have taken into account the whole State Forest Reserve in Toorongo Parish, including an area of just less than 20 square miles. Happily, the southern forest boundary approximates fairly well to the 2,500 ft. contour, so that all parts of the area lie between this altitude and the culminating height of 3,850 ft. on Mt Toorong—a definitely sub-alpine tract. Northward, the parish boundary embraces headwaters of the Yarra.

This Yarra-Toorongo watershed is really a western extension of the Baw Baw chain, forming a lower narrow plateau of some 3,000-3,500 feet elevation; Mts. Toorong and Horsfall stand up as slightly higher points, the former on a spur that terminates abruptly toward the south-east. The country rock is granitic, but less exposed than on the loftier, boulder-strewn Baw Baws; metamorphosed silurian strata outcrop in places and are quarried for road metal. Rainfall and humidity are high for a great part of the year, and snow falls frequently during the winter and early spring.

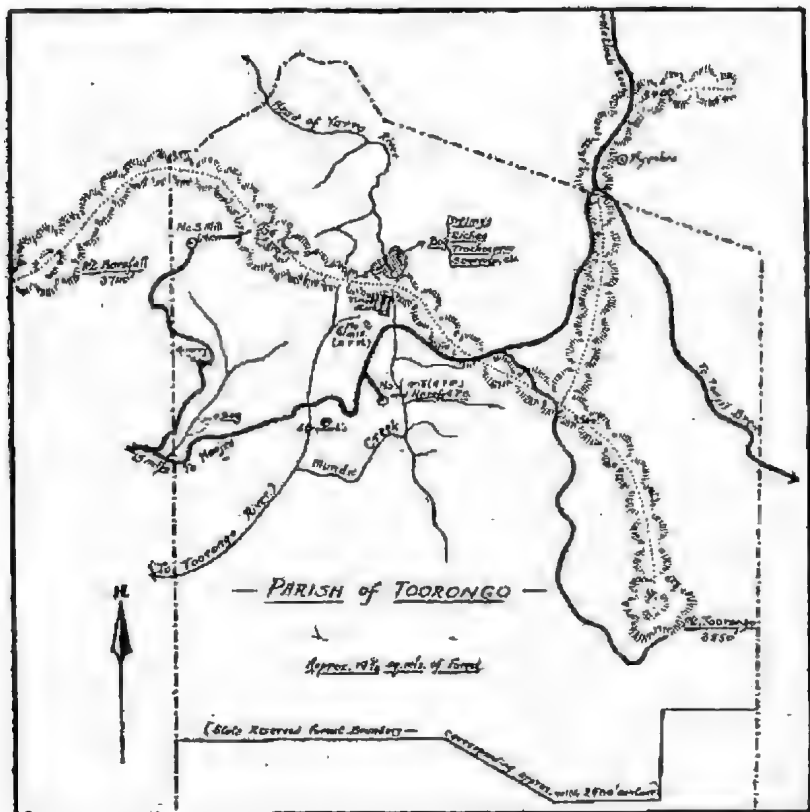
AS IT WAS BEFORE 1939.—The Toorong Ash was a sawmillier's dream, towering skywards for 300 feet in close stands—many of the now fallen giants stretch for more than 250 feet, and one was recently measured to 330 feet, where a substantial top had been broken off. I counted 230 annual rings on one stump; without doubt, most of the larger trees were alive in the reign of Queen Anne!

Eucalyptus regnans was the dominant tree and it mingled with Shining Gum (*E. nitens*)—"miting gum," as known to the locals—in a truly magnificent sub-alpine forest, extending eastward to the heads of the Tanjil River over thousands of acres. Messmate (*E. obliqua*), Silvertop (*E. Sieberiana*) and Mountain Grey Gum (*E. gomicalyx*) intruded from the lower country here and there. Myrtle Beech (*Nothofagus Cunninghamii*) was not only present in all the gullies, but occurred as an understorey on many parts of the plateau, and was draped from crown to butt in delicate epiphytic mosses and huge clumps of Kangaroo Fern (*Polypodium diversifolium*)—erroneously called "stag-horn."

Fragrant Sassafras and Austral Mulberry trees, arboreal species of *Acacia* (including much Blackwood), *Corrivo*, *Peperomia*, *Prostanthera* and *Olearia* species, with an abundance everywhere of Soft Tree ferns, "crowded into a shade," quite inimical to the growth of scrub. Through this cool green realm of lyre-birds one could walk with ease, footfalls silenced by the age-old carpet of deep, rich, leafy mould.

"D" DAY.—If the letter stands for destruction, death, and desolation, then we may apply it to January 13, 1939. The first Toorongo sawmill had commenced operations only the morning before, and by afternoon its small community wisely removed south to safety, so ominously grew the wind velocity and heat. Next day, all fears were turned to fact: hardly

a section of the Upper Yarra-Latrobe watershed remained green, and the last patches of unspoilt Ash, miraculously spared by the terrible fires of 1926 and 1932, were blasted out of existence. An almost continuous wall of flame roared the 60 miles between Taggerty and Erica, enveloping the whole of the Baw Baws and its network of river-heads. What had been virgin forest, glorious beech groves, or mossy alpine gardens of surpassing beauty, were transformed in a matter of minutes into a hellish inferno, then left a hideous dreary waste that can never hope to recapture the pristine charm.



NOW, AND FOR THE FUTURE,—Heavy eucalypt seedling growth and/or wattles now form a dense scrub ten or more feet high over most of the Toorongo reserve, while previously burnt-over areas (as along the Mt. Toorongo spur) carry practically nothing but bracken or "wild oats" (*Glyceria dives*). Should another conflagration overwhelm this re-growth—and conditions are ripe for it—then the final doom of our natural Ash stands will have been pronounced. Silver Wattle and Blackwood have shown amazing regeneration, but not a single Beech seedling was observed—certainly, every butt has a vigorous crop of sucker shoots, but it is extremely doubtful whether these have the necessary stamina to thin themselves and develop into new trees. Tree-

ferns (*Dicksonia antarctica*) have all but vanished, though spores are sure to blow in and give rise to new plants. Mother Shield-fern (*Polystichum proliferum*) is now most plentiful and seems to be thriving.

Cascade Everlasting (*Helichrysum thyrsoideum*) is very tall and prolific in places, exhaling a spicy perfume; other odorous "come-backs" are Otway Daisy-bush (a poor name for the widespread *Olearia Gunniana*), Fireweed Groundsel (*Senecio australis*), Christmas-bush and Balm Mint-bush (*Prostanthera lasiantha* and *P. melissifolia*), Truncate Phebalium (*P. bilobum*) and Mountain Coriex (*C. Lawrenceana*). The Elderberry Ash (*Trochopanax sambucifolius* — both broad and narrow-leaved forms) is conspicuous almost everywhere:

I felt a thrill of pleasure upon reaching one of the sources of the Yarra—an open, boggy flat at about 3,200 feet, near the timber stacks of A.P.M.'s No 2 mill. Here, there were still examples of the snow-loving *Blechnum penna-marina*, *Drimys lanceolata* (small-leaved condition) *Scaevola Hookeri* in wide mats, *Coprosma nitida*, *Richea continentis*, *Leucopogon Macraei*, and, loveliest of all, the dwarf lilac-berried endemic heath, *Trochocarpa Clarkei*—it was in full fruit and strikingly recalled (as Mueller remarked in 1855) the European bilberry (*Vaccinium Myrtillus*). The Hair-moss (*Polytrichum commune*) provides a deep carpet over the whole area of soakage, but little true *Sphagnum* was in evidence. A big saw-sedge, *Gahnia tetragonocarpa*, is plentiful throughout wet depressions, and its tussocky clumps do not seem to have suffered unduly from the fire.

Nearby gullies afford both Victorian *Ericaceae* (*Wittsteinia* and *Gaultheria*) and in one soak I found *Oxalis magellanica*, a rare wood-sorrel with pure snowdrop-like flowers. *Persoonia arborea* (uncommon) and *Lomatia Fraseri* alone represent the large family *Proteaceae*; *Orites lanceifolia*, the splendid lustrous *Grevillea Victorianae* and its close congener, *G. Miqueliana*, apparently did not descend so far below their accustomed habitat on and north of the Baw Baws. The *Compositae*, as in most places, has more species here than any other family. Not more than 94 native vascular plants and 12 aliens were noted, sorrel and dandelion among the latter being widespread, but this tally is not by any means considered exhaustive.

Good forest roads have been constructed by "bull-dozer" tractor, primarily to salvage the fire-killed Toorongo eucalypts, and each week sees nearly two million super feet of lumber and pulpwood removed for utilization—mostly in the round. The present demand for this wood is keen, but it is a fast diminishing asset and, when exhausted, will call for the large-scale importation of building timbers into Victoria, once the best forested part of our continent. *Sic transit copial*

LIST OF VASCULAR PLANTS

(Alien species indicated by an asterisk*)

DICKSONIACEÆ

Dicksonia antarctica

CYATHEACEÆ

Cyathea australis (marginal)

POLYPODIACEÆ

Polystichum proliferum (very common)

Blechnum cartilagineum (marginal)

indum (marginal)

procerum

fluviatile

penna-variana

Hypolepis rugosula

Histiopteris incisa

Pteridium aquilinum

Polypodium diversifolium

(once abundant, now almost extinct)

GRAMINEÆ

Tetrarrhena juncea (marginal)

Echinopogon ovatus

Agrastis hiemalis

Poa

caespitosa var. *latifolia*

**annua*

Glyceria dives (v. common)

**Dactylis glomerata*

**Holcus lanatus*

**Lolium perenne*

CYPERACEÆ

Scirpus

cernuus

inundatus

Schoenus foliatus

Galinia

tetragonocarpa (v. common
in bogs)

Lepidosperma elatius

Carex

appressa (very common in
bogs)

Gaudichaudiana (?)

JUNCACEÆ

Juncus campestris

Juncus

polyanthemos

pauciflorus

LILIACEÆ

Dianella tasmanica

IRIDACEÆ

Liberia pulchella

FAGACEÆ

Nothofagus Cunninghamii

(v. common, stump re-
growth)

URTICACEÆ

Urtica incisa

Australina Muellerei

PROTEACEÆ

Personia arborea

Lomatia Fraseri

SANTALACEÆ

Exocarpus

cupressiformis (marginal)

POLYGONACEÆ

**Rumex Acetosella*

CARYOPHYLLACEÆ

Stellaria

flaccida

**media*

**Cerastium glomeratum*

RANUNCULACEÆ

Clematis aristata

Ranunculus hirtus

WINTERACEÆ

Drimys lanceolata

(small-leaved form, at Yar-
ra heads)

MONIMIACEÆ

Atherosperma moschatum

ROSACEÆ

Acaena Sanguisorba

LEGUMINOSÆ

Acacia

dealbata (v. common—5 yr.
seedlings)

falciformis

melanoxyton (v. common—5
yr. seedlings)

verniciiflua (marginal)

verticillata (marginal)

GERANIACEÆ

Geranium bilosum

OXALIDACEÆ

Oxalis magellanica

(near Yarra heads)

RUTACEÆ

Zieria Smithii (marginal)

Phebotium bilobum

Coryca Lawrenciana

CALLITRICHACEÆ

Callitriche verna

RHAMNACEÆ

Pomaderris apetala (marginal)

VIOLACEÆ

Viola hederacea

THYMELÆACEÆ

Pimelea axiflora

MYRTACEÆ

Eucalyptus

goniocalyx (marginal)

nitens

obliqua

Sieberiana

regnans (dominant tree, now
represented by 5 yr. seed-
ling growth).

Leptospermum

pubescens var. *grandifolium*

ONAGRACEÆ

Epilobium nlabellum

ARALIACEÆ

Tieghemopanax

sambucifolius (v. common)

UMBELLIFERÆ

Hydrocotyle hirta

ERICACEÆ

Gaultheria appressa

(rare—Yarra heads)

Wiltsteinia vacciniacea

(rare—near Yarra heads)

EPACRIDACEÆ

- Trochocarpa Clarkei*
Leucopogon Macraei
 (near Yarra heads)
Richea continentis
 (bogs at Yarra heads)

Leucopogon Macraei

OLEACEÆ

Notelaea ligustrina

LABIATÆ

- Mentha laxiflora*
Prunella vulgaris
Prostanthera
lasintha
melissifolia

PLANTAGINACE

**Plantago major*

RUBIACEÆ

- Coprosma*
hirtella
nitida (Yarra heads)
Asperula conferta (?)

CAMPANULACEÆ

Pratia puberula

GOODENIACEÆ

- Goodenia ovata* (marginal)
Scaevola Hookeri
 (bogs at Yarra heads)

STYLIDIACEÆ

Stylidium graminifolium

COMPOSITÆ

- Olearia*
argophylla
Gunniana
Lagenophora stipitata
Cotula filicula
Cassinia aculeata
Helichrysum
Hookeri (rare—near Yarra heads)
thyrsoidesum
Gnaphalium
collinum
involutratum
Erechthites
quadridentata var. *Gunnii*
Senecio
australis
velleioides
Bedfordia salicina
 **Cirsium lanceolatum*
 **Hypochaeris radicata*
 **Toraxacum officinale*
 **Sonchus oleraceus*

PARTHENOGENESIS IN PHASMIDS

Through the kindness of Professor Hale Carpenter, Oxford, I have received a copy of "Parthenogenetic Breeding of *Eurytenes hercules*, Charpentier," by R. Hanitsch, Ph.D., Curator of the Raffles Museum, Singapore, July, 1902.

The museum received a female of this great Phasmid about January, 1897. It was kept alive on guava leaves, and in February, commenced to lay eggs, most of which hatched during April and May of that year, one being hatched in August, and the last in September. All were females, and these commenced to lay eggs in September. These unfertilised eggs again produced all females, the first of which reached maturity in August, 1898, and commenced to lay eggs in September, 1898. Her eggs did not develop. None of her sisters laid any eggs. Dr. Hanitsch suggests artificial surroundings as the cause of the latter failure.

The foregoing suggests that I gave up my experiment on our Great-brown Stick insects too soon, and that a parthenogenetic generation may have appeared later. The cage will be thoroughly scarified and more immature females will be isolated.

EDITH COLEMAN.

PERSONAL

Mr. K. Fairey, of "The Manse," Yass, N.S.W., wishes to correspond with a Victorian naturalist who would be willing to exchange specimens of and information on insects in the groups *Colcoptera*, *Hymenoptera*, *Lepidoptera*, *Diptera*. Details would be supplied of the species that are particularly desired.

THE SNOWY RIVER JUNGLE

(To the Editor)

Sir.—I was greatly interested in the article by Norman A. Wakefield, "A Remnant of the Snowy River Jungle," in the December issue. I think I was the first botanist to visit this area. Mueller seems to have passed it in 1853-4; Messrs. Spencer, French and party missed it in 1890. My visit took place in 1901. The jungle was not to be reached by land, so Mr. R. P. Cameron took me down in his river steamer. It was, and according to Wakefield still is, a wonderfully interesting place, the only survival of the rich Snowy River jungle.

Reference is made to the fruit of the "big leaf vine," *Sarcopetalum Harveyanum*, with the suggestion that these were in evidence in one place, "an occurrence rarely, if ever, noted before in Victoria." Mueller must have collected these, for there is a figure in his *Key to the System of Victorian Plants*, still a useful book. Mueller first figured it in his *Plants Indigenous to the Colony of Victoria* (1860), as coming from "near the mouth of the Snowy River." I collected it in abundance from 1899-1902. The little pink berries are very lovely, and well merit the local name of "pink pearls."

Mr. Wakefield saw three large palms; I saw five, with many small seedlings. I hope that the number has increased. Mention is made of the abundance of the "Scrub nettle," *Urtica incisa*. I noted one stem thirty feet in length climbing up a tall tree.

Then, as to the "gum vine," *Aphanopetalum resinosum*, the article suggests that this does not occur here—"they evidently reach Victoria only in the extreme east, about Mallacoota Inlet." In my day, this vine was fairly common about Orbost, and abundant in the old Brodribb River jungle, now destroyed, as well as in Curlip jungle.

But I regret to miss from the list that delightful tree, the "Yellowwood," *Acronychia laevis*. It was fairly common in both jungles, and when the clusters of very small "oranges" were abundant on the trees, with a background of the so-called "Spanish moss," to which the article refers, it was a fine sight. As Rutaceous trees are very subject to fungous troubles, it is possible that they have all been killed out.

Mr. Wakefield has done a good service in directing attention to this interesting corner of fifty acres. Owing to periodic flooding, it could never be of much value either for grazing or cultivation, and I suggest that the time is now ripe for the F.N. Club to take action through the Minister of Lands, to have this most valuable botanic area preserved for the public for all time.—Yours, etc,

ED. E. PEScott.

Camberwell.

LINK WITH JOHN GOULD

A link with Australia has been severed by the death, reported in the cables on January 10, of the 89-year-old Lord Desborough. He was probably the last man living who had been acquainted with John Gould, the "father" of bird-study in Australia. Gould died in 1881, which means that Desborough was moderately young when he knew him. In fact, he used to relate that "the Birdman" lifted him up to his first bird's nest. Lord Desborough, incidentally, was a sturdy sportsman in his day. He rowed for Oxford, shot in wild places, swam Niagara twice, won a punting championship three times, and between whiles indulged in parliamentary, military and a host of other activities.—A.H.C.

BIRDS v. AIRCRAFT

The following informative article appeared in the issue of *Time* (American news-magazine) for November 6, 1944:—

Collisions between planes and birds are reported by U.S. airline pilots about twice a week. They can disable wing tips, dent the fuselage, foul the motor—but the chief danger is a windshield break. Last month a DC-3 almost crashed in Iowa when a duck came through the windshield in an explosion of glass and knocked out the pilot.

Both airmen and ornithologists think that bird collisions may have been responsible for some unsolved air disasters. The bird-bumping problem is becoming so troublesome that airlines rate the Civil Aeronautics Administration's windshield-strengthening experiments as the most urgent present research project.

In the October *Air Transport*, a veteran airlines pilot, Pat Curtin, tells some of the airmen's strange stories about migrating birds. Most collisions occur at night or in clouds, when both planes and birds are flying blind. Migrating birds usually fly at night, stopping to feed in daylight. Ornithologists agree that they seem to have a sixth sense which enables them to fly even in "instrument weather."

Another Curtin story suggests that birds may be downed by wing-icing: a pilot reported that one night, after he had been forced down, hundreds of mallard ducks also landed, their wings heavily ice-coated.

The chief U.S. expert on migratory birds, Frederick C. Lincoln of the Fish and Wildlife Service, doubts such stories; he admits that birds are sometimes forced down by snowstorms, but thinks confusion and fright have as much to do with it as anything. Nonetheless, airmen's reports have greatly extended ornithology. Airmen, for example, have found old notions about the speed of birds much exaggerated: the top speed of ducks seems to be about 55 m.p.h.; of the fastest known birds, swifts, and duck hawks, not more than 150 to 200 m.p.h.

Migrating birds generally fly at less than 3,000 ft. above ground level, but in getting over mountains ducks have been known to reach 7,500 ft. above sea level, cranes and condors, 20,000 ft. Highest recorded bird altitude (reached by a flock of geese photographed in India): 29,000 ft.

ANOTHER CUCKOO FALLACY

Many queer beliefs developed in other years from the parasitic habits of cuckoos, but it is surely remarkable that a journal of to-day (the *Sydney Bulletin*, of November 11) should allow itself to be the victim of such statements as are contained in the following paragraph, which is erroneous in every sentence and in places rises to dazzling heights of fallacy:

"Moyhu": It was once thought that the bronze cuckoo scooped the egg of the host-bird removed to make room for her own. Recent researches, however, have shown that after she has accumulated nine or ten eggs the cuckoo hatches them herself and feeds the young like any normal bird-mother. It isn't clear just why she prefers to incubate other birds' eggs rather than her own, but it may be that she can comfortably cover 10 eggs such as those of the white-checked honeyeater, a favourite host-bird, whereas she would be hard put to it to cover more than three of her own, gaining in the process two more clutches in the same period. Ornithologists generally are of opinion that the cuckoo, in hatching out host-birds' eggs, is merely completing a cycle without which both parasite and host-birds would perish. Others are convinced that the phenomenon is an example of avian good nature.

HERMIT CRAB BLUFF

At Sorrento early this year we came upon another instance of the usefulness of "bluff." On the front beach sands many Great Hermit Crabs are left stranded at low tide. Left alone, they have plenty of water in their borrowed homes to tide them over the danger hours until next flow. Many unwary ones fall victims to sea-gulls, but bluff must save scores of others.

One may see a circle of gulls, like crows round a still-living sheep, keeping a safe distance from the crab, who has made himself into a terrifying object. Emerging from the shell, until only the soft, unarmoured end of his body is within, he raises his claws and waves them in a most menacing manner, his complicated mouth parts making what seem very like grimaces. As a gull moves forward, the crab pops back into his shell with a loud click, and the gulls pop back too! A circle of foot-prints, 18 inches or so from the crab, shows clearly that the gulls are taking no chances with this fearsome jack-in-the-box. Honours are with the crab who has so cleverly bluffed his tormentors.

The noisy pops and clicks are certainly startling. One involuntarily moves back, even though one knows the trick, and has handled many of his clever brothers. Our dogs, one of them a large deerhound whose very size keeps many people at a distance, jumped back as swiftly as the gulls, although both were all a-tiptoe to tackle this strange new "rat."

EDITH COLEMAN.

RAIDERS OF POULTRY FARMS

Recently poultry farmers around the North Croydon district (and probably other districts) have been suffering the loss of young chickens and ducklings, the offenders being large birds with a raucous note similar to that of a crow, but deeper and more prolonged. These birds are larger and more streamlined than a crow, with dark navy-blue shining plumage and hooked beak; they fly high and swiftly until over their prey and descend in a circling movement ending in a swoop. From my observations their numbers in flight vary from six to a single bird. They are very timid and will not approach while humans are around, but when no human is in sight they appear almost magically. On my own farm ten ducklings, nine weeks old, were attacked at the first visit from these birds. All the bodies were left, but in every case a hole was torn in the side and the head was torn off. All but two of the heads were carried off by the birds. They appear to be no respectors of poultry, as friends of mine have lost turkey chicks in the same manner. During my nine years' residence in the district I have not previously seen these particular birds. The same view is expressed by older residents whom I have interviewed. Immediately my ducklings were attacked I erected a scarecrow, which had the desired effect of preventing further losses, the raiders now flying a straight course and not attempting to alight

CHARLES FRENCH, JUN. (North Croydon).

SCENT OF THE MUSK

The English journal, *My Garden*, for August, 1944, reports that Alice Jordan, writing from New Zealand, states that she, husband and friend, passed a patch of flowering Musk and, as usual, tried for scent. It was faintly sweet. Later they passed another patch and it was the scent that first attracted their attention. The following week they received their copy of the previous issue of *My Garden*, telling of the scented plant which had been removed to Kew (Oct., 1943). So it looks as if the little musk may regain its lost fragrance.

EDITH COLEMAN

THE KEILOR SKULL

The English magazine *Nature* for February 19, 1944 (Vol. 153, No. 3877) publishes an interesting short article by Professor F. Wood Jones, F.R.S., of Manchester University. Comment is made on the "Memoir of the Melbourne National Museum (No. 13, 143)," relative to the Keilor skull. The Professor regards the skull as a "genuine human document of first-class importance," and accepts the geological authenticity of the finding of the skull *in situ*. He does not consider, however, that the account of the skull and that of the palate and maxillary teeth, as set out in the Memoir, shows conclusively "Australoid and Tasmanoid characters in about equal proportions." The hypothesis that the Tasmanian and Australian had inhabited continental Australia side by side and had fused their races in Pleistocene times is therefore questioned. The cultural development of the two races, as for instance the use of the boomerang, throwing stick, and shield by the one, but complete ignorance by the other, and the presence both living and fossil of the dingoo on the mainland, but not in Tasmania, would have to be harmonized with such hypotheses. He advises "the acceptance of the Keilor remains as permanent documents rather than to assume that the conclusions drawn from their first examination are necessarily the final ones."

FROM AN ARMY POST "UP NORTH"

Last night I captured an interesting nocturnal lizard, highly camouflaged and possessing a most curiously-shaped shovel-like tail, apparently as part of the general disguise. I got him in the dark—in the light of the torch his eyes shone like rubies. Also present in the jungle was a possum, presumably the Coppery Brush-tail, a local race of the common Brush-tail of the southern States. One of the chaps in 3 Div. has a ringtail, which I take to be the Herbert River Ringtail, so that possums are definitely present, though apparently not particularly common. Incidentally, I saw a specimen of the rare black-and-white Striped Possum, which had been killed on the road, so they are present also, it seems.

In the jungle over the creek I have located several disused mounds of Scrub-fowl. There must be a good mound not very far away, however, as recently I saw and chased a chick only a few days old—not that I caught it; the wretched thing could run like a champion sprinter. It wasn't particularly shy; while I watched it, it scratched about in the leaves littering the ground just like any full-grown fowl, but made off at speed whenever I approached too closely.

I still have our bad-tempered Carpet Snake. Yesterday I gave him a rat which I had trapped in the bush; he killed it after I had stirred him up a bit, but more of bad temper than in hunger, I think; anyway he refused to eat it afterwards.

SAMUEL T. GIVENS.

ORCHIDS ALONG THE ROADSIDE

Besides the Sun Orchid *Thelymitra pauciflora* and two different Onion Orchids, *Microtis unifolia* and *M. parviflora*, our children found for the first time the Ruddy-hood, *Pterostylis pusilla*, along Leeds Street, exactly opposite our gate. They found four flowering specimens (the biggest having twelve flowers, including buds, the smallest five) well on the roadside in the grass. Two years ago we found two flowering plants of the same species in a paddock which formerly had been orchard land, and several Snake Orchids, *Diuris pedunculata*, in a treeless grazing paddock. It would be interesting to hear about other orchids which can re-establish themselves after cultivation.

M. FISCH (Doncaster).

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PROCEEDINGS

The monthly meeting of the Club was held on February 12, 1945, at the Royal Society's Hall, the President (Mr Ivo C. Haunnet) and about 120 members and friends attending.

Miss Ina Warson reported on the recent excursion to East Kew, and Miss Nance Fletcher on that to Badger Creek Sanctuary.

The following were elected as ordinary members of the Club: Miss J. Trebilco, Miss A. Quinsey and Mr. W. N. Douglas.

Two motions came before the meeting and were carried unanimously, viz.:

1. (A. H. Chisholm/A. D. Hardy). "That the Field Naturalists' Club of Victoria expresses satisfaction at the assurance that the Aboriginal Cemetery at Coranderrk will be preserved, and urges that the cemetery be renovated and held as a National Memorial, and that the remainder of the reservation be added to the Mackenzie Sanctuary." Mr. H. C. E. Stewart asked if any outstanding characters were interred in the cemetery, and Mr. Chisholm replied that Barak and some of Batman's friends were certainly there.

2. (A. D. Hardy/A. S. Chalk). "Whereas the destruction of useful plant cover and soil by continued firing of mountain forests will have a calamitous and irreparable effect upon the future economy of Victoria; and whereas it is the solemn duty of those entrusted with the government of our country to eliminate every probable factor contributing to forest fires; and whereas fires deliberately lit during the past year in the watershed of the Ovens and Buckland Rivers and along the Barry Range can only be attributed to grazing interests in these high areas; and whereas the total value of stock depastured on Victorian mountains, and the State revenue derived therefrom are only a preposterously small fraction of the incalculable permanent damage to soil, timber, wild life, and natural scenery resulting from such grazing, this Club can do no other than request in the public weal that the presence of cattle on Crown Lands above 2,000 feet in elevation be declared a national menace and prohibited by law."

Mr. Frazer reported that the Otways were burnt in recent years by graziers.

Mr. H. C. E. Stewart, in speaking of Mount Buffalo, stated that conditions are somewhat improved, as the lessee has been forced to keep to the conditions of the lease.

Mr. A. H. E. Mattingley stated that a clause in the leases given for Wyperfeld Park provides that the first fire on the property cancels the lease, and that there had been no fires as a result of this clause. It was also suggested that interested bodies arrange a meeting in the Melbourne Town Hall, and by means of American national park films show the general public what should obtain in our own national parks.

Mr. C. C. Ralph suggested that petitions be circulated to gain interest in the national parks with their lack of proper upkeep.

NATURE NOTES

Mr. R. G. Painter reported having seen on November 8 signs of emerging cicadas; also, on February 8 he heard the cicadas again. "Was this not a long season?" A reply was promised for the next meeting.

Miss Edmondson reported there were many earwigs in her garden, and asked how to get rid of them. (Answer promised for the next meeting.)

Mr. A. H. Chisholm introduced a novel visitor in the form of a living specimen of the Varied Lorikeet (*Psittentulus versicolor*), a species restricted to the far North and rarely seen in aviaries in Victoria. The specimen had been taken from a nest near Darwin by an English airman, and had been fed at the outset through an eye-dropper. It had become accustomed to riding on the shoulders of pilots and had actually been brought down in that manner in a Douglas air-liner. A honey-feeder, having a very small stomach, the Varied Lorikeet is a tropical nomad, and one that does not take kindly to the southern winter.*

LECTURE ON ALPINE FLORA

"From St. Bernard to Buller in Search of Plants." Under this heading, Mr. J. H. Willis, of the Melbourne Herbarium staff, gave an illustrated account of an eight-day trip he had recently made across 38 miles of rough alpine country, embracing several little-visited peaks of more than 5,000 feet altitude. Nearly 300 different plants were listed in this area, and Mt. Cobbler (5,300 feet) proved particularly interesting, its ultimate peak being one of the most spectacular in our highlands and almost immune from both cattle and fires. (A summary of Mr. Willis's address will be published in a later issue.)

*The bird exhibited died a fortnight later. Although feeding well it had become subject to fits—a common trouble with captive lorikeets—and although it rallied from the first few bouts nothing could be done to save it. Post mortem examination at the National Museum revealed that it was well nourished. Apparently the nervous system had become affected.—A.H.C.

CHLOROPHYTUM—A GENUS OF LILIES NEW TO VICTORIA (AND NEW SOUTH WALES)

By J. H. WILLIS, National Herbarium, Melbourne.

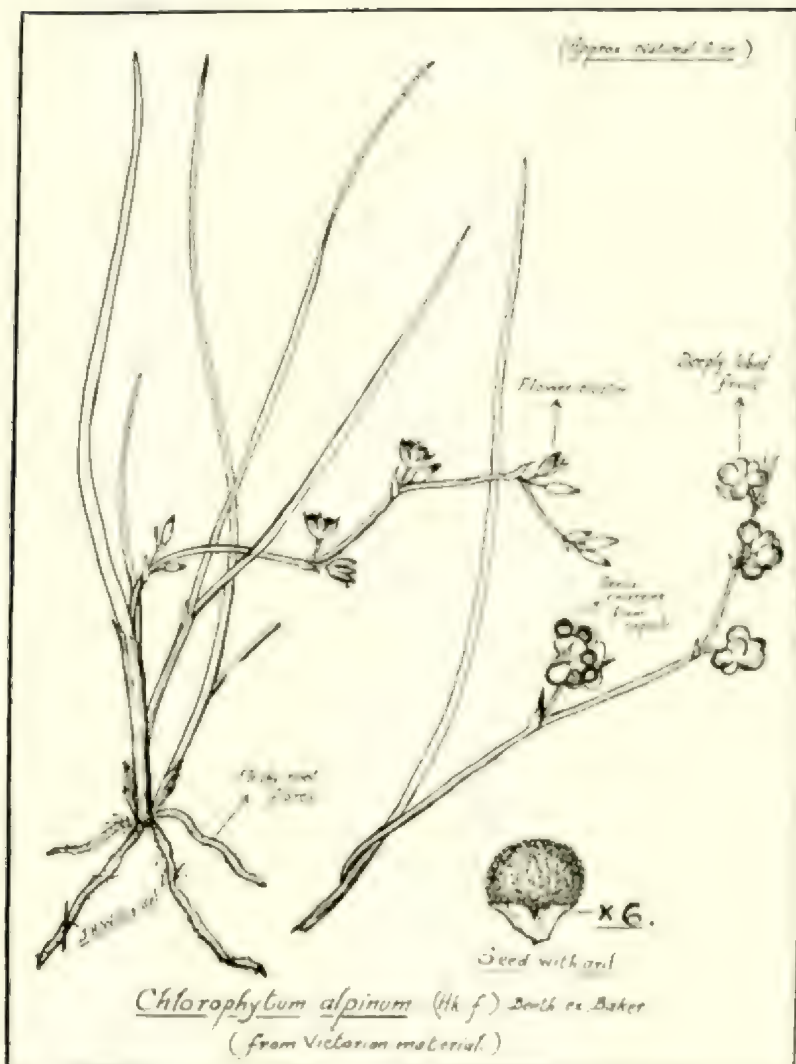
Just below its source on Mt. Cobbler Plateau, the Dandongadale River emerges from a circular sub-alpine swamp ("The Lake") to plunge over the precipitous northern escarpment of the plateau in a series of very beautiful falls. During a botanical excursion there on January 3, 1945, I was rewarded by the discovery of *Chlorophytum alpinum* (Hook. f.)¹ Benth. ex Baker² previously on record only from its type locality in the "western mountains." Tasmania (most probably the watershed of Meander River, south of Deloraine, whence it was collected by William Archer some time prior to 1857, the year he visited England with his orchid paintings and copious botanical notes for inclusion in J. D. Hooker's monumental *Flora Tasmaniae*).

This humble plant grew rather plentifully in mossy soaks and dripping rock ledges at the head of the Dandongadale Falls (about 4,000 feet altitude), and I saw a few plants also on Mt. Speculation, some five or six miles to the south—at 5,300 feet where the Catherine River begins.

Our "Alpine Green-lily" (for this would be an apt name) has much the size and appearance of the Onion-grass weed (*Romulea*), but with lax and rather fleshy leaves as in Streaked Arrow-grass (*Triglochin striata*) to which its resemblance is further heightened by the clusters of deeply lobed green fruiting capsules. Flowers are small, greenish, in groups of one to four, but, although the day was warm, none were expanded on any of the specimens I examined—since fruit and seed were abundant, it seems likely that cleistogamy may obtain. The floral racemes were, as described by Baker,² "laxissimus," lying along the ground and often hidden by mountain mat plants, e.g., *Haloragis micrantha* and *Nertera depressa*.

Chlorophytum (established by John Bellenden Ker in *Botanical Magazine* t. 1071, 1808) is one of the largest genera in *Liliaceae*; half of the 150 or more species now recognized occur in tropical Africa, while there is a good representation in the Cape region and southern Asia, with a few species in South America and but two widely separated ones in Australia (*C. larum* R.Br. of the far north, and *C. alpinum*, subject of this paper). Baker^{2, 3} (celebrated monographer of the *Liliiflorae*) described the seeds of all *Chlorophytum* spp. as *discoïd* and *thin*—a generic criterion.

C. alpinum is discussed by only four botanists, viz., Hooker f.,¹ Baker,² Bentham⁵ and Rodway,⁶ who all doubtless based their opinions on the dried type material in which ripe fruits appear to



be lacking—they are certainly absent from the duplicate types fortunately preserved at the Melbourne Herbarium—and it is therefore not surprising that some uncertainty should exist as to the exact status of the plant. Hooker,¹ in his original diagnosis, tentatively refers it to *Casia* and states:

“I am doubtful about the genus of this curious but insignificant little plant, which appears to differ from *Casia* in the perianth not being twisted after flowering.”

He describes the pedicels as extremely short (though they can be appreciably long and quite slender, as evidenced in the suite of specimens now at the Melbourne Herbarium), and goes on to say: "Ovary of three unequal rounded lobes, each with two collateral ovules." No mention is made of seeds. Neither Baker² nor Rodway⁶ mention the seeds, but Bentham⁵ remarks: "Seeds flat, disk-shaped." I have examined ovules from one of the type ovaries and found them indeed very flat, so Bentham probably jumped to a conclusion that *C. alpinum* would be sure to follow the general *Chlorophytum* rule in this regard (Incidentally, the spelling "*Chlorophyton*" as adopted by Bentham, and later by Rodway, also calls for correction—we are bound to follow Ker's original and deliberate use of the "UM" suffix.)

The seeds of *Chlorophytum alpinum* are a striking anomaly in the genus: spherical, black, shining, papillate, 1½-2 mm. diameter, with white and papery arils adhering as a prominent volva at the base—precisely the kind found in *Casia*. Our species thus combines the characters of both *Chlorophytum* and *Casia*, having the persistent, non-coiling (or only very slightly twisted) perianth of the former, but seeds of the latter, albeit the capsule opens up more widely and readily than is usual in a *Casia*. Perhaps it is as much entitled to distinct generic rank as *Chamaecilla*, which occupies just such an intermediate position (though with a reversal of the *C. alpinum* characters) and of which Bentham⁵ wrote: "The genus is limited to Australia, showing the perianth of *Casia* with the fruit and seeds of *Chlorophyton*."

A search through *Casia* exsiccatae at the National Herbarium, Melbourne, brought to light two collections of our "Alpine Green-lily" that Mueller had labelled "*Casia parviflora*": a goal one from the "table-land," Apsley River district, eastern Tasmania (presumably the Fingal Tiers, whence it was taken by A. R. Crawford in 1887), extends the known distribution there by at least 80 miles; the other is from Braidwood district, N.S.W. (W. Bäuerlen's No. 164, Nov., 1886, probably obtained in nearby mountains, rising to 4,000 feet) which definitely establishes *Chlorophytum alpinum* for that State and extends the range to nearly 500 miles. Probably the species has been overlooked on account of its grass-like appearance and small stature.

Victorian specimens were exhibited at the January meeting of the F.N.C. and are now in the Melbourne Herbarium.

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4. G. Bentham, *Flora Australiensis*, VII (1878), p. 48.
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HISTORY OF THE GEELONG FIELD NATURALISTS' CLUB

By CHAS. DALEY, B.A., F.L.S., Melbourne.

Of the numerous Clubs, suburban and provincial, established for the study of Natural History since the formation of the Victorian Field Naturalists' Club, the only one which seemed to have the quality of permanence and which has left a fine record of accomplishment and useful systematic work was the Geelong Field Naturalists' Club.

It was formed in 1880 by some naturalists, the most prominent of whom were Messrs. J. F. Mulden and W. Shaw. For the first ten years there is no published record of its activities, but it made good progress, its membership including Messrs. W. H. Renton, A. B. F. Wilson, A. Purnell, M. G. Roebuck, J. Hammerton, H. E. Hill, W. Errey, J. Goodlet, H. L. Grieve, E. Patterson, B.A., W. A. Hargreaves, M.A., B.C.E., J. B. Leitch, and others. The Rev. J. S. H. Royce, F.R.G.S., was one of the earliest Presidents, and Mr. Bracebridge Wilson, M.A., F.L.S., Principal of the Geelong C.E. Grammar School, a keen botanist, was elected as Patron of the club. Mr. A. B. F. Wilson was the Hon. Secretary.

Fortnightly meetings were held at the Gordon Technical College, where specimens of natural history were shown and described. Papers were read, lectures given and field excursions arranged. In addition a library and a museum were formed. An Annual Conversazione was fixed, with exhibits and pertinent addresses thereon. From time to time public lectures by qualified men were provided. The Club maintained close contact with the College Students' Science Club and the Amateur Photographic Club of the Technical College.

The first issue of the *Geelong Naturalist* appeared in July, 1891. The Rev. Royce was then President, the supplementary subject to his Presidential address being "Sea Urchins." At the exhibition in 1893, Professor Baldwin Spencer gave an illustrated lecture upon "How Animals See."

The Geelong environment is specially suitable for Nature study with its varied features by mountain, lake, stream and sea, forest and plain. At different times members had coastal excursions from Queenscliff to Apollo Bay, and Otway forest, also to the Barrabool Hills, the Lorne district, You Yangs and Anakie Gorge, the Barwon and Moorabool rivers, the lime-stones of Fyansford and Batesford, the Dog Rocks, overlying basalts, Eocene formations at Shelford, fern glades and forests beyond Anglesea, the middens and chipping grounds of Torquay and Bream Creek. Easter and Xmas Camps were held at Anglesea, Point Addis, Bream Creek, Erskine River and Otway forest.

Dredging was undertaken in Corio Bay, so that an extensive and fruitful district was well traversed, and its natural features observed, studied and recorded.

The Journal was published quarterly. Mr. H. E. Hill was editor in 1894, at which time Mr. J. Dennant, F.G.S., the distinguished geologist, was President. The membership then approximated 80.

Among Corresponding Members were Messrs. W. A. Hargreaves, M.A., of Brisbane Grammar School; W. E. Matthews, Stawell Technical School; G. Sweet, F.R.G.S., H. J. Tisdall, F.L.S., T. S. Hall, M.A., Rev. W. T. Whan, M.A., J. H. Betheras, M.A., Rev. J. C. Love, Lorne; A. J. Woodward, Sale, etc. Mr. A. J. Campbell, F.L.S., contributed many articles, including "A Bird-list of 393 Species, Nests and Eggs," "Nests and Eggs of Pardalotes," etc. Mr. W. A. Guilfoyle contributed a paper with a list of the "Flora of the Bellarine Peninsula," Mr. Le Souef, one on "Victorian Mammals," and Mr. Dennant set down the "Fossils from Shelford." In 1895, Mr. G. H. Adcock gave a list of "Plants from Cape Otway Forest," to be followed two years later by a "Census of the Plants of the Geelong District." Mr. H. Kingsbury with his paper supplied a list of "Victorian edible salt and freshwater fish," also later a paper on "Oyster Culture." The editor of the Journal at this time was Mr. Hartley E. Williams. On the death of Mr. Bracebridge Wilson, Professor Ralph Tate, F.G.S., F.L.S., was elected Patron of the Club.

In 1896, Mr. Dennant was still President. Life Members at this time were: Baron von Mueller, Messrs. C. French, F.L.S., J. F. Riley, J. R. Remfrey, and A. J. Campbell. Mr. Adcock became editor. Mr. H. T. Tisdale, F.L.S., gave a paper, the first of many, on "Edible Fungi of Victoria," and Mr. T. S. Hall, M.A., a paper on "Tupong or Marble Fish."

A member who by his wide knowledge, enthusiasm, and practical experience in Nature's ways, was outstanding, was Mr. G. F. Mulder. Well versed in every branch, a keen and intelligent observer, his advice, ready help, and special knowledge were of the utmost value to the Club for about forty years. His numerous notes, papers, and lectures aptly epitomise the natural history of the Geelong district, dealing with Geology, Palaeontology, Ornithology, Entomology, Conchology, Zoology, and Ethnology, a valuable work. Many geological papers were, through the offices of his fellow geologists, Dr. T. S. Hall, Dr. G. B. Pritchard, and Mr. Dennant, who valued his research, submitted to the Royal Society. A few of his papers may be mentioned: "List of Fossils from Corio Bay," "Eocene Deposits and List of Fossils, Corio Bay," "Terrestrial

Fresh, and Brackish Water Mollusca of Geelong and neighbouring Districts," "Catalogue of Fossils from Birregurra," "Birds of Cape Otway Forest," (225 species being noted out of Campbell's list of 393), "Victorian Hydrozoa," "Geology of Cape Otway Forest," "Wauru Ponds Fossils," "Cleoptera of the Geelong District," etc.

In 1896 Mr. Adcock became editor. He continued his botanical work, supplementing the list of Cape Otway forest flora, and giving a paper on "Insect Traps." Mr. Tisdall also contributed "Survival of Water Plants During Drought," and Mr. C. French, F.L.S., dealt with "Economic Entomology." In the following year it was decided to hold the Club meetings at the Mechanics' Institute.

In 1898 an official branch for meteorological observations was registered, such being regularly noted in the Journal.

In the year 1895, owing to some slight disagreement between the Field Naturalists' Club and the Science and Photographic Clubs, the latter published, in August, a Journal of their own, the *Wombat*. In 1896 it was recognized as the official publication of the Gordon Technical College, Mr. H. E. Hill being editor. Among occasional Nature Study papers in the *Wombat* was Mr. C. F. Belcher's "Notes on the Birds of the Geelong district." In July, 1899, the *Wombat* suspended publication. Meanwhile the Science Club connected therewith had proposed amalgamation to the Field Naturalists' Club, and this was agreed to. Mr. G. H. Adcock was elected President, the veterans, Messrs. W. Shaw and J. F. Mulder, Vice-Presidents, Mr. J. F. Dentry, Hon. Treasurer, Mr. H. E. Hill, Editor, and Mr. J. B. Leitch, Secretary. In 1902 the *Wombat* was issued for the combined incorporated Clubs, but in March, 1904, the name *Geelong Naturalist* was reverted to. The new editor, for a brief period, was Mr. C. F. Belcher, M.A., LL.B.

Professor Baldwin Spencer now became Patron on the death of Professor N. Tate. Mr. J. F. Cary was the next editor.

About 1903 Mr. R. E. Trebilcock, an active member, in company with Mr. Robert Hall, F.L.S., C.M.Z.S., the ornithologist, made an unusual trip to follow the course of some of our migratory birds to Siberia, a journey to the nesting places at the Tundras within the Arctic Circle, full of incident and fruitful of knowledge.

During the early years of the century, the subject of nature study had assumed importance in the State schools, under Mr. J. A. Leach's skilful guidance. The Club decided to hold a Nature Study exhibition at Geelong, as a timely means of furthering natural science. A strong executive Committee, of which Mr. G. H. Adcock, F.L.S. and Mr. W. Shaw were

chairmen, was formed, comprising Club members, prominent citizens, and Education Department representatives. The exhibition fund was freely subscribed, full publicity given, and on Monday, April 24th, the Hon. Thomas Bent, M.L.A., State Premier, opened the first exhibition, which in all sections of natural history was a gratifying success, the numerous exhibits from State schools and scholars, as well as from others interested, showing how popular nature study was becoming in the community. In addition to the general public, between two and three thousand children attended the exhibition. Mr. F. Tate, M.A., I.S.O., Director of Education, an ardent supporter of the project, gave an address on "Why Nature Study Should Have a Place in Primary Schools." Other lectures were given by Dr. Gavin McCallum, Rev. W. Williams, F.L.S.; Messrs. J. A. Leach, B.Sc.; J. H. Betheras, M.A.; C. R. Long, M.A.; Mr. Trebilcock graphically described "A Trip through Northern Siberia."

Another Nature Study Exhibition was held in 1906, with equal success. A branch Club was started at Mortlake. Dr. Gavin McCallum succeeded Mr. Adcock as president, worthily holding the office for many years. Mr. Trebilcock edited the Journal. In 1906 Mr. H. B. Williamson, an ardent botanist, on appointment to Geelong, continued Mr. Adcock's botanical researches on the flora of Geelong district. Messrs. C. F. Belcher, H. E. Hill, and H. A. Purnell did valuable work in observation of bird life over a wide area. Mr. G. C. Bartlett specialised in microscopical rock sections and Hydroid Zoophytes. A special lecture on "Central Australia" was delivered by Sir W. Baldwin Spencer.

In 1907 I joined the Geelong Club. Dr. McCallum was president and Mr. A. B. F. Wilson hon. secretary. This year the membership was at its highest, provision having been made in the previous year for including junior members and members of the Mortlake branch. My first contributions were reports on attendance at the Victorian Field Naturalists' Camp at Mornington, and on the Science Congress at Brisbane as representative of the Geelong club. During four years' residence there I was busily occupied in the activities of the Geelong F. N. Club. Dr. Gavin McCallum was a popular president. He gave annual addresses on subjects such as "Instincts and Reason," "X-ray and High Frequency," "Low Forms of Life at the Saltpans," etc. Mr. J. M. Murdoch treated of "Moss Hunting" and "The History of a Moss;" the Rev. W. Williams, F.L.S., of insects generally; Mr. A. J. Campbell, jun., gave papers on "Mud Island," "About Torquay," "Point Addis to Anglesea," "A Mountain Gully," and "After Lyrebirds in August." Messrs.

W. Shaw and J. F. Mulder, the two foundation members, were made life members for their long and faithful services.

At a visit to Geelong of His Excellency Sir Thomas Gibson Carmichael, K.C.M.G., on December 18th, 1908, the president, on behalf of the club, presented him with an address, his interest in entomology being so well known.

The ex-president, Mr. G. H. Adcock, F.L.S., then Superintendent of the Viticultural College, contributed an article, "A Field Naturalist in Papua," and Mr. W. W. Froggatt, F.L.S., Government Entomologist, N.S.W., "A Naturalist's Notes in the Solomon Islands," both excellent articles. A welcome lecture was Mr. J. A. Leach's "Birds of Victoria." The departure of Mr. R. E. Trebilcock was a distinct loss to the Club. Besides being an ornithologist of note he had closely studied crustacea, diatoms, and lepidoptera, and with Mr. Mulder had described and figured many species of the Hydroida. Among papers contributed were: "Protective Colouring in Animals," "Variation of Domestic Animals," "A Cruise in Bass Strait," "The Butterflies of Geelong District," "An Expedition Down the Lena River," etc. He had been librarian, secretary, and editor, respectively.

Another useful member was Mr. H. W. Davey, F.E.S., who furnished papers on entomology, reptilia, and amphibia, e.g., "Insect Control in Victoria," "Life Histories of Insects and of Coccids," "Insects in Relation to Plant Life," "Ants' Nests and Visitors," "Insect Pests," etc.

Mr. H. B. Williamson's series of articles on "The Flora of Geelong" was also supplemented by papers and lecturettes, e.g., "How to Collect, Press, and Preserve Plants," and by diligent field work on introduced plants, habits of bees, etc. Mr. Mulder described "The Formation of the Highton Valley," and "The Eocene Deposit of Limeburner's Point." Mr. R. T. McKay, C.E., wrote on "The Great Australian Basin," and also on "The Murray." The Rev. Robert Kelly dealt with "The Flora of Yorke Peninsula."

On Mr. Trebilcock's departure the writer became editor of the Journal, continuing for six years. Personal contributions were: "Casuarinas and Mistletoes," "Afforestation, a National Duty," "By the River," "Origin of the Australian Aborigines," "Instinct in Plant Life," "Around Cunningham," "The Relation of Geological Structure to the Character of Indigenous Flora," "Mt. Wellington and Tali Karng," etc.

In 1913, at the President's (Dr. McCallum) election for the seventh year, he was presented by the Club committee with a complete set of the *Geelong Naturalist* (from 1891), beautifully bound and inscribed. The Vice-President, Mr. W. Kyle, made

the presentation. In the following year Mr. A. B. F. Wilson, on the occasion of his twenty-first nomination as hon. secretary, received a purse of sovereigns subscribed by members.

Among other papers by members, the Rev. Mack, B.A., described "How Nature Makes Peat," Mr. H. A. Furnell gave notes on "The Pilot Bird," and "Lorne." Mr. Mulder, in his versatility, gave "Aboriginal Stone Implements in Victoria and Their Age," his fellow Vice-President, Mr. Kyle, "Reminiscences of Aboriginal Life in Victoria and N.S.W.," and Mr. H. H. Riordan supplied "Bird Notes," and described "Exploration of the Cumberland Falls" and the Lorne District.

Mention must also be made of Mr. C. F. Belcher's contributions in consistent observation of birds, "Notes on the Rufous Bristle Bird," "Birds found Breeding in Eastern Park," "Notes on Birds of Torquay and Anglesea," "The Honey-eaters of the Geelong District," etc.

On December 21st, 1911, at the president's residence, a farewell function and presentation to the editor on his departure from Geelong was held—a pleasant social gathering.

Among the special lectures given over the decade were those on geology by Drs. T. S. Hall and G. B. Pritchard, by Mr. Hardy on "Freshwater Algae," Professor J. A. Gilruth on "Microbes, Useful and Injurious," Mr. J. A. Kershaw on "Wilson's Promontory," Sir W. Baldwin Spencer on "The Northern Territory and its Aborigines," and Professor Ewart on "A Botanist in the Tropics." These were all illustrated and open to the public.

I edited the *Geelong Naturalist* up to May, 1914, the year in which I joined the F.N.C.V. Then came the Great War with its widely disruptive effects. The journal ceased publication. Subsequently, with the departure of such active members as Messrs. H. B. Williamson, H. W. Davey, C. F. Belcher and others, later of Dr. G. McCallum, and with the severe loss by death of Messrs. Wilson and Mulder, interest waned and membership decreased. Eventually the Club ceased operations. The last secretary was Mr. H. E. Hill.

This inglorious ending, after so long and honourable a record of achievement in studying and fostering natural history, was a calamity that with a little foresight and energy by members should have been readily averted. One cannot but think that if the Club in earlier years had opened its membership to women, its existence would not have so unfortunately terminated.

It is hoped that when peace returns, there may be an active endeavour to resuscitate an institution which was so educative and pleasurable a cultural factor in the important city of Geelong.

SOME HAUNTS OF EAST VICTORIAN FERNS

By FRANK ROBBINS, Castlemaine.

Having spent three years (1935-6-7) in pleasant rambles through gullies and jungle country east of the Gippsland Lakes, where the prodigality of lovely ferns was a constant absorption, I have followed with much interest Mr. N. A. Wakefield's splendid authoritative articles which have appeared in this journal since February, 1940—augmenting our Victorian list of vascular cryptogams by at least a dozen species, and clearing up many erroneous ideas surrounding their identity and nomenclature. His recent contribution, in which the whole fern flora of our far east is surveyed, is a welcome consummation of what he has already published.

It may be considered that the last word on this subject has now been said, yet I have a few notes about specific areas which are worth placing on record for the guidance of fern enthusiasts who have the opportunity to pay East Gippsland a visit. Although I have observed less than 60 of Mr. Wakefield's impressive list of 82 ferns and club-mosses for this region, I can claim priority in the discovery of at least five and on that account, perhaps, my presumption in writing about ferns will be forgiven.

The Prince's Highway from Melbourne to Lakes Entrance (200 miles) follows open, flat country in the main, and for the 100-mile stretch between Morwell and the Tambo crossing one passes through grassland with Forest Red Gum as a dominant tree. From Lakes Entrance onward to Orbost (240 miles), Cann River (294 m.) and Genoa (325 m.), the country becomes hilly and supports a typical East Gippsland flora, consisting of eucalypt forest with abundance of ferns, James, and other jungle plants in most valleys. Between Orbost and Cann River the roadside ferns are very luxuriant, especially at Eucyre Creek valley (Lind Park), and again beyond Cann River at Mount Drummer. Other beautiful fern drives are along Martin's Creek (Orbost-Bonang-Delegete road), the Cambienbar road along the Benm River, and, in my opinion the most beautiful of all, along Glen Arte River, especially at waratah time (Nov.-December). To reach Glen Arte, a journey of 19 miles is necessary from the Murrungowar turn-off on the Prince's Highway (10 miles east of Orbost), but the traveller in no hurry will find this fern paradise well worth the visit.

The climate of East Gippsland approximates closely to the east coastal type of New South Wales—copious rainfall in summer, as well as in winter, and few frosts—and this favours a luxuriant vegetation, so that, wherever one leaves the beaten track to explore a well-marked valley, he is almost sure to find ferns and/or jungle in profusion. Victoria is certainly rich in fern gullies, for one may continue along the Prince's Highway as far as the Queensland border without seeing much evidence of ferns. The cooler damp conditions seem to favour tree-ferns, and excellent gullies of them (now, alas! fast disappearing) were a feature of South Gippsland (along the Grand Ridge road, at Bulga Park and Tarra Valley), the Otways and the Dandenongs. Most of my time was spent around Orbost, Marlo, and the fringe of the Snowy River flats—an area from ten to twenty miles in diameter—and 34 species were noted hereabouts. By far the best fern and jungle gullies near Orbost are Pipeclay Creek, Wilenduck Creek, and Cook's Gully, which will now be described in some detail.

PIPECLAY CREEK

This can be reached by car, the last half-mile along the Snowy bank being very rough, but well worthy the trip. It is comparatively easy to walk up the stony creek bed (usually dry) between walls of jungle fern growth on either side; I noted 23 species here. The two tree-ferns *Dicksonia antarctica* and *Cyathea australis* occur, the former in abundance,

as in most Gippsland gullies. Climbing or scrambling over the tree-ferns, trees, and rocks are the beautiful *Polygodium pustulatum* (Fragrant Poly-pody) and *P. diversifolium* (Kangaroo Fern), the former very profuse. As both have pinnate fronds and often grow intermingled here, they are at first somewhat difficult to distinguish; however, the chief differences are that *diversifolium* has fewer fronds (frequently simple) which are larger, firmer, and more lustrous, whereas *pustulatum* has delicate pinnate fronds in sufficient number to hide the supporting fern or tree trunk, spore masses closer to the leaf margin, and, of course, it exhales a vanilla-like perfume when bruised—it is common, too, at Glen Arte and Mount Drummer. Another typically eastern fern, *Cyclophorus rupestris* (Felt Fern), is related to *Polygodium* and literally covers the trunks of lilly-pillies (*Acmena Smithii*) here to a great height. Its small, round, thick leaves are unmistakable and it abounds in most densely canopied gullies. My first introduction to Felt Fern was in Geyser Valley, Wairakei, N.I., New Zealand, where it grew in the open on bushes right within the steamy sulphurous vapours of the geysers.

The only filmy fern here was *Hymenophyllum cupressiforme* (common in East Gippsland), its minutely toothed broadish fronds being easily recognized among others in this family of delicate midgets. In profusion on the sides of the creek grow: *Culcita dubia* (False Bracken—formerly but inappropriately called "Rainbow Fern"), *Dennstaedtia darwallioides* (Creeping Lace Fern—rather similar in appearance, but the former is of a yellowish colour, and more often on the drier lilly slopes, where very common), *Dryopteris Shephardii* (Shining Wood Fern), *Diplazium australe* (Shade Spleenwort—common in very shady gullies throughout East Gippsland), *Doodia caudata* (Small Rasp Fern), *Pteris umbrosa* (Jungle Brake—uncommon in East Gippsland, but abundant in this creek in large clumps; also at Mt. Drummer), and *Blechnum cartilagineum* (Gristle Fern—very common, especially on dry hillsides and roadsides, where it has a distinctly yellow caste). The Fishbone Fern (*Blechnum nudum*), though not seen in Pipeclay Creek, is common everywhere else in East Victoria, while a bipinnate freak form occurs at Marlo. *Asplenium flabellifolium* (Necklace Fern) is prolific here and in most gullies, but the best growth was found in the cliff-face jungle at Loch End, facing Lake Wat Wat. (Mr. Wilby reports the same fern with *Psilota falcata* as exceedingly plentiful on cliffs carrying jungle flora about Lakes Entrance.) *Blechnum Patersonii* (Straw Fern), though usually inclined to be rare, is fairly widespread at Pipeclay Creek, found only in the darkest damp gullies; fronds are sometimes pinnate here, the surer ones being narrow, tail-like and often divided. N.B.: The illustration in the *Fern Book* does not appropriately represent it.

If you travel a hundred yards or so beyond the mouth of Pipeclay Creek, the Giant Maidenhair (*Adiantum formosum*) comes abundantly into view, some fronds standing three feet on their shiny black stems. I have seen it elsewhere only at Loch End on the Snowy banks (now probably cleared, as part of the wraggling scheme for flood prevention), but I understand from Orbest people that it used to be dug up for ferneries at Cann River, where Mr. Wakefield has lately collected examples. *A. athiopicum* (Common Maidenhair) is very common throughout Gippsland, though always as small plants, and often on open land. *Pteris tremula* (Tender Bracken) occurs with the Giant Maidenhair at Pipeclay, Loch End and Mt. Buck, but I seldom found it. *Asplenium bulbiferum* (Mother Spleenwort), so widely known in cultivation, occurs at Pipeclay, Glen Arte, Mt. Buck and Mt. Drummer, but the best examples were seen at Cook's Gully on fern trunks or logs and not in soil. In addition to the 23 ferns (including Common Bracken) noted above for Pipeclay Creek, four other rare plants may be mentioned in passing: *Marsdenia flavescens* (Yellow Douah), *Beyeria losiocarpa* (Wallaby-hush), *Korthalsella apuntia* (the

rare Jointed Mistletoe, on Lilly-pilly trees) and *Sarcanthus trifidatus* (the Tangle Orchid, festooning trees in abundance).

WIBENDUCK CREEK

Returning a few hundred yards along the Snowy Gorge, one reaches this creek which, on account of its pools of water, is more difficult to traverse, though well worth visiting. At least 15 of the above-mentioned species grow here, and the following in addition: *Blechnum nudum*, *B. capense*, *Polypodium australe* (Finger Fern), *P. grammidiis* (Gipsy Fern), and *Todea barbara* (Austral King Fern). The rare Gipsy Fern was also found at Glen Arte and Mt. Drummer, usually perched on branches of *Tristonia laurina* (Kanooka), but never on tree-ferns as depicted in the *Fern Book*. I have found it on practically dry branches at Wibenduck, its small leathery fronds probably affording resistance to dry periods. The small tufted Finger Fern occurs also at these other localities.

NEAR THE SNOWY FLATS

Cook's Gully—once popular to fern gatherers—is reached by entering a gate from the Brodribb River bridge on the Prince's Highway and following the track upstream past a farmhouse for three-quarters of a mile, until a small cottage comes in sight. In the unprepossessing narrow gully above the swamp, one encounters a mile or so of really splendid ferns. *Asplenium bulbiferum* featuring conspicuously higher up.

Loch End is six miles from Orbost, along the right bank of the Snowy River. Giant Maidenhair and Creeping Lace Fern were once plentiful in the river jungles (since cleared), but farther on, over and around the "Devil's Backbone," the red-soil cliffs overhanging Lake Wat Wat still harbour many ferns, notably Necklace Fern.

At Marlo, and also on the Murrungowar road, there is sandy country offering a similar flora to the swampy heathlands east of Port Phillip. *Lindsaya linearis* (Screw Fern) and *Selaginella selaginoides* (Swamp Selaginella) are both very common; I found also *Phylloglossum Drummondii* (Pigmy Clubmoss) and one plant of *Schizaea bifida* (Forked Comb Fern), but failed to locate the Meadow Moonwort which, I am assured, is there.

Cheilanthes tenuifolia (Rock Fern) is common on the granitic country around Young's Creek near the Prince's Highway, the limestone rocks of Buchan, and the acid hills at McKillop's Bridge on the Upper Snowy. On one occasion I found *Lycopodium laterale* at the Newton's Creek bridge. The two Coral Ferns (*Gleichenia microphylla* and *G. circinnata*) are common in places, such as on the road near Brodribb bridge and along the Murrungowar road; swampy valleys like Newton's Creek are more or less covered with these ferns, while roadsides almost anywhere east of Orbost will yield the Fan Ferns (*Stichosium lobatus* and *S. tener*). Stagnant gulches on the Snowy Flats are often blanketed over with the red *Azolla pinata* (Ferny Azolla), but, like Mr. Wakefield, I did not find its companion, *A. rubra*; three dozen ferns and clubmosses are on my list for this area and its immediate surroundings.

GLEN ARTE

A distance of 29 miles from Orbost, the drive through Murrungowar is one of the finest in Victoria. About a mile past the turn-off on the Prince's Highway, a large patch of *Lycopodium densum* (Bushy Clubmoss) and strongly scented, pink-flowered *Hakea sericea* is entered. Like a miniature pine tree, the former is reputed to be the largest clubmoss now living; it grows also on the Prince's Highway past Newton's Creek, and along the track to the Cabbage-tree Palms (giant specimens here). *Hypolepis punctata* occurs at a sharp turn just beyond Murrungowar. Good views of the Orbost region are afforded as the road ascends, followed by a down-grade of several miles beside the glorious fern-fringed Arte River.

PLATE VIII

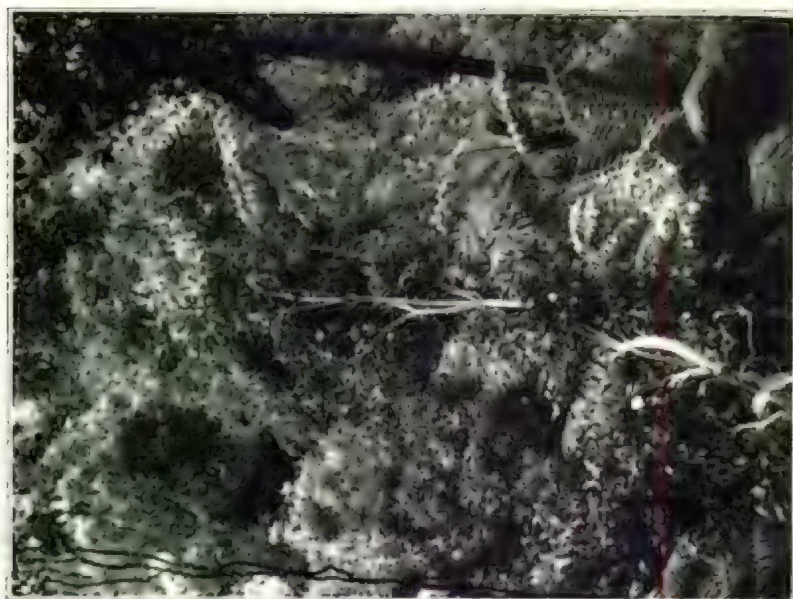


FIG. 1. Ferns and Mosses in the Mt. Prunus Forest.

FIG. 2. H. T. Broom.

set in a forest of enormous Silver Wattles. This is quite the finest waratah gully I have seen.

In addition to previously mentioned ferns, tree-ferns here are festooned with the twining *Polystichum adiantiforme* (Leathery Shield Fern), *Asplenium bulbiferum*, *A. fuscoides* (Weeping Spleenwort), and the two hymenophylls, *Polyphlebium venosum* and *Mecodium australe*, which are more abundant at Mt. Drummer—I did not observe *N. falkellatum* (Shining Filmy-fern). The two *Asplenium* are somewhat similar, except that the Weeping Spleenwort has narrower segments to its gracefully drooping fronds, but intermediate conditions appear to exist; the latter is found high up in the tops of kanookas on Mt. Drummer, as also at Martin's Creek and Bemm River jungles on the Combenbar road. The pendent Long Fern Clubmoss (*Tmesipteris Billiardieri*) hangs from fern trunks too; its foot-long fronds could easily be mistaken for some dicotyledon, but upon closer scrutiny the little spore capsules in the forked leaves are discernible. Another rare fern found at Glen Arte and Mt. Drummer was *Doodia aspera* (Prickly Rasp Fern), which I at first confused with *Blechnum lanceolatum* (Lance Fern)—fertile fronds are quite distinct, but in their absence the venation affords a key.

MOUNT DRUMMER

This is the most noteworthy fern paradise remaining, my list registering 36 species, which is by no means complete (some common species appear to be lacking). Eighteen miles east of Camo River the Highway passes through the upper portions of two large, distinct jungles on the mount, the lower one being the more accessible. Motorists often pause here, as a little stream of crystal-clear water is seen falling from a sheet of iron inserted at the embankment. Beside the majority of mountain and jungle species I have already discussed, this rich gully contains all four Victorian species of *Cyathea* (viz., Slender, Rough, Prickly, and the new Skirted Tree-ferns). *Dryopteris tenera*, very rare in Victoria, also covers a large area in this gully, especially on the eastern side, but I was unfortunate in not finding *Macroglena caudata* (Jungle Brisle-fern) at Mt. Drummer.

OTHER LOCALITIES

Roads pass through fern gullies at Martin's Creek, Bemm River above Club Terrace, and Euchre Creek (32, 40, and 45 miles east of Orbost respectively). One interesting trip rather devoid of ferns is the highway from Buchan to the Upper Snowy bridge and on to Bonang. At Buchan, near the caves, *Asplenium trichomanes* (Common Spleenwort) is to be seen in the crevices of the limestone. Here, also, are the Blanket Fern (*Pleurosorus subifolius*) and Bristly Cloak Fern (*Notholaena distans*), though I did not see them myself. Just before Bonang is a gully in which I found *Blechnum furvatile*, while at Mt. Buck (in the headwaters of Young's Creek) is another on the old road, but it is difficult to reach without a guide.

To the naturalist who can get away from the road, Gippsland is pregnant with fern gullies, many of them as yet incompletely explored.

[The substance of this article by Mr. Robbins was written nearly six years ago, but he deliberately withheld his Mss., chiefly owing to the indefatigable researches of N. A. Wakefield, who shortly afterwards embarked on the study of Australian ferns, bidding well to become a leading authority on this subject. While praising such monumental and enthusiastic labours by the younger botanist, I recently persuaded Mr. Robbins to allow the publication of his article, with nomenclature duly amended, as I feel it is still a valuable contribution to Victorian pteridology. Both writers owe the kindling of their interest in ferns to R. W. Bond's splendid little handbook (published by our F.N.C.V., Nov., 1934) and to the earlier *Sw. Nature Books* of Charles Barrett.—J.H.W., Asst. Ed.]

DENDROBIUM GRACILLIMUM, stat. nov.

By the Rev. H. M. R. Rupp, Northbridge,
New South Wales.

This plant was described by me in *Proc. Linn. Soc. N.S.W.*, LIV (1929), under the name *D. speciosum* Sm. var. *gracillimum*. It has become rather popular among growers of our native orchids, and is invariably advertised as "*Dendrobium gracillimum*."

Apart from growers, however, the general consensus of opinion that it should rank as a species appears to be very strong. Therefore I now comply with several requests to raise it to specific status: and in doing so I wish briefly to review its history.

It was first brought to my notice in 1925 by the late John Tucker and his wife, of Paterson, N.S.W., who had collected several plants in the neighbouring forests. Subsequently I found it there myself. Its appearance at once prompted the idea of a natural hybrid between *D. speciosum* Sm. and *D. gracilicaule* F. Muell., the plant itself suggesting a very stout and robust form of the latter, although very slender in comparison with the former. The flowers, however, closely resemble those of *D. speciosum*, the only outstanding distinction being that the perianth segments are never more, and often less, than half as long.

Specimens sent to the late Dr. R. S. Rogers elicited his opinion that the plant was practically identical with the Lord Howe Island *D. gracilicaule* var. *Howeanum* Maiden; but in this view I could not concur. After flowering a plant sent to him by Mrs. Tucker, Dr. Rogers wrote agreeing with me that it should be placed in *D. speciosum* rather than in *D. gracilicaule*; and ultimately I published it under the name cited above. I took this course solely because of the obviously close relation of the flowers to those of *D. speciosum*; for between the plants there is no resemblance beyond that arising from the fact that both belong to the same section of the genus.

Lest it may be imagined that the Paterson plants were merely the result of a local "cross," I may say here that since 1929 *D. gracillimum* has been found in many widely-separated areas of the northern half of N.S.W., and also in southern Queensland.

There is some uncertainty, however, whether this was the plant intended by Bailey in describing *D. speciosum* Sm. var. *nitidum* (*Proc. Roy. Soc. Queensl.*, i; *Queensl. Fl.*, v (1902), 1526.) The description agrees fairly well except on the following points: (1) In *D. gracillimum* the flowers are usually cream or deep yellow, only very rarely white; (2) pitted leaves, though on record in *D. gracillimum*, are as rare as white flowers; (3) old stems of *D. gracillimum* have not been observed as conspicuously "shining."

Moreover, Bailey's record for his variety is "Tropical Queensland." Mr. W. H. Nicholls and the writer have received very numerous orchids from that area during the past 16 years, but have not seen any *Dendrobium* remotely resembling *D. gracillimum*. Unfortunately Bailey left no specimens of var. *nitidum*, and Mr. C. T. White, the Queensland Government botanist, informs me he has never seen it. On the whole it would seem probable that the two plants are not identical.

The future botanical designation of the orchid here discussed will be *Dendrobium gracillimum* (Rupp) Rupp.

NESTING OF BANDED STILTS

(To the Editor)

Sir,—I have just read an article in the *Herald* about Banded Stilts appearing near Melbourne and the mystery of their nesting places. It might be of interest to record that I saw a small colony of these birds nesting here in 1939. That year we had big rains which filled a swamp on this and an adjoining property. On this swamp there were thousands of ducks, swans, stilts, avocets, terns, gulls, dotterels, and every type of water bird. But the stilts did not breed there.

About three miles away there was another lignum swamp and just before the rain I had had a drain cut from the middle of the swamp into an excavated dam. When the swamp filled the tops of the dumps of excavated dirt just showed above water and on each of these, fourteen in all, a stilt had a nest. The eggs were very similar in size and colour to those of a small plover, or lapwing, and I regret now that I did not photograph them as the birds were very tame.

I was in the Deniliquin district during the big flood in 1917, during which thousands of acres of country were under water, and water birds, including stilts, were there in thousands. I spent quite a lot of time riding through the water but never saw a stilt nesting, although there were thousands of them there. I think they must like to have a quiet nesting place where there are no other birds, and, of course, where they are not interfered with by man.

Yours, etc.,

A. K. McCRAE.

Newmarket,

Hay, New South Wales.

VX140007, Cpl. K. D. Clarke, H.Q.'s 3 Aust. Div. Provost Coy., A.I.F., Australia, would like to correspond with any members of F.N.C. who are interested in Australian butterflies. He has a goodly collection of species from the S.W. Pacific area, and, in order to expedite classification, would greatly appreciate a copy of *What Butterfly Is That?* by Dr. Waterhouse.

Miss MacPherson, National Museum, Melbourne, is desirous of obtaining live fresh-water snails from as many different localities as possible, and the assistance of interested members would be welcome. The shells are being used in Liver Fluke experimental work, and should be addressed to Miss MacPherson at the National Museum. If packed in damp grass they will carry through the post successfully. Be sure that localities are shown, including the name of the creek or river if known.

BATS AND VIBRATIONS

By A. H. E. MATTINGLEY, Melbourne.

Of what use are their eyes to some species of bats when other senses or means of information such as vibrations guide them in their flight?

I have frequently noticed that the sudden transition from intense darkness to brilliant light has had no effect on the rapidity of the flight of small bats such as the genus *Vesperugo*.

The eyes of the smaller insectivorous bats are relatively much smaller than in mice of about the same size. The question arises, how are bats able to live in dark places and to secure their insect prey by night without constantly dashing into obstacles in their flight. Observations have been made by me of bats in caves in various countries, some of which were wide open to daylight. In some instances their sleeping-places were situated under a ledge of rocks with just sufficient cover to shelter them from rain, but subject to the direct light of day.

As long ago as 1794, Spallanzani, an Italian, experimented with bats deprived of their sight. It was demonstrated by the cruel experiment of amputating their eyes, and later by another method of covering their eyes with wax. It was found that these bats in some mysterious way were aware of the proximity of objects. With their eyes entirely covered or with their eyes amputated, bats when liberated and allowed to fly in rooms across which threads have been stretched with just room between for the outstretched wings to pass, in no case were the threads touched, even when placed so close together that the bats were obliged to contract their wings. They also successfully avoided striking each other, as well as walls, ceilings, furniture, twigs and leaves, and suspended themselves by their legs to any object as efficiently as when possessing sight.

Rollinat and Trouesart, in 1900 in France, and Hahn, in 1908 in America, tried similar experiments with black wires. In over 2,000 trials with small *Myotis* 25% hits were recorded. In 600 trials of same animals deprived of their sight the percentage of hits was less than if the eyes were uncovered. This provided evidence that bats depended little on sight in avoiding wires. In a second set of experiments the delicate ears and tragus were amputated and it was found that these membranes did not warn them by reflecting sound waves. No doubt it is the echo of vibrations or radiations set in motion by air currents that they really perceive. Apparently this does not apply to all species of bats with different speeds of flight and so far as is known to the larger fruit-eating bats. The hits recorded may have been due to the tiredness of the bats or weakness due to want of food.

Acting on the assumption that air vibrations were set up by passing insects or reflected by nearby objects, scientists invented a device for detecting obstacles in a ship's path at night or in fog by sending out vibrations of a low tone from the ship's prow and recording the echo by delicate membranes on board.

E. Troughton, zoologist of the Australian Museum, says that on account of their relatively small eyes some of the insectivorous bats must be provided with some special means of avoiding objects during their flight. G. Lakovsky, the eminent French physicist, says it seems more and more evident that the sense of direction in bats originates from special radiations of ultra-short wavelength, emitted by birds and insects themselves. In dealing with nocturnal and diurnal birds he says that we are led to believe that they are attracted to their prey by radiations emitted by these insects. With bats it is commonly believed that it is to the acuity of the senses of hearing and smell that the bat owes its ability to approach its prey, whose least movements it can detect, thanks to the vibrations of the air reaching

its ears. This hypothesis may be admissible under certain conditions such as the calm atmosphere of the countryside.

In Paris I have often watched bats from my balcony, on racing days, amidst the uproar of a great crowd and the noise of thousands of cars setting up vibrations in the air, saturated with the products of petrol combustion. Amidst this deafening din and vitiated atmosphere it is neither the sense of smell nor that of hearing that guides the bat straight towards insects which they catch as easily as in undisturbed silence of the countryside. The bat is thus more probably attracted to these insects by the radiations they emit, which are not influenced by noise nor by petrol fumes.

Since experiments made by physicists by amputating the eyes, ears and tragus of bats establish the fact that none of these organs guide bats in their flight, then one might assume that the flight of bats in pursuit of their prey is due to the directional guidance of radiations affecting their organic structure which conveys the requisite vibrations to their senses.

Bats, like birds, migrate over the sea. Both are guided by radiations, as stated by me some time ago when dealing with the orientation of birds.

EXHIBITS AT FEBRUARY MEETING

Mrs. J. J. Freame: Eggs of Sea-slug (*Doris*) under the microscope; "saws" of Sword Shark and Swordfish; swords or piercing organs of two species of Sting-rays; Calappa, a crab from Queensland, and a large Crayfish (unidentified) from Queensland; also cast skin of Diamond Python.

Mr. C. French: Specimens of the Hyacinth Orchid (*Dipodium fructolium*) from Carrum having double labellums, which is very uncommon. (Collected by Miss Stanton, of East Camberwell.)

Mr. T. Griffiths: 17 species of marine shells.

Mr. E. Muir: *Myoporum platycarpum* (Sugar-wood) attacked by rabbits. Specimen from the Mallee at Rainbow.

Mr. P. Fisch: *Caladenia pallida* (pressed specimens) found near Anderson's Creek, Mitcham, by Ursula Fisch on November 19, 1944.

Mr. T. S. Hart: *Muralia nieta* (*Polygala* family), an introduced plant very uncommon in Victoria; specimen collected south of Mornington, January, 1945.

Mr. Ivo C. Hammet: *Eucalyptus Stedmani*, E. *Desmondensis*, *Myoporum debile*, all garden grown.

BIRDS AND WIRELESS WAVES

(To the Editor)

Sir,—Mr. A. A. Cook perhaps desires to associate the discovery of the effect of wireless waves on the flight of pigeons in the same category as the beautifully conclusive experimental series of Lister and Koch!

The interference of the flight of pigeons by wireless recorded by Lakovsky in no way proves the existence of any form of electro-magnetic waves as accounting for bird behaviour. Over twenty years have elapsed since such observations, but despite this Edward A. Armstrong, a distinguished ornithologist, and author of *Bird Behaviour*, a comprehensive introduction to Bird Psychology, writing in *The Way Birds Live*, 2nd Edition (1st Edition, Nov., 1943, published by Lindsay Drummond, Ltd., London), mentions, on page 90, that all kinds of theories have been propounded to account for bird behaviour, including that of possessing a magnetic sense; but he definitely states that there is nothing to prove this.

Cairns,
North Queensland.

Yours, etc.

H. FLECKER.

EXCURSION TO RICKETT'S POINT

More than 100 members and friends attended the marine biology excursion to Rickett's Point on January 13, and a pleasing feature was the number of younger members present. We were favoured with pleasant beach weather, and a very low tide which exposed a large area of the rock reefs of ferruginous sandstone opposite the Rickett's Point kiosk.

After a preliminary skirmish among the weed-line along the high tide mark, during which sponges, skeletons of rays, eggs of the Port Jackson shark shells, and other common objects were noted, the party concentrated on the rock pools of the reef. A very wide variety of living specimens representing almost every phylum was noted, and the smaller specimens were collected, at least temporarily, for closer examination.

Because of the large number present it was difficult to demonstrate the specimens individually, so a demonstration bench was improvised by piling rocks into a cairn, and on this a small aquarium tank was placed behind a large magnifier. This proved an excellent way to demonstrate living specimens to a large party.

The general fauna of this area has been described in previous reports of excursions to the same spot, so a detailed list need not be given here. Specimens of outstanding interest were a starfish in the act of eating a piece of mussel by the process of everting the stomach through the mouth (the stomach being swallowed again when the feed was over); a large and very lovely tubicolous worm of the *Sabella* type with a crown of feathery gills almost 3 ins. in diameter; several living sea-urchins; and some tiny brittle-stars.

I would like to express special thanks to Mr. and Mrs. Freame, and to Mr. P. F. Morris, as well as other experienced members of the party, for the energetic way in which they helped with the hunting and demonstrating, for the party was much too large to permit the leader to cover the whole ground single-handed.

CROSBIE MORRISON.

NATIONAL MESSAGE

One of our members, Major T. H. Brunn, who has just returned from active service, and has given his services to help the Third Victory Loan, has asked that all members be urged to subscribe to the limit of their power.

Every additional £10 is required, and when you realize that a £10 Bond will purchase one Owen machine gun or one thousand rounds of .303 aircraft ammunition, you will understand how necessary it is to have this Loan fully subscribed. Besides, there is no better investment offering to-day.

When making your subscription to the Loan, if a quota form is used and returned to me the total will be credited to the war effort of this Club, and at the same time the amount can be credited to your local quota.

Major Brunn will attend our next meeting and will explain all about the Loan and answer any questions.

Quota forms will be available at the next meeting.

F. S. COLLIVER,
Hon. Secretary, F.N.C.

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PROCEEDINGS

The monthly meeting of the Club was held on March 12, 1945, at the Royal Society's Hall, the President (Mr. Ivo C. Hammett) and more than 100 members and friends attending.

The deaths were announced of Col. B. F. Goadby, a member in Western Australia, and Mrs. Chas. Daley, wife of a very old and valued member; their memory was honoured by a call to silence, and letters of sympathy from the Club will be sent to near relatives. Reference was also made to the illness of Messrs. J. and W. H. Ingram—loyal brother members of long standing.

Letters were received from the secretary of the Sir Colin Mackenzie Sanctuary at Badger Creek, thanking the Club for support given in connection with the desired additional reservation of land, and from Capt. Lee Burcham (of the American Marines), who had attended Club meetings whilst in Melbourne during 1943 and now sends greetings to the Club from U.S.A. Member Dave Geddes (in the Navy), through Mr. L. W. Cooper, also conveyed greetings to fellow members.

Reports of excursions were given as follows: Fern Tree Gully (ferns), Mr. T. Griffiths; Yarra River trip, Mr. H. P. Dickins; and Heidelberg (entomology of Yarra lagoons), Mr. A. J. Swaby.

The following were elected as Ordinary Members of the Club: Miss P. Rowe, Miss L. Neil, Mr. J. K. Galbraith, Mr. L. Carritt as Country Members; Mrs. Eric Muir, Mr. W. C. Hedditch, Mr. K. Fahey; and as Junior Member: Master Peter Braham.

The President announced that recently Mr. A. H. Chisholm had been re-elected as a trustee to the Badger Creek Sanctuary, and that Mr. P. Crosbie Morrison and Mr. S. R. Mitchell had been appointed to membership of the newly formed Technological and Natural History Museum Trust. In proffering the Club's congratulation, he pointed out that these three members were all Past Presidents, and had no doubts that they would strive to further the interests of the F.N.C.V. in every way possible.

Major Brunn spoke for a few minutes on the forthcoming Victory Loan and urged the utmost assistance by Club members. He emphasized the debt owed to members of our F.N.C. who are now serving with the forces "up north"; his own son never lost a chance to make natural history observations and even carried insect collecting gear to the very battle-front in the islands.

NATURE NOTES

Mr. V. H. Miller congratulated the editor of *Wild Life* (Mr. P. Crosbie Morrison) on his recent broadcast remarks championing the Black-shouldered Kite, and pointed out that this splendid bird was already "protected" by law, but apparently by not much else.

Mr. P. Crosbie Morrison brought up the matter of Tea Tree destruction at Beaumaris, stating that local residents were chopping up the fire-damaged trees along unmade roads, which were apparently still private property; he appealed to members to use their influence in stopping this destruction. Miss R. Chisholm suggested that possibly a lecture could be arranged at Beaumaris to arouse local interest. Mr. A. J. Swaby promised to contact the local council in this matter and report results later.

BUTTERFLIES

Mr. J. C. Le Souef began an instructive lecture on this subject by describing the various items in a butterfly collector's outfit, viz., the butterfly net, killing bottle, storage boxes, relaxing tray, forceps, etc. He went on to enumerate the types of country in which collecting is worth while, pointing out those particular plants which are attractive to insects. The collection of caterpillars and pupae, subsequent breeding of the insect, possible causes of failure to emerge, handling and mounting of specimens, were all mentioned. Illustrations from the plates of *What Butterfly Is That?* were projected on the screen, and a running commentary upon these brought the very interesting address to a conclusion.

EXHIBITS

Mrs. M. E. Freame: Starfish with stomach still everted. (This specimen was screened by means of the epidiascope and explained by Mr. Morrison.)

Mr. T. Griffiths: Box of butterflies and other insects. Portions of the barren and fertile fronds of Cistle Fern (*Blechnum cartilagineum*) seen by Mr. V. H. Miller on the banks of the Yarra at Studley Park.

Mr. F. G. Elford: The spiny spider (*Castercantha minax*). Two varieties were exemplified, the coloured and the less common black variety.

"AUSTRALIAN POISONOUS SNAKES"

An illustrated and very informative article on this subject has just appeared in Vol. VIII, No. 10. of *The Australian Museum Magazine*. Mr. J. R. Kinghorn, C.M.Z.S., of the scientific staff at Sydney Museum, has supplied full data on means of recognition, habitats, and actions of the different venoms.

A NEW VARIETY OF SUN-ORCHID

With Notes on Other Quaint Orchid Forms.

By W. H. NICHOLLS, Melbourne.

(1) *THELYMITRA IXIOIDES* Sw., var. *SUBDIFFORMIS*, var. nov.

Planta subrusticula circiter 25-35 cm. alta. Racemi laxiusculis. Flores magni. Segmenta-perianthis elliptico-lanceolata, patentia; sepala viridia; petala lavendulacea maculata.

This interesting variant was described in English in *Orchidologia Zeylanica*, Vol. ii (1935), p. 156. To comply with the international rules it now appears in Latin.

(2) Two specimens of a singular form of *Caladenia Menziesii*, R.Br., were found at Portland by Mrs. F. Mellblom in November, 1943. The flower is much larger than in the typical form, the labellum petaloid with undulate, incurved margins and papillate glands.—Figs. K, L, M.

(3) A curious flower of (apparently) *Chiloglottis reflexa* (Labiell.), Druce. Hab.: Creswick (R. W. Bond, April, 1939).—Figs. O, P, Q.

(4) A neat, and attractive, flower of *Thelymitra ixioides*, Sw., variety *subdifformis*, Nich. (*Orch. Zet.*, Vol. 2, p. 156). Habs.: Portland (Mrs. F. Mellblom, Oct., 1934); Blackburn (Mrs. E. Coleman, March, 1940).—note here the unusual month of flowering.—Fig. N.

(5) *Caladenia FitzGeraldii*, Rupp. The lateral sepals with two perfect lines of calli along one. Hab.: Grampians (J. Costick, Oct., 1934).—Fig. R.

(6) A symmetrical twin-flower of *Pterostylis pedunculata*, R.Br. Hab.: Portland (Mrs. F. Mellblom, Sept., 1934).—Fig. S.

(For other notes on curious flower forms see this journal, Vols. xiv, p. 45; xlv, p. 183; lv, p. 135.)

KEY TO FIGURES ON ACCOMPANYING PLATE

K, L.—*Caladenia Menziesii*, R.Br. (Teratological form) M.—Column from front (note sack-like base).

N.—*Thelymitra ixioides*, Sw., var. *subdifformis*, var. nov. (flower from front)

O.—*Chiloglottis reflexa* (Labiell.) Druce — Teratological form P.—Labellum from same, from above. Q.—A view of the conjoined lateral sepals.

R.—*Caladenia FitzGeraldii*, Rupp. Note calli on lateral sepal.

S.—Twin flower of *Pterostylis pedunculata*, R.Br.

(For natural size of flower figures see their respective descriptions.)

A CURIOUS NEW VICTORIAN GREENHOOD

By W. H. NICHOLLS, Melbourne.

PTEROSTYLIS CRYPTA, sp. nov.

Planta gracilis glabra circiter 10-11 cm. alta. Folia radícula absentia. Caulis bracteae pl. obtusa. R.Br. similis, 15-25 mm. longa. Flos solitarius, viridis et rufus. Galea erecta, incurva, acuta, 13 mm. longa; apice paulo sursum curvatum. Petala acuta, galea non-excedens. Labium inferius erectum, lucinis filiformibus ad galeam basi manifeste adnatum, supra dilatatum.

Labellum oblongo-lanceolatum, medio constrictum, immobile, fere stricium, circiter 1.5-2 cm. longum; apice breviter-decurvatum; marginibus

basi incurvatus saccus; floris anteriorum celans. Appendice filiforme ad basim lobis obcordatis. Columna erecta robusta, circiter 8-13 mm. longa; lobo superiore alas acuta; lobo inferiore oblongo-obtusae. Stigma prominens cordiforme, elevatum.

A slender glabrous plant about 10-11 cm. high. Radical leaves not seen. Stem-leaves as in *Pt. obtusa*, R.Br. 15-25 mm. long. Flower solitary, green with rufous markings. Galea erect, incurved, 13-20 mm. high, the tip short and deflexed. Petals acute, not exceeding the tip of galea. Lower lip erect, the conjoined portion conspicuously adnate—for fully half its height—to base of galea; upper part widely dilated from its free base, the lobes produced into fine erect points, only slightly exceeding the galea. Labellum on a prominent immobile claw, almost straight, its shortly decurved apex extending to the tip of galea, thus, with the petals completely sealing the galea entrance; lamina oblong-lanceolate, somewhat constricted about the middle, about 1.5-2 cm. long, the lower margins incurved, forming a deep pouch-like cavity below the constricted part, median ridge not prominent; the appendage filiform, curved, arising from the base of claw, with a small cordate apex. Column erect, on a stout base, about 8-13 mm. long, each angle of upper lobes produced into an acute tooth; lower lobes oblong. Stigma prominent, situated immediately behind the lower lobes, cordiform. Flowering in May.

TYPE (in writer's possession): Nos. 1004, 1031; Hoddle Ranges, Toora, S.-East Victoria, May 1941, collected by Miss Ruth Clark of Toora.

I am indebted to Mr. A. J. Tadgell of Sandringham (Vic.) for forwarding to me the specimens of *Pt. crypta* (sp. nov.), with the collector's following note: "It was in the sandy soil along Waratah Bay that these specimens were found."

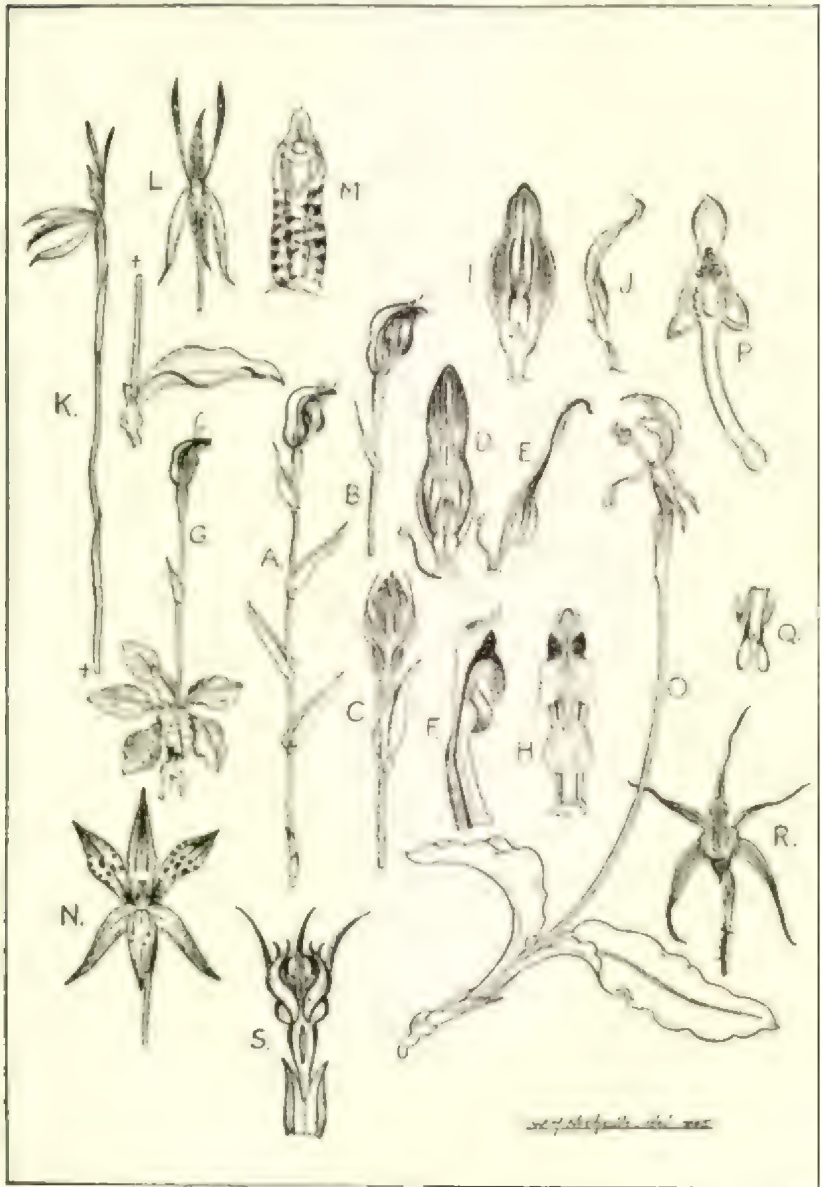
My specific epithet refers both to the habitat (in dense scrub) and to the hood which is perfectly sealed up by the rigid lid-like labellum.

Only three specimens of this remarkable greenhood orchid have so far been discovered and the foregoing description is based on this material; one flower had to be sacrificed for dissection purposes. I must confess that the very strange characteristics alone prevented its being described earlier, for it was originally considered a freak condition of *Pt. obtusa*—just another intriguing, teratological form so difficult to define. But, with the appearance of the recently described *Pt. celans*, Rupp (*Vic. Nat.*, Vol. 61 (1944), pp. 106-107), it was deemed expedient to fix this form also.

Pt. celans is, apparently, well established at Portland, for since the description appeared an additional colony of plants has been located. In spite of this, however, the writer does not present this analogous form as a valid species (notwithstanding its great interest) without some little trepidation, for almost every season brings forth some curious "sport" among orchid flowers: several such examples are figured here. One often wonders what is the explanation for such abnormalities (Figs. A, B, G, J, N, O); is it to be summed up by the one word "mutation"?

The close nature of the overhead canopy is possibly a contributory factor here; doubtless it prevented earlier discovery. Through the altered conditions prevailing in the habitat, the pollinating insect agent may be absent. Unquestionably conditions are altering in some areas. Bush fires create (eventually) a more compact growth in scrub-land areas; this fact was well demonstrated to our party recently, in the vicinity of Portland, home of Rupp's remarkable species.

Pt. celans (which closely resembles *Pt. nana*, R.Br.) hides itself in such exceptionally dense scrub country, while *Pt. crypta* is found in heavy tea-tree areas, also in association with its congener, *Pt. obtusa*, R.Br. Both



SNAKES IN FACT AND FICTION

By II. W. DAVEY

Introduction

Reptiles appeared on this earth long ages before mammals, or even birds, and in Mesozoic times attained their greatest development, some being titanic creatures measurable in yards and tons! The class *Reptilia*, though still occurring in temperate and tropical regions, is best represented by variety and size in the warmest parts of the world. In this paper I shall deal only with snakes, concerning which more tales have been told (mostly untrue) than about any other group of animals.

Among the many oddities of Australia is the preponderance of venomous snakes over the harmless ones—a reversal of the rule in other lands. To my knowledge, 108 species of snakes are known to inhabit our island continent, and only 35 of these are innocuous. No other country possesses so many venomous kinds as this.

India is generally regarded as the home *par excellence* of poisonous snakes, yet Dr. Gunther, in *Reptiles of India*, gives 18 species of the *Elapidae* (the venomous Colubrine snakes) and 19 species of Viperine snakes—a total of only 37 compared with Australia's 73 venomous species.

Few people trouble to distinguish between snakes and legless lizards, in species of which Australia is particularly rich, but unfortunately many of the latter inoffensive creatures are killed every summer. These lizards do certainly have a snake-like appearance, but their scales are differently arranged; they possess eyelids and ear openings, which snakes never have, and very long tails—a feature exhibited only by tree-inhabiting members of the serpent clan.

Feeding Habits

Four different methods of taking food are recognizable among snakes:

1. In one family, including the "Rat Snakes" of India and America, the prey is seized and beaten against the ground until dead or stunned; it is then gulped down very rapidly and another victim usually sought at once. These snakes are so quick in their movements that a rat is very seldom given the chance to bite them.

2. Other snakes, e.g., *Tropidonotus* (the Common Ringed Snake of Europe), swallow their prey alive and otherwise uninjured in any way.

3. Venomous species kill their food by means of poison fangs and wait patiently, as a rule, until the victim is dead before

attempting to swallow it; the venom must be injected into the blood stream, and is quite harmless when taken into the stomach. Small mammals and birds usually die within a few moments, succumbing more quickly if the bite be inflicted on a fleshy part.

Many poisonous snakes feed on lizards or frogs, especially the latter, but the venom takes longer to act than in warm-blooded animals, so that frogs are usually swallowed alive. The Indian Cobra will await a mouse's death, but never waste time waiting for a frog to die, while that largest of poisonous reptiles, the great Hamadryad, is a snake eater that habitually devours its prey before death in case the victim should wriggle away and escape. In the Reptile House of the London Zoological Society I have seen a Hamadryad swallow a snake $2\frac{1}{2}$ feet long and then look around for more.

4. Those snakes which kill their food by constriction first seize the prey (usually by its head) between their jaws and at the same time throw a couple of coils around the victim's body. If the animal or bird be strong and can struggle, one or more coils are rapidly passed round it and the pressure increased until struggling ceases, by which time the prey is usually suffocated. The serpent retains its jaw-hold throughout, and often the strain on its jaws is very severe. I have seen a large Malay python (*Python reticulatus*) relax a coil in order to relieve the pressure on its own head. All constrictor snakes would seem capable of exerting much greater force when anchored by their tails to some convenient object.

After a victim ceases all movement, the snake will relax its mouth grip, then relax the coils a little and survey its victim closely, with a simultaneous flicking of the tongue. This behaviour probably gave rise to the absurd tales about serpents coating their food with saliva before swallowing it. All snakes swallow their food in the same manner, viz., by an alternate raising and reaching forward of one half of the upper jaw at a time, the hooked teeth thus drawing the food inside—actually a "crawling" over and along their food. Once it has passed the head, nourishment is worked down into the stomach by lateral bendings and by forward stretchings of the body; its passage to the stomach is indicated by the widely separated scales. Finally, the snake usually gives two or three big yawns, during which its jaws open beyond the perpendicular, as if to settle back into a normal position; thereafter it crawls away and coils up until the meal has digested.

Anyone who has had experience with snakes can usually form a good idea of the real need for food by the position a snake assumes, but there is naturally a variation with species.

In some natural history books, serpents are figured killing their

prey against a tree-trunk by winding themselves around both tree and victim; such portrayals, however artistic, are purely imaginary.

A belief commonly held is that constricting snakes crush their food to pulp before attempting to swallow it. The writer had two opportunities at the London Reptile House for examining the bodies of Muscovy ducks that had been killed by very large pythons (*P. reticulatus*), one of which was 21 feet in length, but there was no evidence of pulping. The ducks had been merely suffocated by severe squeezing and were never allowed a gasp of air after being seized; the whole seizure was terribly sudden.

In my opinion, pulping would be of no great, if any, advantage to the snake. Non-constricting species have to swallow without being able to pulp their food, which is just as large in proportion, so why should constricting snakes find it necessary to do so? Moreover, the swallowing of an animal full of broken, splintered bones might even prove dangerous before digestion had proceeded very far.

Most new snake arrivals (especially large pythons and boas) at the London Zoo had their excreta examined for the purpose of ascertaining the nature of their last meal before capture. In the case of the larger constrictors, this usually consisted of monkeys, which could be identified from undigested teeth and hair.

Skin-shedding

This is a universal habit among snakes, though the frequency depends upon species, and a well-fed healthy snake will usually cast its skin more frequently than one in poor condition. In the London Zoo there was an uncommon species of rattle-snake which always had to be assisted out of its old skin; such was a delicate operation, especially in removing the skin covering the eyes.

It is often stated in books that, at shedding time, the skin splits behind the neck and then the snake wriggles out after the manner of an emerging cicada. This is, of course, quite incorrect, like many other nonsensical things written about snakes. What really happens, when a snake is ready to cast its skin, is that the lips are rubbed against a stone or stick until the cuticle ruptures and turns back a little. This rubbing is continued until the skin of the whole head is rolled back; then the snake, if in good condition, crawls through or round grass tussocks, undergrowth, etc., at the same time pulling away from its old skin, which is turned completely inside out, even to the eye scales. The dull opaque appearance of a snake's eyes prior to skin-casting is due to a separating of the old scales covering them, but, as soon as these are entirely free from the new scales beneath, the eyes again resume their brightness and the actual shedding usually begins soon after.

Fang-shedding

Venomous snakes shed also their poison fangs, to be replaced by others held in reserve. This is a wise provision of nature, because an angry or very hungry snake may strike at a large animal and lose its fangs, which, if not replaced, could cause death by starvation. When not lost by violence, these fangs are shed normally at intervals and replaced by a new pair.

Hibernation

In countries of severe winter climate, the snake population hibernates until warm spring days re-awaken them to activity. Here in the south-eastern part of Australia, although our winters are generally mild, snakes do hibernate, while those inhabiting river flats are often submerged during periods of flood, yet without suffering much harm. This is not so surprising as would at first appear: the writer has had small Japanese Terrapins that always overwintered deep in the mud beneath a small clay pond. It is remarkable indeed that an animal, breathing entirely by lungs, can live under water for months without once coming to the surface—such would be understandable in amphibia, most of which can breathe more or less through their skins.

Reproduction

Every serpent is hatched from an egg. In the oviparous group of snakes, eggs are laid and left to hatch by the warmth of their surroundings, whereas in viviparous kinds the young are produced in a living condition, the mother retaining her eggs in her body until they hatch. There appears to be no rule in this matter, as so many non-venomous snakes produce living young, while others lay eggs. All vipers produced young alive, but a surprising fact is that snakes belonging to the genus of the common English Grass Snake (*Tropidonotus*) may lay eggs or bring forth living young according to species. This genus occurs also in Northern Australia, but I have no knowledge as to whether its representative there be oviparous or viviparous.

Popular Legends

Snakes are looked upon with revulsion by most people, and the dislike goes so far as to brand them "slimy creatures." But they are far from being slimy: one could crawl over any clean object without leaving a trace of dirt, while a snake can constantly flick the sides of a glass case with its tongue and yet not cause the slightest smear.

Many are the silly stories told about snakes, and one I well remember hearing in England was commonly believed, viz., that a snake cannot die before the sun goes down. Nevertheless, I

have had an English snake die here in Melbourne within two hours after it had eaten an Australian frog that probably carried in its skin an excess of poison (for a European snake). This particular reptile, *Tropidonotus natrix*, did remarkably well with me, especially during the abundant supply of large tadpoles, which it would very cleverly capture under water, eating several at a meal. Later, when tadpoles were "off the menu" and frogs (*Hyla aurca*) were plentiful, it also prospered. Later still, when these frogs were not available and my snake was becoming really hungry, I hunted around my newt ponds, but the only frog I could find was the marbled *Limnodynastes tasmaniensis*. I am always suspicious about the edibility of highly coloured frogs and it was not without some misgivings that I took the risk; so did my snake, which died at 2.30 p.m., proving that a European species at least does not have to postpone death until sundown.

More silly tales are about snakes milking cows, also about the "Hoop-snake" which allegedly makes a hoop of itself by placing its tail in its mouth and then trundles down hill, much to its enemy's consternation—of course it *must* be down hill! But the most persistent fable is that snakes will swallow their young in time of danger. This old story originated in Europe and was probably brought out here by early settlers. In England it is still believed that vipers swallow their young (it may be noted that *only viviparous snakes* are said to indulge in the habit).

Should a female snake near the end of pregnancy be beaten and broken by some hush hero, it is feasible that the young could emerge from almost any part (mouth included) of her hattered body. If a snake did swallow her young to protect them, the result would be just the reverse, because her movements would be so retarded that an enemy could easily destroy both mother and progeny. I have seen snakes born, and if it were instinctive for them to swallow the young when danger threatened, surely the same trait would be exhibited in captivity, even as a "joy" kangaroo seeks the refuge of its mother's pouch in a zoo exactly as if it were in the natural "bush."

The gastric juices of serpents are very powerful, everything with the exception of teeth and hair being digested, and their effect on the delicate, newly born young would be rapidly fatal—again a very reversal of security. Those snakes that I have seen come into the world were treated with utter indifference by the mother and, when I purposely frightened them, would merely scatter for shelter wherever it could be found, more often trying to get beneath the mother whenever she stopped moving about; none showed the slightest inclination to go near her mouth.

LIZARD VICTIMS OF A CAGED GECKO

Early this summer, Mr. Erasmus Wilson kindly presented me with three lizards of the genus *Lygosoma* (subgenus *Lirolepisma*), which were housed in a case containing two geckos, viz., *Gymnodactylus milinisi* and *Phyllodactylus marmoratus*, the former having occupied the case for over five years and the latter for more than four years.

A tragedy occurred at the beginning of January, when I discovered my smallest specimen of *Lygosoma* lying dead and quite flattened out from head to tip of tail, as though it had passed through rollers. Later, the lizard next in size was also found dead, but I could not discern any trace of injury sufficient to have caused its death. The third surprise came when it was noticed that the tail of the surviving and largest specimen had been bitten off during the night of January 12, and apparently eaten, since there was no sign of it in the case.

The final and greatest surprise of all came at night on January 28, when I was just in time to see the last of my tailless lizard disappearing down the throat of *Gymnodactylus milinisi*. Originally, this hapless reptile was equal in length to that of *G. milinisi*, but, even after its tail was lost, the possibility of being swallowed by such a small gecko seemed scarcely credible. These attacks were certainly not due to shortage of food, as two receptacles containing mealworms a-plenty are always available to the lizards, while beetles, spiders, and other small game that I may come across often provide them with a change of menu; an earthenware saucer of water is also kept replenished.

I had often wondered why this particular gecko has such a very large head, compared for instance with *P. marmoratus*, but, in view of what *G. milinisi* can do, it seems probable that it is more likely to encounter larger game as a ground dweller than would a gecko frequenting trees only. It may now appear strange that the other gecko, sharing the same quarters for over four years, has been able to survive, much less retain its tail. *P. marmoratus* is, however, a much more active, quick-moving, and also nocturnal lizard which is not likely to be caught napping. The smaller lizards, which curl up to sleep and are defenceless at night, stand far less chance against the predatory powers of *G. milinisi*.

H. W. DAVEY.

A LARGE FUNGUS

At the head of Myer's creek, Healesville, there is an exceptional specimen of the common large "bracket-fungus." It grew at first on a standing wattle tree and attained a width of a foot. Then the tree fell and at each side a further growth produced lobes as large as the original. The total length is now three feet and it is still vigorous.

From the appearance of the fallen tree I would judge that it has lain about five years. If so, the age of the bracket must be at least ten years.

A. J. SWADY.

[Apparently the "bracket-fungus" alluded to was a specimen of Giant Punk (*Ganoderma applanatum*) which in wet, mountainous country can attain immense size and form such a strong shelf on the bole of a tree as to accommodate the weight of several people. The Dandenong Ranges has yielded fine examples, but the record for longevity among these large, woody polypores must go to *Fomes robustus*, which has been known to persist on a tree for some 80 years.—J.H.W.]

A NEW ALPINE VARIETY OF THE "MALLEE EVER-
LASTING" (*HELICHRYSUM ADENOPHORUM*)

By J. H. WILLIS

HELICHRYSUM ADENOPHORUM F.V.M., var. *WADDELLÆ*
var. nov.*Perennis alpinis, caulis virgatis foliis glandulosis, in rupestribus conglomeratis aut graniticis altitudine 1200 metr. (et ultra) crescens. Differt a forma typica foliis basi angustioribus non amplexicanalibus, subtus albido-lanosis ut in H. leucopsidium D.C.*

LOCAL (ut in Herb. Melb. repr.):

1. Mt. Speculation, Vic., 5000-5400 ft., J. H. Willis, 1/1/1945 (HOLO-
et PARA-TYP!).
2. Mt. Buffalo, Vic. (P. R. II. St. John, March, 1931; Dr. R. T. Patton,
15/3/1933).
3. Mt. Teathertop, Vic., 6200 ft. (K. J. Simpfendorfer, Feb., 1945).

The Mallee Everlasting is described in Ewart's *Flora of Victoria* (1930) as "confined to N.W. and S.W. Victoria, but rare, except near the South Australian border," and indeed there is only one collection from this State represented at the National Herbarium, Melbourne (viz., "S.W. of Murrayville and 4 miles from S. Aust.," H. B. Williamson, 29/12/1916); this accords well with Mueller's type specimen from "high barren ground" on Kangaroo Island, S.A., March, 1851.

While botanising recently on Mt. Speculation, at the western extremity of the Barry Mountains, I found an elegant, pale pink everlasting growing plentifully amongst loose conglomerate rock on steep north-eastern declivities of the mount; it was also present on Mt. Koonika and Mt. Cobbler, 6 to 8 miles northwards. This *Helichrysum* has no rivals to beauty among all the large-headed kinds. At first I mistook it for a tall, narrow-leaved condition of the ubiquitous *H. leucopsidium* which grew sparingly in the vicinity, but close scrutiny revealed much stronger affinities with *H. adenophorum*—a desert plant.

Typical *H. adenophorum* shows broad, stem-clasping bases to the leaves, which are glandular all over (as are the scapes), with no cottony vestiture beneath. My Speculation plant has narrow leaves, right to the point of attachment, and they bear a dense web of white cottony hairs on the ventral surface (just as in *Satin Everlasting*, *H. leucopsidium*).

I am now satisfied that the alpine form is worthy of varietal rank, and have pleasure in naming it after Miss Winifred Waddell—a keen advocate for the conservation and cultivation of our native flora, and a lover of the high mountain plants in particular. Miss Waddell was first to observe the slender, pearly-pink everlastings of Mt. Speculation and, insisting on their distinctiveness, urged me to collect and examine specimens if fortune should ever bring me near their rocky fastness.

CLUSTERING OF THE SORDID WOOD-SWALLOW
(*Arlamus tenebrosus*)

By EDITH COLEMAN, Blackburn, Victoria.

On February 20, 1945, wood-swallows again clustered in one of our gum-trees, about ten feet distant from last season's site, and very much higher on the stem. For some days we had noticed them hawking at dusk between the stems of the trees.

On February 21 they had commenced to cluster at about 7 p.m. There were about twenty when I first saw them. I counted twenty-three more as they came in. Then a hawk flew through the tree, and five or six wood-swallows left. After the hawk disappeared there was a long pause; then I counted twenty-five more as they alighted, the last at 7.25 p.m.

Feb. 22.—At five past 7 I saw the first birds settle and watched them leaping at each other as they clustered, as if playing. I counted forty-five. It seemed surprising that they could cling so surely to such a clean stem—without fork or twig. With opera glasses, and the moon nearly full, I had a clear view.

Feb. 23.—I rose at ten to 5 a.m. but the birds had flown, yet it was still dusky and foggy below the tree-tops. Higher up it was much lighter for the birds' "take-off," and the sky was clear. There were no droppings on the ground. At 7.20 p.m. on the same day they clustered in a much taller tree in the garden proper. I wondered if my attention with the opera glasses had worried them. They had all clustered and were quiet at 7.30 p.m.

Feb. 24.—I went to Healesville, and although I returned at 7.30 it was too dark to find the cluster.

Feb. 25.—The birds were hawking very low after a warm, humid day. I think they did not cluster in our trees.

Feb. 26.—There were many on the telegraph lines and a few skimming among the trees. There was a vivid sunset. I waited until sundown but saw no clustering.

Feb. 27.—I watched the wood-swallows cling to several stems, including last season's site, as if they were undecided. Then they flew in a band to a tall tree in the garden, settling high up on a very slender branch. It was pretty to watch them clambering in and out of the cluster, as if playing at pushing each other out of bed. The branch was no thicker, perhaps, than my wrist. There seemed to be only about half the usual number. I counted thirty-five, not very accurately, perhaps, for they were so high and so animated, and I had not been near enough to count them as they alighted. There was little foliage on the chosen branch so they were much exposed, and the slender bough was tossing in the wind. All was quiet at 7.35 p.m.

I did not see them again. The next two evenings were cold.

Each evening the first-comers had skimmed between the tree-trunks before clustering, sometimes leaving the cluster to hawk again. Late-comers flew direct to the cluster.

It is possible that the wood-swallows have been swarming in these trees for many seasons. Year after year we have said, "The wood-swallows are back," and have enjoyed watching their manoeuvres at dusk among gum-trees on less than an acre of ground which we call our "paddock"; but, knowing nothing of their clustering habit, we had not looked for it. It is interesting to recall that last year's first cluster was noted on Feb. 26.

"PUNGA PUNG"

(From *Salt*, 9/10/44)

An interesting nature note comes from Pte. R. Ryan, Q28247: "As I was wandering through jungle country one afternoon, my nostrils were shockingly assailed by the most nauseating stench I have ever encountered.

"The rain-forest, dark, wet, cavernous and vine-curtained, abounding in pinkish, jelly-like, luminescent roadstool growths, giant trees supported by huge flying buttresses, pulpy soil and rotting bread-fruits, gave no clue to the origin of the smell. I looked into a gloomy recess formed by the buttressed base of an *Ocoteles Sumatrana* and saw, for the first time, the flower of the Punga Punga Lily.

"The bloom, marbled in reddish magenta, yellow and green, not unlike a piece of decomposing liver, both in appearance and odour, gleamed dully in the half light. 'Punga Pung' is only one of the many New Guinea native words used to describe this plant, which is believed to be akin to, if not the same as, a growth found in the East Indies. An amazing feature of the fleshy, tubular blossom (which emerges from the ground before the lily blooms for some weeks, then dies) is that it makes itself offensive only before sundown.

"I brought the flower back to my hut and planted it in the garden. It was an exhibition for two days, during which time it behaved admirably and caused no discomfort; its viciousness had disappeared. However, on the third evening it polluted the pure equatorial air for a distance of 50 yards. Ungentle persuasiveness and Australian adjectives compelled me to consign my prize to its final resting place, the roaring waters of the wild Laloki.

"The Punga Pung is insectivorous, as flies, beetles, bugs, worms, etc., on entering the tube, become entangled in the thick soupy syrups at its base. It is indigenous to both coastal and mountain regions."

[Ed.: *Amorphophallus rex* Prain, also known from India, Malay, and Java.]

PERSONAL

Mr. A. H. Chisholm, who for the past five years has been Honorary Editor of the *Victorian Naturalist*, has had temporarily to relinquish the position owing to his having been appointed Press Attache to His Royal Highness the Duke of Gloucester. All material for the *Naturalist* should be addressed, until further notice, to the Acting Hon. Editor, Mr. J. H. Willis, National Herbarium, South Yarra, S.E.1.

EXCURSION TO FERNTREE GULLY

Light rain greeted the sixteen Club members who attended an all-day outing to the National Park on March 10. After assembling to hear a brief dissertation on the subject of this excursion, viz., ferns, by Mr. A. J. Swaby (leader), the party split in two, my section taking a right-hand track.

We soon encountered a fine patch of Gristle Fern just off the track and, a little further on, a very large Wonga Vine (our only native *Tecoma*). Many clumps of the Kangaroo Fern could be seen on mossy trunks and branches of the low gully trees, and fungi were much in evidence—one of the gilled type was a delightful little gem of brilliant ruby-red. At the large grove of tree-ferns that was to be our principal hunting ground, many ferns were found in a very short time and our list rose to 16 species.

Just here the party was intrigued by sight of a powerful owl carrying off a full-grown possum; it flew about 50 yards in one stage, then, before we lost sight of it, at least 70 yards more, still carrying the possum—surely an unusual event for mid-day. A heavy shower forced us to take cover for about ten minutes beneath the tree-ferns, and we shortly afterwards retraced our steps to the public kiosk, where both sections met together for lunch and were joined by additional excursionists from the city. More rain having fallen, Mr. Swaby kept the whole afternoon party to a main track and the subject resolved itself into general botany. The leader gave interesting notes on some 40 different plants that were observed and identified, including the pest St. John's Wort.

Here is a list of the 23 ferns that were seen during the day:

Austral King Fern, Common Filmy-fern, Veined Bristle-fern, Soft Tree-fern, Rough Tree-fern, Rufous Hypolepis, Sticky Hypolepis, Common Bracken, Hat's-wing Fern, Tender Brake, Netted Brake,* Common Maiden-hair, Sickle Fern, Gristle Fern, Necklace Fern, Mother Spleenwort, Shade Spleenwort, Shining Wood-fern, Mother Shield-fern, Leathery Shield-fern, Kangaroo Fern, Ringer Fern, Gipsy Fern.

*The record of Netted Brake (*Pteris comans*) is particularly interesting, as this rare fern was previously known in the Dandenongs from only one small area, viz., on Clematis Gully.

T. A. GRIFFITHS.

EXCURSION TO HEIDELBERG

About forty members and visitors attended and enjoyed a quiet afternoon in the shade on February 24. The lagoon which usually provides maximum variety was almost empty, but among the weeds were found plenty of *Odonata*, *Hemiptera* and *Diptera*. The best specimen of the day was, as usual, the fish that got away! This was a very large green "mudeye," netted in a shallow backwater of the Yarra; it was inadvertently returned to the water.

The leader finished the day with a short talk on types of breathing apparatus evolved by insects which return to the water, and on some of the interesting modifications of their jaws.

A. J. SWABY.

SCARCITY OF TIMBER IN EARLY MELBOURNE

"There is so great a scarcity of large, sound timber fit for building, that the greatest part of Melbourne is built with wood from Van Diemen's Land. The want of good timber is generally felt throughout the colony."—Letter from Thomas Winter, Esq., about 1837.