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PROCEEDINGS

The monthly meeting of the Club was held on April 9, 1945, at the Royal Society's Hall, the President (Mr. Ivo. C. Hammet) and more than 100 members and friends attending.

The President announced the recent death of Mr. W. H. Ingram, a Club member since 1919, and erstwhile Assistant Librarian. Mr. Coghill spoke briefly in appreciation of the late Mr. Ingram's work for the Club, and a tribute to his memory was paid by those present.

Excursion reports were given as follows: Croydon, Mr. T. S. Hart; Zoological Gardens, Mrs. Pinches. Members of the Queensland and N.S.W. Naturalists' Clubs were present at the latter.

The following were elected as Ordinary Members: Mrs. L. Pink, Miss I. Jenkin, Miss Joan Forster, Major F. S. Wright, Spr. T. V. Givens, Mr. J. A. Roberts and Mr. E. J. Evans; and as Associate Members: Miss Winifred Wright and Miss Naomi Heinrichs.

The President welcomed to the meeting Petty Officer Young, a member of the W.R.N.S., and expressed the hope that she would be able to take part in outings arranged by the F.N.C. P.O. Young stated in reply that she was looking forward to association with the Club and its members, as long as her sojourn in Melbourne permitted.

It was announced that Mr. F. Smith, through Mr. S. R. Mitchell, had presented the Club Library with a copy of the book, *Aborigines of Australia*, by Worsnop, and the President conveyed thanks for this very acceptable donation.

NATURE NOTES AND QUERIES

1. Mr. P. Crosbie Morrison exhibited a small piece of ambergris, which was of topical interest in view of the discovery at Portland during March of a 73-oz. lump—the Victorian record. He explained that ambergris was a morbid secretion formed in the stomachs of a few individual Sperm Whales, possibly through irritation by the beaks of cephalopods (cuttlefish, octopus, etc.). The ambergris may be passed out of the whale and cast ashore as a fawn to yellowish-grey mass, but sometimes mottled, black or, rarely, even white, each variety having its characteristic odour

—mildly musty to foetid. The value of the best is about £10 per ounce, with £5 for black and inferior grades. The material is used to fix perfumes, and the largest specimen yet recorded was a lump of 600 pounds weight taken from the stomach of a whale by Nantucket whalers; it was this specimen that had solved the mystery of the origin of ambergris.

In reply to a question, as to whether any beaks were found in this specimen, Mr. Morrison stated that there were none in the "nugget" centre, but horny fragments were in the material around this, and there were actually two fragments visible in the small specimen exhibited. To a question regarding the possible cultivation of ambergris, Mr. Morrison replied that the actual nature of the secretion was not known.

2. Mr. F. S. Colliver exhibited the skulls and gave a note on the two species of crocodiles found in Australia (*Crocodylus porosus* and *C. johnstoni*), and pointed out the differences between them.

3. Mr. A. P. Jenkin exhibited a live specimen of the native black snail (*Paryphanta atramentaria*), and asked if it were rare. Mr. Colliver stated that it was fairly common in the mountain districts near Melbourne, and on one occasion he had noted a great number at Cement Creek, after a shower of rain. Mr. Morrison held that the shell was now fairly rare, that three specimens for a day's searching would be good repayment (from his experience), and that Mr. Colliver was fortunate in having found a rich locality in favourable conditions for collecting.

4. Mr. J. H. Willis reported finding a marine shell of the genus *Oliva* in Port Phillip Bay (Brighton) and asked if the occurrence so far south were unusual. Mr. Colliver, in reply, stated that these shells were generally regarded as sub-tropical, and would hardly be found farther south than Queensland. It was possible for the shell to have been dropped on the beach by someone, as he had collected a good specimen of *Delphinula* (*D. laciniata*) at Beaumaris, and this is a strictly tropical form.

Mr. Frazer submitted the question, "Do rabbits swim?" He guaranteed having seen rabbits plunge into water at Romsey and also on the Goulburn River, where he had noticed them rolling in the sand, apparently drying themselves after the swim. People to whom he had spoken of this happening averred it was impossible, that rabbits could not swim. Could any other club members corroborate his experience? Mr. Colliver stated he had frequently seen rabbits swim across the creek in Doctor's Gully, Daylesford, but that stream was only a few yards wide. Mr. Hyam said that rabbits would certainly swim across small streams for food on the other side.

"THE MIGRATION OF BIRDS"

Miss Ina Watson, in discussing this subject, mentioned first some of the facts and fallacies relating to Bird Migration, then gave information on the banding of birds as a means of tracing their migratory flights. The main trends were northward to breed in colder places, an exception being the Banded Dotterel, which has an east-west migration between West Australia and New Zealand.

It was stated that the average flight speed was between 30 and 40 miles per hour, and the height of flights approximately 3,000 feet. Among the probable causes for migration were stressed inherited instinct by following food supplies, by some fever, or by an increase or decrease in light. Interest in this lecture was evidenced by the many questions raised at its conclusion, e.g.:

1. Do birds from the opposite hemispheres cross on migrational flights? Answer: Northern Hemisphere birds come only to the Tropic of Cancer, Southern Hemisphere ones to the Tropic of Capricorn.

2. Why does an east-west migration take place? Miss Watson stated that this particular case of the Banded Dotterel was always quoted as an exception to the general rule, but the reason was not yet clear.

3. Which country is considered the home of migrating birds and do they stay longer in the countries where they nest? Answer: The lengths of stay here have not been proved, and would certainly depend on food supply. Mr. P. Crosbie Morrison advised that the home of a bird is generally recognised as the country wherein it was born, and was usually the colder of the two countries concerned.

Mr. Lush mentioned that Swallows in London took 10 days to assemble before migration, and there were no young birds in the first gathering; two days after they had gone, the next brood collected by themselves, and then later again another.

EXHIBITS

Mrs. J. J. Freame: Scales from a 275-lb. fish recently taken in Queensland.

Mr. A. P. Jenkin: Live specimen of native black snail (*Paryphanta atramentaria*); the salmon-red animal contrasts beautifully with its shining jet-black shell.

Mr. P. Crosbie Morrison: Ambergris, showing horny inclusions.

Skin of Shingleback Lizard (*Trachysaurus rugosus*) cast in one piece, showing "gloves" and eyelids but no scale over the eye—of geckos and snakes.

Mr. T. Griffiths: A shore eel, and a small shrimp carrying eggs; both specimens were from Rickett's Point.

Mr. C. C. Griffiths: Cast skin of common Brown Snake (*Demansia textilis*).

Mr. F. S. Colliver: Skulls of the two Australia Crocodiles (*Crocodylus porosus* and *C. johnstoni*)

AUTUMN FUNGI AT EMERALD

BY EDITH COLEMAN, Blackburn

"VEGETABLE CATERpillARS" (*Cordyceps Gunnii*)

A few hours spent in the forest at Emerald (20/3/45) yielded several interesting fungi, and afforded ample proof that *Cordyceps Gunnii* may be considered a valiant ally in the preservation of certain forest trees. Under Black wattles (*Acacia mollissima*), badly infested by Wattle Goat-moth larvae, were small forests of *Cordyceps* fructifications, some barely showing above the deep litter of partly decayed vegetation. Scraping away humus, one could follow an interesting story, indeed.

Taking into consideration the thousands of eggs that should have been deposited (probably on healthy wattle trees) by the infected larvae, had they lived to complete their transformation, one is impressed by the beneficial work of *Cordyceps*. As there

appeared to be larvae of only one species of moth, it may be assumed that each species of *Cordyceps* is associated with the larvae of one particular insect, and this is indeed generally true.

The length of the stem varied greatly. Where larvae had been attacked at an early stage of development, and were still some distance from the surface, the stems were from 4 to 10 inches in length. In these instances, the club-shaped fructification was small, the parasite having obtained less nutriment than larger larvae would offer. In older larvae, attacked presumably when almost fully grown, and ready to pupate near the surface, the stem was much reduced (less than half an inch in length) and the fructification was very much larger.



Fructifications of *Cordyceps Gunnii*, the olive-green surface of specimen on right covered with filiform "spores."

PLATE I



Fruiting forms of *Lycogonia (Lycogonia) imbricaria* in various stages. Note the warty universal sheath developing specimens in "button" stage.
Photo. — Ralph Collins

The size of the burrow corresponded with that of the fructification, not with that of larva or stem. The latter fitted loosely in the burrow, showing that the fungal fruiting body was completely formed below ground, and was lifted to the surface by the lengthening stipe, as in ordinary mushrooms. It varied in shape from a single club, or several, to inch-wide specimens which appeared to be composed of several flattened confluent clubs; they were from half to $1\frac{3}{4}$ inches in length, dark olive-green in colour, and velvety-soft to touch. The larvae ranged from $1\frac{1}{2}$ to 4 inches in length, and from the thickness of a mapping pen to that of fully-grown Goat-moth larvae. We found only one pupal skin protruding from the ground—not surprising, as there had been no autumn rains.

Next day, several fructifications were covered with a flocculent mass of "spores." Cross sections (cut from the apex of the club in order not to have too large a field for the lens to encompass) showed copious filiform sporidia emerging through the perithecia on the surface, as Mr. Willis has described in his beautifully illustrated book. Under high power, the 8-spored glassy asci were clearly seen.

At a further visit, many more *Cordyceps Gunnii* were seen, again under Black wattles.

"FLY AGARIC" (*Amanita muscaria*)

Another "interesting" find was of many Fly Agarics almost hidden in deep litter under chestnut trees. Most of them were immature, the universal sheath not having ruptured. They resembled whitish warty puff-balls at an early stage of development, with a pleasant, nutty fragrance. As certain puff-balls are edible at this stage, it seems advisable to make known this rather dangerous resemblance.

It is, of course, probable that the Fly Agaric is not so poisonous in Australia as in northern lands. It is known that soil and climate have an effect on the toxicity of certain herbs; but caution cannot be too emphatically stressed. The danger signals are a warty yellowish-white universal veil or sheath which parts to disclose a scarlet or yellowish cap, flaked with adherent scaly fragments of the sheath, and scaly rings at the base of the stem, the remains of the volva. At an earlier stage the scaly, or warty, volva is more apparent.

My illustration shows clearly the danger signs—both ring and volva (the latter almost disintegrated in the mature examples), and flaky remains of the universal veil on the scarlet pileus. Chestnut leaves have been scraped away to show their form more clearly. More specimens were found on a second visit, showing that the Fly Agaric is firmly established at Emerald.

It has been interesting to watch the development of immature specimens into one of the most beautiful of all fungi—the gradual rupturing of the enveloping sheath, leaving a "warted" volva which almost disappears, mature specimens showing merely an irregular band of membranous flakes.

On the pileus the disintegrated sheath remains as whitish flakes, rather than warts, a beautiful contrast against the scarlet. The rupture of the pure-white partial veil, left as a ring high up on the stem, is a pretty phase to follow. This is clearly seen in the illustration.

The soil beneath these beautiful *Amanitas* is now powdered with white spores. It will presently be scattered under large maple trees in the garden, which should give conditions (deep humus) approaching that of the chestnut tree.

Slugs, evidently quite immune to the toxic properties, are feasting royally on the deadly Fly Agarics, both soil and fungi being coated with slime. Although of a nutty fragrance when young, the specimens are now as unpleasantly odorous as most deliquescing fungi. Flies are attracted in numbers, reminding us that this Agaric was at one time sprinkled with sugar to attract them—to their deaths. It has been superseded by fly-papers and sprays.

I read somewhere that a fresco in a 13th century French church depicts the Tree of Life as a branching *Amanita muscaria*, with the serpent twined in its branches! Certainly, this toadstool has an evil reputation.

Its use as an intoxicant is better known than its use in medicine. It was anciently used in treating epilepsy and scrofula. Lotions made from it were employed in cases of ringworm and skin eruptions. It was included in Hahnemann's "Chronic Diseases" (about 1824), and is the *Agaricus* and *Agar* of homœopathy.

Preparations are still dispensed by some chemists—in the highly diluted, infinitesimal doses of homœopathy. According to Dr. Fernie (1895) strong doses stimulate the action of the heart. A tincture in high dilution will relieve a laboured and feeble action of the heart—the like-to-like homœopathic way of using drugs, in which a medicine (in high dilution if poisonous) is given to a sick person because it is capable of producing a similar state when given to a healthy person. Apart from its well-known intoxicating action and poisonous principles, the Fly Agaric is said to cause immoderate and untimely laughter; Belladonna is an antidote.

The appearance of the Fly Agaric in numbers under chestnut trees is interesting and suggests mutual benefit. It is usually associated with birch and pine forests. Oaks and beeches, pines

and spruces are *mycorrhiza* formers. It would be interesting to learn whether the root cells of the Emerald chestnut trees contain mycorrhiza formed with *Amanita* mycelium.

[On April 10, Miss D. Kidd showed me examples of the Fly Agaric that had been gathered from under pine trees outside Taylor and Sangster's nursery, Crescent Road, Mt. Macedon, where specimens were reported as being "very numerous." To my knowledge, the occurrence constitutes the first and only Victorian record of this sinister, though magnificent, exotic toadstool outside its well-known habitat at Emerald. There are a few recordings also for Tasmania and South Australia, but apparently nowhere else in the Commonwealth.—J.H.W.]

MOVEMENTS OF SWIFTS

At approximately 2.30 p.m. on Sunday, February 18, heavy rain clouds, accompanied by lightning and thunder, approached from the west, and a thunderstorm seemed imminent. Before the approaching storm, came a flock of Spine-tailed Swifts (*Hirundapus caudocutus*), which I estimated to number between 100 and 150; they were hawking at a high altitude.

The birds flew around until about 3 p.m., and toward that time, when steady rain began to fall, they dropped to a much lower altitude—within 40 to 50 feet from the ground—and continued flying in the rain for about five minutes, before gradually disappearing eastwards. The rainfall at Eaglehawk this day registered 113 points, our best fall for many months.

On the following evening (Monday), towards dusk, a solitary pair of spine-tailed swifts flew low over the house. The weather was close, and many large swarms of insects were active. At about 7 a.m. on Tuesday, steady rain commenced again and continued to fall for about 1½ hours. It is interesting to note that, during many past dry months, the only rains of any consequence were always preceded by the appearance of swifts.

W. PERRY, Eaglehawk.

BIRDS AND WIRELESS WAVES

(To the Editor)

Sir.—Regarding Dr. H. Flecker's remarks in the *March Naturalist* (p. 203), I must submit that I did *not* quote Lister and Koch, but Louis Pasteur and Robert Koch, and then merely to show how the unorthodox is always opposed by the "scientific" world. At length, the facts noted by laymen slowly rise to such importance that the common-sensed individuals of the community accept them, thus driving other sceptical sections to do the same. Our Parliaments, by the way, also appear to exemplify this line of "progress."

As Dr. Flecker had stated that nothing was known to him of the Spanish and German experiments with electro-magnetic waves and pigeons, he is endeavouring to debate a subject of which, on his own admission, he knows nothing. I do not purpose to continue an argument which, on the face of it, can give us no progressive, useful information; it would seem purely waste of time. Thanking you for the space already allowed me.—Yours, etc.,

Mackay, Queensland.

ALBERT A. COOK.

BIRD "ANTING"

BY SPK. T. V. GIVENS

In June, 1944, at Kairi, on the Atherton Tableland, North Queensland, it was noticed that for some reason a small flock of Red-browed Finches (*Aegintha temporalis*) was daily visiting a smouldering log. Closer inspection revealed that the birds were going through the motions of what has elsewhere been termed "anting" themselves, using the tendrils of acrid smoke curling up from interstices in the bark as a medium.

The same routine was followed each day. First one and then another of the birds would fly on to the log, until the whole flock of about a dozen or so birds was present. Not particularly timid, they could readily be observed from a distance of not more than six feet.

Once on the log the actions observed were quite distinct from those commonly seen when birds bathe in dust or water. Upon reaching the smoke, each bird stood as upright as possible, using its tail as a support. The wings were opened slightly and drooped a little forward and down. Then the head was swept forward, down and under, the wing in a circular motion, the bird meanwhile vigorously shuffling its wings and body feathers, often toppling backward from the violence of its efforts. These actions were rhythmically repeated as many as eight or ten times, when the bird usually rested before repeating the whole process.

It has been stated by observers of the phenomenon among other birds that ants were actually picked up and placed under the wings. Careful watch was kept in this instance to see whether this occurred, and it may unequivocally be stated that on none of the several occasions, on which the phenomenon was observed, was anything picked up. However, the actions—sweeping the head forward and down and under the wings, almost touching the log at the bottom of each sweep—were such as to lend themselves to that interpretation. Subsequent examination was made of the log, and, as might have been expected from the heat of the fire, no ants or, indeed, insects, of any kind were found either on or under the bark. While what has been said applies definitely only to the present observations, it may be suggested that possibly more has elsewhere been read into the bird's actions than is, in fact, the case.

On several occasions one or two of the birds, unable to find space in the smoke, went through the "anting" motions a few feet away, much as other birds, unable to find room in a bird bath, will attempt to bathe on the dry ground outside. On one occasion, when a piece of bark was torn away from a nearby

stump, revealing an ant nest, one bird tried to ant itself there, but soon abandoned the attempt in favour of the smoke. Though in the thick of it, the birds seemed less disturbed by smoke than the observer, but the nictitating membrane could be seen to flick across the eye more frequently than usual.

In the absence of definite evidence the writer does not care to express a positive opinion as to why these birds should perform what is apparently an inherent habit pattern. However, it may be suggested that the acrid smoke dislodged lice which the birds were then more effectively able to shake or pick from their plumage.

JOHN GILBERT'S BIRD NOTES

This year marks the centenary of the death of John Gilbert, murdered by blacks in a night attack on the first Leichhardt Expedition near the Mitchell River, North Queensland, on June 28, 1845. Little was known of him except through the works of John Gould (for whom Gilbert was an ornithological field collector) until his diary of the expedition, in manuscript, was discovered among some old Gould papers in England a few years ago.

Mr. A. H. Chisholm, who discovered the diary and brought it to Australia, has already published the general story of Gilbert and the Leichhardt Expedition in "*Strange New World*" (Sydney: Angus and Robertson, 1941). The more detailed notes on birds, culled from the diary, were published later in "*The Emu*" in 1944 and 1945. These articles have now been combined and, with a little re-sorting published as a separate booklet under the title, "An Explorer and His Birds—John Gilbert's Discoveries in 1844-45."

Following a general survey of Gilbert's observations, the book contains a detailed discussion of each of the birds mentioned in the Gilbert Diary, but, to aid in clarity for the modern reader, the names used are those of the current edition of the R.A.O.U. *Official Checklist of the Birds of Australia*. These are dealt with under no fewer than 90 headings, but since in some instances ("Quail," "Cormorants, etc.," "Hawks, falcons, etc." are examples); a number of species are grouped, this falls far short of the total number of species which Gilbert recorded on the expedition. He had made notes on more than 200 species, many of them being first records for the region that is now Queensland. All are noted in the present volume.

It is a handy, interesting little work, well produced at a modest price (2/6 net), and contains four plates and a map. Its content amply justifies this re-publication in a form more readily available to the general naturalist.

—P.C.M.

NARDOO (*Marsilia Drummondii*)

Does Nardoo under cultivation produce fertile fronds?

For two summers my plants, although growing lustily, have shown only infertile fronds, as did the plants from which they were taken. It seems probable that, being always in water, they miss the resting stage in dried-up clay pans.

—E.C.

THE MOONEY COLLECTION OF ABORIGINAL STONE ARTIFACTS

By S. R. MITCHELL, Melbourne.

Through the courtesy of Mr. J. L. Mooney, of Mooney's Gap, I was enabled to make a study of the late Mr. L. Mooney's collection of aboriginal stone artifacts. Mooney's Gap is on the low divide that separates the head waters of the Hopkins and Wimmera Rivers, and is about seven miles north-east of Ararat, Victoria. Many of the relics were obtained locally, chiefly on Mooney's property, which is known as the "Gap," while others were found on the flats and low rises close to a small perennial stream, a tributary of the Wimmera River, that rises on the Gap and flows northerly through Crowlands.

The collection comprises some 600 specimens, of which about 200 consist of ground-edge implements, mills and sharpening stones, the balance being axe blanks, hammer and pounding stones, small flaked tools and wooden implements. The collection, with a few exceptions, can be considered as representing a phase of the stone culture of those aborigines inhabiting the country within a radius of 50 miles from Ararat.

The local finds embrace 51 ground-edge implements, 22 sharpening stones, and can be classed as a typical camp set.

Census of principal items in collection

Grooved ground-edge implements	18
Large ground-edge implements	15
Gad-shaped tools	5
Large axes over 12.5 cm. (5in)	29
Small axes, 7.5-12.5 cm. (3in.-5in.)	74
Small axes and knives under 7.5 cm. (3in.)	25
Mills	40
Sharpening stones	24

230

Ground-edge implements classified according to length

Under 7.5 cm.	3in.	25			15.04%
7.5-10cm.	3-4in.	36	74		21.65%
10-12.5cm.	4-5in.	38			22.8%
12.5-15 cm.	5-6in.	19			11.4%
15-17.5 cm.	6-7in.	18	51		10.8%
17.5-20 cm.	7-8in.	14			8.4%
20-22.5 cm.	8-9in.	6			3.6%
Over 22.5 cm.	9in.	10			6.05%
		166			99.74%

Ground-edge implements classified according to weight

Under 1 lb.	54	41.2%
1-2 lbs.	30	22.9%
2-3 lbs.	14	10.68%
3-4 lbs.	16	12.2%
4-5 lbs.	10	7.63%
Over 5 lbs.	7	5.34%
	131	99.95%

The grooved implements are heavy, massive tools that range in length from 5½ in. to 10 in., and in weight from 1.9 lbs. to 5 lbs., the majority being over 4 lbs. The groove is seldom central, but usually placed towards the butt, the implements being therefore out of balance when hafted. This characteristic, together with their great weight, make them unsuitable for such uses as those to which normal axes were put. They were probably wedges or tools for splitting wood, used with one hand grasping the handle, and the other the butt. An alternative method would be to hold the tool in position, and drive it by means of a billet of wood. The grooving, which is carried completely round the implement, has been effected by hammer dressing, and is usually well defined. This technique has also been employed commonly in shaping the body of the implement, and in reducing the bevel prior to grinding the cutting edge.

Of the 18 grooved wedges, 12 are made from hard metamorphic sandstone, 5 of basalt, and one from a dark, dense, igneous rock. No. 1 from Inglewood, is a well formed implement measuring 17.5 x 9.8 x 5.2 cm., of a dark coloured sandstone, and weighs 2.5 lbs. It has a central, well-defined, broad transverse groove, with a longitudinal groove, that extends round the butt, and a somewhat blunt parabolic cutting edge. The cutting edges on these wedges are much less sharp than the edges on normal axes, and are usually wider, in keeping with the greater width of the implement, although some are quite narrow. In two instances, Nos. 10 and 11, a point replaces a cutting edge, the bevelled portion being circular in cross section. No. 365 is from Wickliffe, and is made from a flat elongated pebble of cellular basalt and weighs 4 lbs. It has a central groove, but no cutting edge, both ends being blunt. This appears to have been a hafted hammer or maul.

There are 15 large ground-edge implements that seem much too heavy for hafting and can be classed as chopping or digging tools, which were probably grasped by both hands. They are usually over 8 inches in length and weigh from 3 to 7 pounds. The largest was found locally and measures 38.5 x 8.5 x 6 cm. and weighs 8 lbs.; it has a narrow ground edge and was probably

a digging tool. Two have pick-like pointed ends. Of this group, 12 are made from sandstone, two of porphyry, one of basalt, and one of an igneous rock that may be diabase. They have all been shaped by the flaking and hammer dressing of elongated blocks, followed by grinding.

There are five examples of the oblong-elongate, or gad-shaped tool, a type that is fairly consistent in form and size. These are approximately cylindrical, with a circular or slightly flattened cross section, and have a ground edge, with a butt that is usually flat. They have all been shaped by hammer dressing, and were apparently intended for hand use only. A typical example is No. 16 from Crowlands, made from metamorphic sandstone and measuring 20.5 x 5.5 x 5.7 cm. with a weight of 2.2 lbs.

Large axes number 51, range in length between 12.5 cm. and 20 cm., and weigh from 2 to 3½ lbs. The predominant material used is sandstone, followed by porphyry and diabase or diorite.

Seventy-four of the smaller edged implements fall within the limits of 7.5 cm.-12.5 cm. in length, weigh from 0.4 lbs. to 1.5 lbs., and appear to be those that were most frequently hafted. Many have depressions on one or both flat surfaces, probably finger grips, the implements being actually hand axes.

Elongated forms that taper towards the butt, or otherwise, lend themselves to hafting, were, no doubt, prized, but many excellent examples taper toward the cutting edge. Because of the direction of taper, these appear to have been unsuitable for hafting, and were probably hand axes, which applies also to many others that are either too small or too irregular in shape. So little is recorded as to the use of these ground-edge implements that it is unsafe to assume any particular method of use, but we know that the aboriginal was not at all concerned with the use to which a tool was put, provided it served his purpose.

The cutting edges in the axe group vary much in keenness, in width, and in the angle of bevel. The ground portion also varies greatly in extent and finish, the main objective being the production of an efficient cutting edge. This edge is usually curved and seldom straight, its curvature ranging from slight to semi-circular or even parabolic. The cutting edge may be narrow, measuring from 2-8 cm. wide, or more. Occasionally the edge is inclined to the major axis of the tool in an oblique direction; in other cases, in a diagonal one. Very few of these axes are bilaterally asymmetrical. Because of the extreme variations in shape, it is almost impossible to classify them into defined groups, the most satisfactory factors for comparison being the dimensions and weights. Axes having the keenest edges are usually those made from dense igneous rocks, particularly the fine-grained-diabasic or dioritic types.

PLATE II



Grooved maul and wedges: 1, Wicliffe (365), basalt, 4 lbs., 17.3 cm. x 12.5 x 5; 2, Lake Bolae (5), basalt, 4.6 lbs., 18.5 x 13 x 4.5; 3, Ellerslie (4), basalt, 5 lbs., 19.5 x 14.5 x 3.7; 4, Mooney's Gap (2), sandstone, 4 lbs., 19 x 10 x 6; 5, Crowlands (14), sandstone, 3 lbs., 22 x 7 x 5.5; 6, Inglewood (1), sandstone, 3.5 lbs., 17.5 x 9.8 x 5.2; 7, Crowlands (13), sandstone, 4.7 lbs., 24.5 x 7.7 x 6.3. 8-13, small mills and axe sharpening stones.

The pygmy type ground-edge implements under 7.5 cm. in length number 25, and include some made from thin pieces of either good quality igneous rock or indurated mudstone, on which a sharp edge was ground. These are obviously ground-edge knives, or chisels, some of which were used mounted on the end of a stick. They are too small and light for hafting, but probably served many purposes, such as scraping and scoring skins, carving and shaving wood.

The axe-sharpening stones in the collection number 24, of which 22 were found in the vicinity of the Gap, associated with ground edge implements. They were used in grinding the cutting edges on blanks, and for sharpening axes; sand and water being employed in the process. They are flat, elongated pieces of hard sandstone or slate, often showing bedding planes on both the upper and lower surfaces. Some of the stones show numerous hollow casts due to the weathering out of chialolite crystals. The axe sharpening stones usually have one longitudinal concave groove on the upper surface, but some have grooves on both flat surfaces. The depth of the grooving depends on the amount of wear, and occasionally the stone is worn completely through, particularly with those grooved on both faces. The dimensions of these sharpening stones range between 10 and 35 cm. in length, 6 and 25 cm. in width, and 3 to 6 cm. in thickness.

There are 40 nether mill stones, but only five were found locally. These are chiefly waterworn boulders of sandstone or basalt, circular, oval, or subangular in form, and fairly thick and heavy. They are generally found in numbers on the larger, more permanent camp sites, and were important items of camp equipment, used for grinding and pounding seed, roots, pigment, fibre, etc.; a small topstone or muller was also employed in this operation. Some of the milling depressions are shallow, others quite deep; they may be on one surface only, or occasionally on both upper and lower faces. Sometimes there is one or more anvil depressions on the lower surface.

No. 149 is an interesting example. It is a somewhat angular, waterworn boulder of sandstone, 13.5 x 12.5 x 7 cm, and has a deep milling depression on the upper surface, a crater-shaped anvil depression on the lower, and another on a flat face on one end of the stone. The latter "dimples" are 1.5 cm. deep, with a diameter of 3.5 cm., the walls converging towards the centre. Topstones may be any suitably sized spherical, discoidal or cylindrical stone that could be used for this purpose. Many in the collection are flat, discoidal shapes, with a finger grip on each face, showing much peripheral wear.

Much of the stone material was obtained in the district. It

consists chiefly of metamorphic sandstone, of which there are many outcrops, indurated argillaceous rocks, a diabasic rock, porphyry and basalt. Granitic rocks outcrop on the range that runs north-west of Mt. Mistake, about 7 miles east of Ararat and 1 mile east of the Gap; it also occurs about 6 miles on the western side of Ararat. Between these granite occurrences are Ordovician rocks in the form of black and grey sandstones, shales and slates, all of which show evidence of contact metamorphism. Chistolite is well developed in the sandstones as defined crystals or irregular knots, and mica is also common.

Basalt is plentiful south of Ararat, and was used for axes, but the most useful stones for axe-making are the dark coloured igneous rocks which may be classed as diabase or diorite. On Hatley's property at Julka, some 15 miles from Ararat, is a black rock which was probably the source of much of the axe stone used in this district, and this may be one of the Cambrian diabases related to the Mt. Staveley and Chatsworth outcrops lower down the Hopkins River. No doubt there are other occurrences of similar rock that have not yet been mapped.

The types of artifacts found locally, particularly the ground-edge implements and sharpening stones, the presence of permanent water, and a countryside abounding in native game, would indicate native encampments, which were more in the nature of hunting camps. As this locality formed part of the tribal territory of the Hopkins River aborigines, it is probable that the older people, including the implement makers, frequented larger camps that are found farther south (e.g., at Willaura, Lake Bolac and Glen Thompson), which sites are characterised by firestones, mills, quantities of broken stone, and flaked implements. One rather significant statement made by Mr. L. Mooney was that axes and sharpening stones were frequently found on the summits of hills, evidently left there by natives during their hunting excursions.

NESTING OF BANDED STILTS

(To the Editor)

Sir,—The letter from Mr. A. K. McCrae in your March issue, unless contradicted, will tend to perpetuate an error prevalent in ornithological circles until 1931, when the eggs and nesting habits of the Banded Stilt were described in the *South Australian Ornithologist*, Vol. XI., part 2, by McGillp and Morgan, and in the journal of the Royal Society of Western Australia, Vol. XVII., by Glauert and Jenkins.

There seems no doubt that the birds mistaken for Banded Stilts by Mr. McCrae were White-headed Stilts, whose eggs resemble those of the Plover in colour—but are rather smaller—and whose nesting habits agree with the writer's description.—Yours truly,

L. GLAUERT,

Curator of the Museum.

Perth, W.A.

EXCURSION TO CROYDON

For the combined F.N.C. and B.O.C. outing on March 24, a route was chosen to the hills west of Croydon township, the first feature noticed being the flattish area around the station, on which the trees were nearly all a sort of stringybark, locally often called "Apple." This is *Eucalyptus cephalocarpa* of Blakely, *E. cinerea* var. *multiflora* of some others. It occurs in other situations as well, for instance, on fairly level land at Whitehorse Road, on the divide between valleys. The White Stringybark, *E. eugenioides* in the old sense, was soon met with low on the valley side, but the more accessible for examination were specimens at Whitehorse Road. Some other eucalypt species were also observed. The buds, both of *E. cephalocarpa* and *E. eugenioides*, were in some cases heavily attacked by gall forming insects. (See appended notes.)

Several Acacias were observed, mostly with young buds. Both the shrubs called "Prickly Moses" (i.e. *Mimosa*) were seen, the well-known Victorian *Acacia verticillata* with its spiny phyllodes forming rings around the branchlets and flowers in spikes, and the *A. juniperina* with narrow sharp-pointed phyllodes placed singly and flowers in globular heads (flowering early, about May). The latter is known as "Prickly Moses" at Sydney, where our common form does not occur.

This *Acacia juniperina* is found here and there on the west hills of Croydon, on which the soil seems lighter, but has not been noticed on the east side of the valley. It is the true *A. juniperina*; a more prostrate and slenderer plant, formerly seen near Sandringham and still at Clarinda, is Bentham's variety, *Brownii*, which seems worthy of recognition as a distinct species—it also occurs at North Croydon.

A plant of *Acacia myrtifolia* (Myrtle Acacia), though some years old and about 5 feet high, was seen to bear phyllodes carrying the juvenile pinnate leaflets. *A. verticillata* also had small pinnate leaflets on some ends, possibly due to insect attack, and was not so uncommon. Self-sown plants of *A. terminalis* (Cedar Wattle of N.S.W.) were seen, derived from garden trees nearby. A deviation was made to look at a hybrid acacia upon which a special note is appended.

Among other plants noticed were Williamson's var. *planifolia* of *Pultenaea juniperina* (Prickly Bush Pea), and a couple of plants of the "Chinese Scrub," *Cassinia arcuata*. This is not common in the Croydon valley, though plentiful near Tunstall, but would probably not be very difficult to eradicate. The small pendent, slightly-tinted flowers give a good appearance in suitable lighting.

Our return journey was made by Alto Avenue, where several points of interest were noted, both among the native plants and those in gardens. A Spine-tailed Swift, found dead on a roadside, attracted some attention by its very long and narrow wings.

A good viewpoint on Wicklow Hill, at over 600 feet elevation, was visited. Even moderately distant parts, however, were obscured by haze, and the interesting hills far away beyond the Watts Valley are only well seen on very clear days. Opportunity was taken to remark on the form of the land, with a steep western descent into Brushy Creek, which caused the railway to be removed from the Yarra Valley and made to turn southerly across the northernmost head of Dandenong Creek, the open, swampy, valley at Croydon. By this means, the descent is begun much earlier, a complete change of view taking place after the passage through a cutting near East Ringwood. The low terrace above the valley floor afforded a practicable station site, and hence the township. Return to the Yarra system is easy by Lincoln Road gap.

Note on a hybrid Acacia

This plant was first noticed some years ago as one of unusual aspect in a patch of Hedge Acacia, *A. armata*, the "prickles" of which are stipules at the base of the phyllode, not the phyllode itself. The strange plant had a smoother stem and somewhat different foliage, but still bore spines and would have passed as a form of *A. armata*. Seeds were collected and grown; some gave apparently normal *A. armata* and other plants like a small-foliaged *A. leprosa*. Some of these earliest from *armata* were grown and in turn allowed to seed; their seedlings still gave some *armata* (typical). In vigorous growth, in the garden, some of the progeny pass for *leprosa*; one small plant, which I have growing, bears small phyllodes of the *leprosa* kind, but has distinct very slender spiny stipules.

There seems no doubt, therefore, that the original was an *armata-leprosa* hybrid, but not altogether new, since supposed *armata* hybrids are mentioned by Bentham (from plants cultivated in England), and some had no thorns.

Near my original plant are some farther from typical *armata*, but not ordinary *leprosa*; they may be second generation hybrids.

Names used for the Eucalypts

E. cephalocarpa of Blakely was described from an example collected by Maiden at Mt. Dandenong; others from Ringwood are associated with it. The name *E. cinerea* var. *multiflora* has been used and is preferred by some, but there are other forms nearer to typical *E. cinerea*, to which this name is more properly applied. That noticeably blue tree, seen in poor country from Moe eastward, differs from the Mt. Dandenong ones in general character. Blakely includes localities for this blue tree with his diagnosis of *E. cephalocarpa*, whereas Maiden appends localities of the Mt. Dandenong tree to his *E. cinerea* var. *multiflora*, in which the other is most prominent. The name, Silver-leaved Stringybark, quoted by Hopkins of Bairnsdale, refers to a "small scraggy tree," no doubt the blue form of East Gippsland.

The bark of *E. cephalocarpa* here is not so smoothly "stringy" as some of the stringybarks, but externally is a sort of slab with stringy texture. None of the descriptions seem to notice that the flowers in 7's are a definite arrangement—one central, two outward to the sides, and two pairs lateral to the side buds. Smaller numbers may occur by poorer development or injury, and somewhat higher numbers by supplementary buds. This applies also to other eucalypts with flowers in sevens.

E. eugenioides (*E. scabra*, according to Blakely) was used as a comprehensive name, without raising the question of the distinctness and constancy of various forms. An example from Croydon had been identified by Blakely as *E. Yangourae*, sometimes called the "Melbourne form of White Stringybark," but there are also Gippsland localities given by Blakely. A tree at Blackburn has been referred to as *E. Wilkesiana*. I seem to remember referring a tree in that district to *E. eugenioides*, as used in Mueller's Key, but do not know whether any still survive.

Blakely remarks of his *E. Yangourae*, "a fine tree for forest purposes, excellent poles and a good fissile milling timber." Some fine trunks, clear of branches, were observed on the excursion. The apparent confusion of *E. Yangourae* with *E. piperita* and forms of *E. macrorrhyncha* introduces a further difficulty, and so for the present I have deemed it wise to retain the name *eugenioides* in its old and wider concept.

—T. S. HART, Croydon.

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PROCEEDINGS

The monthly meeting of the Club was held on May 14, 1945, at the Royal Society's Hall, the President (Mr. Ivo C. Hammet) and some 100 members and friends attending.

Before commencing the general business of the meeting, the President read an extract from minutes of the meeting held on Armistice night, 1918, and, in a few words, expressed the heartfelt gratitude of members at news of the cessation of hostilities in Europe. Members stood in silence for one minute as a mark of respect to those who had fallen.

Excursion reports were given as follows: Mooroolbark (autumn foliage), Mr. R. G. Painter; Kalorama (winter ramble), Mr. H. C. E. Stewart, who reported an attendance of 15, despite the excessively wet day.

The following were elected as Ordinary Members of the Club: Misses M. Hood, M. Rojo, E. N. Gates, L. J. Baker and Mr. H. Tarr; and, as Country Members: Messrs. G. G. Shepherd, L. B. Williams, and N. E. Burrows.

Chapman Memorial

The President drew attention to the proposal for erecting a memorial to the late Mr. F. Chapman in the form of an entrance gate at Maranoa Gardens, Balwyn. The F.N.C. Committee had agreed to assist the Maranoa Gardens Committee in raising funds toward this, and the Treasurer was prepared to receive any donations from members, until the annual meeting. Mr. Chapman's work for the Club, and for natural science generally, was emphasized, and this was indicated as a practical way in which members could express their appreciation of him and his splendid contributions to knowledge.

New Meeting Place

The President announced that on and from the annual meeting, until further notice, the Club would meet in the lecture hall of the Public Library, at the corner of Swanston and Lalrobe Streets. The Club Librarian would be in attendance at the Royal Society Building in good time before the meeting, for loan and receipt of books.

Nominations for Office-bearers, 1945-46

The following nominations were received: President, Mr. H. C. F. Stewart; Vice-presidents, Messrs. J. H. Willis and H. P. Dickins; Hon. Editor, Mr. A. H. Chisholm; Hon. Secretary, Mr. F. S. Colliver; Hon. Asst. Secretary, Miss N. J. Fletcher; Hon. Treasurer, Mr. E. E. Lord; Hon. Librarian, Mr. A. Burke; Hon. Asst. Librarian, Mr. H. Preston; Committee, Mrs. J. Freame, Miss I. Watson, Messrs. A. S. Chalk, R. Garnet, T. Griffiths, G. N. Hyam, H. T. Reeves, Owen Singleton. Messrs. A. S. Chalk and A. G. Hooke signified their willingness to act as Honorary Auditors for the ensuing financial year.

Notice of Motion

The President referred to the notice of motion given by Mr. T. Griffiths at the last meeting, viz.: "That any question together with any necessary explanation be limited to two minutes." Mr. Lord moved an amendment reading, "That an answer to any question be limited to 4 minutes," but this amendment lapsed for want of a seconder. Mr. Willis then moved an amendment, "That a limit of two minutes should be placed on the enunciation of a question, such limit not to apply to the answer." Mr. Chalk seconded this amendment.

Mr. Colliver suggested that the difficulty could be overcome by the President using his discretion. Mr. Cooper stated that in his opinion nature questions were the most important part of the meeting, and he spoke against any time limit being fixed. The amendment was put to the meeting and carried, thus becoming the motion, which was in turn duly carried.

NATURE QUESTION

Mr. I. W. Cooper asked: At a recent excursion held in the district of Croydon a number of flowering shrubs was seen. These, by some of the members, were thought to be *Cassinia aculeata* ("Common Cassinia"), but, by others, to be *Helichrysum ferrugineum* ("Tree Everlasting"). Will one of our expert botanists please tell the amateurs how these two plants may be distinguished in the field?

Answer (Mr. J. H. Willis): The Common Cassinia (more popularly known as "Dogwood") and the Tree Everlasting are indeed of similar habit and aspect, but when growing together in association, the former may be picked out by its much shorter, narrower, and more numerous leaves, which impart an ericoid appearance to the shrub, and deeper green coloration—the Everlasting is of a sombre grey-green. Closer examination will reveal a rough ("sandpapery") surface on the foliage of "Dogwood," whereas that of Tree Everlasting is quite smooth to the touch,

while the latter has also a definite papery fringe or "ray" on each tiny flower-head. (*Cassinia* heads have no ray.) Another significant difference (discernible only by microscope) is the presence of minute chaffy scales separating each floret in *Cassinia* species, but not in *Helichrysum*.

CRADLE MOUNTAIN ALPS (TASMANIA)

With the aid of a large number of slides, Mr. P. F. Morris discussed the general physiography and botany of this fascinating area, comparing and contrasting its floral points of interest with those of the mainland. Notes on the local geology, wild life, and history of Cradle Mountain chalet were given as well. In the discussion which followed, Mr. F. E. Burbury (a visitor from Tasmania, who accompanied Mr. Morris on this trip) called attention to other features of Tasmanian botany, e.g., probable hybridism between the King William and Pencil Pines, members of a remarkable endemic genus, *Athrotaxis*. The thanks of the Club were accorded Mr. Morris, and also Mr. Reeves for his generous preparation of the slides employed.

EXHIBITS

Mrs. C. French: Vase containing 5 varieties of Manuka, garden-grown at Canterbury, viz., *Leptospermum scoparium* v. *Keatleyi*, L.s. v. *albo-plena*, L.s. v. *Walkerii*, L.s. (normal seedling with white flowers).

Mr. T. Griffiths: Small lizard from Thomson River, Gippsland.

Mr. R. D. Lee: Specimens of the fungus *Volkweinii speciosa* with brown-pink spore prints.

MOUND ANTS

I have always wondered why the Mound Ants covered their mounds with small stones. My first theory was that the stones were removed from the burrows when found to be in the way, but hours of watching failed to reveal any ants carrying them out.

My second theory was that the stones were required, for some reason, in the galleries, but, again, none were taken below; although some were carried to the mound and dropped there.

I thought of camouflage, but, by adding the stones the mounds were made more conspicuous.

My fourth theory, which I think is the correct one, is that they are added to prevent erosion. Without the stones, rain would soon make gutters in the mound.

About the middle of October, 1944, requiring some small brown and white stones to cover the earthen floor of my glass-house, I swept a mound clean and filled four small sugar bags with stones. On November the fifteenth, the mound was again covered. This time I collected three bags of stones, which had been gathered in the short period of one month. By the middle of December, the ants had re-covered their mound. This time I let them be.

I regret that I was unable to visit the mound on the day following the sweeping. Sometime I intend to do so

MARC COHN, Bendigo.

THE MIGRATION OF BIRDS

— Facts and Fancies

By INA WATSON, Melbourne.

(Paper read at F.N.C.V. meeting, April 9, 1945.)

The Concise Oxford Dictionary defines "migration" as "to move from one place to another (of birds and fishes); to come and go with the seasons." This must be amplified in regard to where they come and go, and so we find "migration" can be divided into various types.

First, we have the small migrations, sometimes called "vertical" migration, a local example of which is the Flame Robin, which comes down into gardens round Melbourne for the winter and returns to the hills to nest in spring.

Secondly, there are the migrations in lands about the Equator. These are usually irregular, and governed by humidity — by the wet or dry season — and are limited in extent.

Thirdly, there is the dispersal from a breeding place. A typical example, which occurs mostly in seabirds, is the return and dispersal of the White-faced Storm-petrel from Mud Island, and of the Mutton-birds from Cape Woolamai.

Then there is the shifting round of the bird population, following a food supply. This occurs with the lorikeets and various honey-eaters in Australia. It might be termed nomadic, rather than migratory.

And, lastly, there are the breath-taking flights covering thousands of miles, which is what we usually think of when we speak of "migration." Some authors maintain that it should be confined to the journeys of the non-hardy insectivorous species, e.g., swallows, cuckoos and swifts, and that the other movements should be called "drifts."

The discovery of this last great movement is not recent. Wetmore¹ gives, as one of the earliest references, the *Book of Job*: "Doth the hawk fly by her wisdom and stretch her wings to the south." Various people have searched the early records. When the Israelites were wandering in Sinai, they were saved from starvation when "at even the quails came up and covered the camp," and a year later, when "there went forth a wind from the Lord and brought quails from the sea." This reference has been calculated as being in 1580 B.C.

Some of the early theories are well known. There was the popular one that swallows hibernated in the mud at the bottom of ponds. One version was that the swallows congregated on the slender reeds growing round the ponds, and became very sleepy. As more and more birds crowded on the reeds, these bent under the weight and gently deposited their sleeping burdens

in the mud. John Hunter, the anatomist, even went so far as to keep the birds in a shed with tubs full of water and mud. The only result obtained was that the poor birds died of starvation.

As late as 1740, the Tartars thought that each crane carried a cornerake on its back in migration, and, in Southern Europe, it was thought that small birds congregated to wait for transport on their larger kindred.

In 1703, an anonymous author, who described himself as "A Person of Learning and Piety," wrote a treatise entitled "*An Essay towards the Probable Solution of this Question: Whence come the Stork, and the Turtle, the Crane and the Swallow, when they know and observe the appointed time of their coming,*" in which he put forth the ingenious idea that the birds migrated to the moon. The author contended that it took exactly 60 days for the birds to reach that orb, and they didn't require to eat in the rarified atmosphere. Sleep was easy, as "with no objects to divert them, they may shut their eyes and swing on, fast asleep." They started at full moon and flew straight ahead. As it took exactly 60 days for the journey, the moon was in place to receive them. It concluded naively, "if the moon will not be allowed, some other place must be found out for them."

It is, of course, impossible to tell any individual bird from another without some distinguishing mark, but with the introduction of bird banding in the early 1800's, there came the possibility of more accurate observation, though bird banding is of little use without easy means of communication, which did not develop until later.

The means used at first ranged through tiny bells, colored yarn, indelible ink or paint on the feathers, metal disks glued to wings and tails, rings of wire and celluloid, strips of metal with texts on them, to the present-day aluminium bands with the names and addresses of organisations or persons responsible.

Scientific use of bands began with a man called Mortensen in Denmark in 1899². By 1909, U.S.A. had started the American Bird Banding Association, which was taken over by the Bureau of Biological Survey in 1920. In 1909, too, in England, two men began simultaneously — one was A. Landsborough Thomson, whose scheme was subsequently abandoned, and the other R. F. Witherby, whose ideas were ultimately taken over by the British Trust for Ornithology. In England, 7 sizes of bands are made, and all bear the name and address of the British Museum, which keeps the records. There was a great increase in interest after the First World War. North America has made the greatest advances, and bird banding is now widely practised there. Up to date, Australia has done very little in this respect, though the R.A.O.U. had plans in hand in 1941, which were interrupted by the war.

Banding is a method for tracing individual birds, but observations of these birds from strategically placed stations gives a broader vision of the whole situation. All writers stress the fact that the lay person has little idea of the vast extent of these great treks among birds.

The main principle is that the birds breed in the coldest part, and "summer" in the warmest part of their range. The main trends are: In Europe, in autumn west and south to the Mediterranean and Africa; in Asia, west and south-west into Europe, and south and east into Australia and East Africa; in Africa, the movement is tropical to southern; in America, more directly north and south. There is one record of east to west migration—that of the Double-banded Dotterel from New Zealand to Australia.

There is no known example among land birds of a southern species "wintering" in the summers of the north temperate zone. This may be related to the different distribution of the land masses in the two hemispheres: in the south there is no land in corresponding latitudes except Antarctica. There are ocean birds—one of the Shearwaters—which breed in the south and summer in northern seas.

To give some idea of the extent of these migratory flights, it has been reported¹ that, during an autumn snowstorm, a number of migrants crossing Lake Huron were forced into the waves. Afterwards, on one section of the beach, the dead cast up were estimated at 5,000 per mile.

Lighthouses are responsible for heavy bird mortality, because birds flying at night are blinded as they are attracted by the light and fly towards it, only to dash themselves against the walls—any direct hit at the ordinary flying speed is fatal. Lockley² tells of standing for 5 hours one night below a lighthouse, listening to the constant thudding of birds as they hit.

The island of Heligoland, one of the best known of the banding stations, lies off the coast of Germany. It belonged originally to England, but was exchanged with Germany for the Island of Zanzibar in 1890. The Heligoland Bird Banding Station and Bird Garden was first made famous by the work of Heinrich Gätke, one of the pioneer students of migration. Lockley, in his book, *I Know an Island*, describes how the birds often arrive at Heligoland in a state of exhaustion, and he was intrigued to see a woman sweeping the street before her door with two exhausted robins perching on her head to rest. He also described the technique of bird catching and ringing. The main part of the island had a number of low growing trees and bushes, and among these were three large traps placed one behind the other. Men with long sticks beat the bushes lightly, driving the birds into one or other of the traps, after which they were caught in the long

funnel-shaped end. They are then banded and particulars taken of the age, sex, race, ring number and weight. For weighing, they use open tubes of light material which fit the bird and prevent movement. Then the birds are released. At the time he wrote, about 1938, there was Dr. Drost and his assistant and a staff of two women clerks on the island.

Now for some "facts" from various sources in regard to distance, speed and height of a typical "migration":

Speed.—In 1921, Colonel Meinertzhagen⁵ estimated the ordinary speed during migration of a carrier pigeon as 30-36, crow 31-45, small song birds 20-37, starlings 38-49 and ducks as 44-59 miles per hour. Some estimates quoted by Sullivan and Grierson for speed between two points connected by telephone of observed birds, were: Crow 30, Finch 32, falcon 37, and starling 46 miles per hour. The general rule on migration would appear to be an even, unhurried pace of the speed of ordinary flight, varying between 30 to 40 miles per hour.

Height.—Estimates of height vary. In America, Dr. Chapman, while watching through a telescope, saw birds cross the face of the moon at an estimated height of five miles⁶. Pilots of planes, however, say birds are not encountered flying at any great height, and it is quite common to hear birds calling as they fly over at night. Thomson⁷ says flight is usually under 3000 feet. There is no proof at present, as most of the main migratory flights take place at night.

Method.—Birds have limited endurance, and need rest like all living creatures, and so the flights are made in stages to suit the bird's own powers. Most observers agree that the majority of flights are made at night, possibly because of safety from birds of prey. There is also the theory that if the migrator feeds by day, it flies by night, and vice versa. The duration of the flight stage is probably short, to give ample time for rest and feeding — provided it is over land. watchers agree that migration is not usually maintained for the whole of a day or a night. Thomson, whose book is one of the most detailed, says that in flying 6-8 hours, at an average of 30-40 m.p.h., the birds would cover 180-320 miles. Ocean flights would possibly be longer, the birds necessarily going on until able to rest.

There are some well-proven records — again quoted by Thomson: a Mallard marked in Wisconsin was recovered 5 days later in S. Carolina — 900 miles in 5 days — and a Turnstone, caught and ringed in Heligoland, released at 11 a.m., was shot on the north coast of France 25 hours later — 510 miles in a direct line.

All flights, of course, are dependent on wind conditions. Commander Acworth presents a different view of bird life in his book *This Bondage*⁷. Its title is taken from his statement that

"Wings do not confer freedom, but a slavery shared by few, if any, earthbound creatures." A bird, or any other object, when it becomes air-borne, does not feel any pressure from the wind—it is moved along at a varying speed in this great moving current of air. Any speed or movement it makes is merely super-imposed on the force and direction of the wind. Necessarily, therefore, the speed and direction of the wind limits and directs its flight. If there is no way of checking the drift of the wind by known landmarks, obviously it is very simple to get lost. That is the reason why aeroplanes have to have the complicated instruments they do. Birds have no instruments to guide them, but Commander Acworth and the other writers claim that they have an extra "sense" which enables them to reach their destination. There is no other explanation of their ability to land back at the same spot.

Some of the experiments which prove the presence of this "extra sense" are very interesting.⁴ Mutton-birds were taken from the Island of Skokholm, off County Pembroke, Wales, 250 miles to Surrey, and they reached Skokholm again at 11.30 p.m. the night following that in which they were released, each bird going direct to its own burrow. On another occasion, these same birds were sent by air to Venice and released at dusk. One bird got home within 14 days, and the other bird was found on the Island again the following spring. This trip was over 1000 miles direct, but 3,600 miles by the sea route that the birds would take.

Flocks on migration are usually mixed as to sex and age, though authors differ about this; some say that the young birds go first, and that the custom varies with different species. Pycraft, in *History of Birds*⁵ (written back in 1910), asked why, in so many species, the males precede the females, and quoted as an example the Warblers, and, with the Swallows, why the young precede the adults. This is another thing that only systematic banding and observation can prove, and possibly elucidate.

The greatest problem of all, of course, is *why* the birds do it. When I first became interested in the problem, as the result of a Question Night held at the Club some six months ago, I put this question of "Why"? to an authority at the Museum⁶. In his answer, he pointed out that while all the details of the problem had not been solved, the general principles are now fairly understood, and need a knowledge of historical geology, genetics, central nervous system of birds, and function of the endocrine glands; all have a bearing on the migration of birds and other animals.

These subjects are beyond my limited lay mind, but here are some gleanings from the books I have read.

As far as historical geology, Sullivan and Grierson⁶, mention

it briefly as a cause. In the Tertiary period, when modern birds were attaining development, it is suggested that conditions were more or less equable all over the world, and any migration was only a seasonal shifting with a varying food supply. However, with the coming of the Pleistocene ice age, huge sheets of ice advanced from the poles; it is suggested that birds retreated before the cold and thus gradually extended their range, working back northwards when the ice retreated. Those species which did not learn to shift were, of course, weeded out by natural selection, and thus gradually the instinct was born. The conclusion drawn from this, is that migration is a very old habit, which needs an immediate stimulus for its release.

Most of the authors mentioned are agreed that food supply is a very big factor. By migrating, the birds are assured of a fresh and copious food supply for the exigencies of the breeding season and the feeding of the young birds. At the end of the breeding season the food supply is decreasing, and behind them is the better food supply. Acworth⁶, who refuses to consider birds as anything but slaves to the shifting winds of the world, says, "There is no motive or intention in migration on the part of the bird, only stark compelling physical necessity, because the bird is parasitical to a moving medium. Swallows, like all other birds, are subject to a ceaseless ebb and flow of wind, and 'migration' as an objective and purposeful movement is non-existent." He maintains, of course, that the winds are dependent on changes of temperature, and agrees that birds are very sensitive to temperature: that the various species have a critical temperature below which they cannot survive (this has been proved by experiments conducted by Dr. Kendleigh in America³), and when the temperature begins to drop, they automatically move with the winds caused by such a drop in temperature.

As the configuration of the land doubtless has effect on the wind currents, it may perhaps, explain to a certain extent, the permanence of the main routes.

This is only one author's view. Others quote the restlessness and flocking of species before leaving. Lockley⁴ describes the experiments carried out in Heligoland, where he saw Robins and Redstarts living in special cages with delicately poised perches which, by means of electrical contacts, register the restlessness of the birds at night, when the migration fever caused them to vibrate their wings and jump about their perches. Each quiver they made broke the inked record which revolves slowly over a time graph, showing the exact second the fever began and ended each night. By this means it was proved that the direct cause, of migration is a fever of intense physiological rhythm of energy which seizes the bird; no matter if confined in the darkest cage, when the hour comes, usually beginning towards midnight and

ending just before dawn, it must expend that energy in violent wing trembling and beating.

Increase and decrease of daylight is given as a secondary cause, perhaps explaining some of the small delays by the difference in the weather. Professor Rowan² made some interesting experiments with Junkos in Alberta, Canada. (Junkos are small, finch-like birds, about 6 inches long.) They are summer visitors to Canada. Well fed and sheltered, they survived a severe winter there. If kept beyond the normal migration time, when the sex glands had dwindled to a normal size, they showed no inclination to depart on liberation. They were then gradually subjected to increasing periods of artificial lighting, and it was found that the sex glands had developed again by the early winter, and that, when released, the birds all disappeared, though it was not known if they attempted migration. It was pointed out that this does not explain the autumn migration in young birds with sex glands not yet mature.

And so it all adds up to one of the world's great mysteries, which scientists have not yet fully solved.

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PORTLAND F.N. CLUB IS LAUNCHED

While we pen *in memoriam* notices and pay tributes to the vanished Geelong Club and its journal, it is gratifying to learn from the *Portland Observer* of May 10, that a new Naturalists' Club has arisen in the far south-west, with inaugural membership of 14. This move is particularly heartening in the face of present war-time exigencies. First President, Mr. Hugh Keiller bore testimony to the enthusiasm of local naturalists, and said, "I feel confident that once we have a hike or two out on those glorious sandhills, we will not only benefit by them physically and mentally, but we will stimulate interest in others who, though fond of the outdoor life, may not feel disposed to 'go bush' by themselves."

Certainly Portland affords ample scope for any nature lover or enquirer, and we hope that our journal may soon be enriched by other such articles as those on the local orchid and fern floras communicated by Mr. Cliff Beaglehole, of Gorae West, even though the new club may eventually support a magazine of its own. Not without some justifiable pride do we trace this accomplishment to interest largely aroused by the visit last October of our esteemed fellow members, Messrs. A. H. Chisholm and W. H. Nicholls, who urged Portland district naturalists to form a Society. The unanimous decision, at this first meeting, to admit lady members is a wise and gratifying step. All success to Portland's new F.N.C.!

THE HAKEA AT MOUNT BUFFALO

The Victorian Naturalist, Vol. 54, p. 151 (February, 1938), contains a note on the occurrence of the sole species of *Hakea* so far discovered at Mount Buffalo National Park. The original specimen, foliage and seed vessels only, from which identification was first made, I collected from one of the two plants that had been transplanted to the front of the Government Chalet. Surprise was expressed at the time with the determination of *Hakea vittata* ("Striped Hakea"), accentuated later by the location of the main habitat of the plant on the high inhospitable ridge of the North Buffalo. As remarked in the note, *Hakea vittata* belongs strictly to the dry plains. Thus the supposed discovery of the same plant in a bleak alpine locality brought it to a most unfavourable environment. So much so that a theory was advanced to account for its isolation as fortuitous and attributable to winged seeds blown by dust storms from the north-west. The *Hakea* was also affirmed in the note as confined to one area beyond the main Buffalo Plateau. After the 1939 fires, however, another colony of dwarfer plants was observed by me in a formerly impenetrable region on the slopes of Jessie's Lookout, well on the Buffalo proper.

The National Herbarium, Melbourne, has since critically re-examined all available material, including specimens in flower collected on the Buffalo by J. Soues in 1907. The species is now found to be an alpine variant of *Hakea sericea*. This conclusion conforms with other Herbarium specimens, from Mount St. Bernard, the upper Macallister River, and abundantly from Tasmanian high elevations. The plant is therefore classified as *Hakea sericea*, var. *lissosperma*. Ordinarily a large alpine shrub, the North Buffalo examples sometimes attain small tree dimensions. One cultivated plant still survives in the Chalet garden, and its conifer-like appearance evokes admiration by Buffalo visitors.

The foregoing correction will also apply to the reference by Miss M. L. Wigan in *The Victorian Naturalist*, Vol. 57, p. 159 (January, 1941). Further, both A. J. Ewart's *Handbook of Forest Trees for Victorian Foresters* (1925), and his *Flora of Victoria* (1930) are in error in attributing *Hakea vittata* to the Buffalo mountains.

Apart from correct nomenclature, the scientific implications of placing native flora in proper association and environment require careful record by botanical collectors. Appreciation is expressed for the intensive research undertaken by the National Herbarium, resulting in this important amendment.

H. C. E. STEWART.

THE GREEN PYTHON

BY SPR. T. V. GIVENS.

New Guinea is noted for the brilliant colouring of many of its birds and butterflies, but it is rather less well known that in the Green Python (*Chondropython viridis*) it also possesses what is possibly the most vividly beautiful snake in the world.

A truly arboreal species, the Green Python is reliably reported to inhabit the jungles of New Britain as well as those of New Guinea, while it has been rumoured as present on the tip of Cape York—a welcome addition to the list of Australian snakes, if substantiated. Like so many tropical snakes, it is nocturnal, but, unlike most nocturnal reptiles, it does not trouble to conceal itself during the day, preferring to rely upon its camouflaged colouring—bright enamelled green tinged with yellow, with bluish diamond-shaped markings down the back and white, or sometimes golden, scales irregularly scattered along its length (to escape detection as it lies coiled across a bough in a manner characteristic of the species). It is mainly because of the excellence of its camouflage that this beautiful reptile, though not particularly uncommon, is only infrequently seen.

Unlike the cylindrical or flattened bodies of most snakes, that of the Green Python is laterally compressed and, when lying on a flat surface, roughly triangular in section, with the spinal column as the acute apex of the triangle; this and the remarkably prehensile tail are conspicuous features of its structure, both undoubtedly developed as an aid to climbing.

The strength of the prehensile tail is astonishing; only three or four inches are all that is necessary to support the entire weight of a five-foot specimen. The tail, is, however, normally used only as a safeguard whilst the python moves through the undergrowth, always coiling about a branch or vine as it casts around for a fresh position.

The Green Python sloughs its skin rather more frequently than most snakes. A specimen kept in captivity in New Guinea performed this act at an average interval of thirty-five days.

The food of the species comprises chiefly small mammals and birds, but it would appear from observations made by Mr. David Fleay at Healesville that, in the young stage when it is yet too young to devour even small mice, geckos form the main item in its diet. Inclined to be somewhat savage when first caught, adult specimens soon become docile and feed readily in captivity.

One very remarkable feature of *Chondropython viridis* is the striking difference in colouration between the adult and the young. In contrast to the vivid enamelled green of the mature

PLATE III



New Guinea Green Python (*Chondropython viridis*)

Photos.: David Fleay.

snake, the young, while retaining the same pattern in their markings, are reddish brown, while the bluish diamond-shaped markings of the adult are creamy-yellow outlined in black—a most brilliant colour scheme. Little is known as yet of the transition in colour (from brown to green) in this species, but there is now, as well as two adult *Chondropythons*, a young reddish brown specimen in the care of Mr. Fleay at Healesville, so that some interesting observations may soon be recorded of this phenomenon.

ADDITIONAL NOTES ON THE GREEN PYTHON

BY DAVID FLEAY, Badger Creek, Healesville.

The fine-scaled, very colourful Green Python so interestingly described by Sapper Tom Givens is comparatively small among constricting snakes, measuring, when full grown, about five feet in length. I made my first acquaintance with the species in 1939 when, following a visit to New Guinea, I received a nice specimen by air from Mr. H. Webb, of Lae P.O. *Chondropython* is not an all-over green in its colour scheme, the ventral surface being silvery white.

One of the most remarkable actions I observed in the first specimen, and also in later ones, was the snake's habit (when really hungry) of launching its tensed body forward, sometimes at full stretch, to seize a mouse; at the same time, it would remain locked to its arboreal perch by the strongly prehensile grip of the tail tip. Doubtless, while lying so, perfectly camouflaged in the humid atmosphere of jungle foliage, many a small mammalian victim, feet distant from the waiting snake, is captured in this fashion. Though overbalancing at times and falling head down, the python immediately draws itself back to the bough to which its tail still clings firmly.

The resting position differs from the aggressive and striking attitudes in that the body is coiled firmly and compactly around a limb—so tightly indeed that to “undo” the muscular snake is quite a task. My first Green Python from Lae fed well on mice and grew several inches longer. Unfortunately, it attempted to kill a half-grown rat which retaliated by sinking its incisor teeth into the snake's spine, causing an injury from which the reptile did not recover.

Of the three specimens secured in their native haunts, and brought to Healesville by Sapper Givens in 1944-45, two are of adult size and opposite in sex. Their approximate lengths are: Male, 51in., and female, 52in. It is interesting to note that they represent two different shades of green, the male a light grass green or *eau-de-nil* green, and the female pale blue-green,

somewhat duller in colour. The colour variation may have something to do with collection in separated habitats, but it is interesting to note that male Tiger Snakes are usually more brightly coloured than females of their species from the same area. Two months after receiving Givens' male Chondropython, it was noticed that some of the mouse victims passed through its body imperfectly digested. However, after shedding a bunch of brilliant crimson nematode worms, the reptile's health improved noticeably.

The third and infant member of the three Chondropythons is a most striking little creature in its red-brown coat with rich creamy yellow dorsal patches. It has grown rapidly, shedding its soft skin frequently and increasing in length by some five inches after five months. Its total length at the time of writing (20/3/45) is 21 inches. The transition in colour of this immature specimen will be watched with extreme interest, particularly as some Chondropythons of fair size and a general golden tint have been noted.

THE LATE LT.-COL. BEDE THEODORIC GOADBY

The recent death of Lt.-Col. B. T. Goadby (Royal Engineers, retired), of Mosman Park, West Australia, is deeply regretted by his many botanical and other friends. Son of Major Goadby, Colonel Goadby was born at Kasauli, in the Himalayas. From England he went to Albany, W.A., about 1895, having been lent for a period of three years by the Imperial Government to superintend the laying of submarines in the harbour. His term was extended by a further three years, when he was transferred to the newly formed Commonwealth Forces.

From Sydney he went with the First Contingent to New Britain (1914), whence he sent an undescribed *Adiantum*, which the late Mr. J. H. Maiden named in his honour. In recent years, orchids were his chief interest, and Dr. Rogers' genus, *Goadbyella*, was named after him.

Colonel Goadby was president of the W.A. Naturalists' Club for several years, and had been a member of the F.N.C.V. since November, 1933.

Botanists here and abroad were greatly indebted to both Mr. and Mrs. Goadby (who died only a short while before her husband) for hospitality and generous help in studying the flora of West Australia. They lived, latterly, at Mosman Park, W.A., where Colonel Goadby was for a short period in charge of the local V.D.C. unit during the present war.

He leaves a son and one daughter (Mrs. Love), whose son, John Love, was one of the R.A.A.F. lads posted missing a year ago, after raids on Germany.

From the time of his arrival at Albany, Colonel Goadby took a keen interest in Australian flora, and constantly sent specimens to Kew Gardens, London. Specimens in his herbarium, now in the possession of the W.A. State Herbarium, date back to 1897. Our National Herbarium, Melbourne, is fortunate in possessing beautifully dried duplicates of many of his 1924-25 orchid collectings, notably among the rare "spider" types (*Caladenia* spp.), in which Western Australia is extraordinarily rich.

EDITH COLEMAN.

THE LATE WILLIAM HENRY INGRAM

It is with deep regret that we record the passing of Mr. W. H. Ingram, on March 25, a member of the Club for more than a quarter of a century, and one of the connecting links between foundation members and those who have joined the Club in comparatively recent years. Although Mr. Ingram was elected a member in June, 1919, it was not until 1927, when he was appointed co-auditor, that he undertook any responsibilities. Mostly, his interest was expressed by attending excursions, exhibiting at monthly meetings, and contributing small paragraphs on some observations of bird life for publication in the *Victorian Naturalist*. When his brother, John, was elected Honorary Treasurer in 1929, Mr. William refused further nomination as one of the auditors.

It was part of their daily routine for the Ingram brothers to walk through the Botanic Gardens, to and from the City, so that any unusual occurrence was readily noted, and, what was of equal importance, the information was passed on to other members. Although chiefly specializing in ornithology, Mr. W. H. Ingram was quite expert in mounting specimens of seaweed on cards, and at the Club's Jubilee Show in 1930, was one of the organisers, exhibiting a collection of Algae which excited considerable attention. The Jubilee year was marked by pronounced activities, and the office-bearers and committee, already overburdened, gladly availed themselves of Mr. Ingram's offer to attend at the Royal Society's Hall on Club meeting nights to issue books from the library, before the meeting was timed to begin.

There is a trite saying that the reward for doing a thing well is to be asked to do still more. Up until 1931 the Assistant Secretary was also Assistant Librarian. Increased pressure of duties made it necessary to discontinue this arrangement, and the inevitable choice for the newly-created office of Assistant Librarian was our late member. So inseparable were the Ingram brothers that it seems impossible to mention one without the other. They were always popular as leaders of excursions; some of the more extended ones such as the Easter trips to Beechworth in 1932, and again in 1936, will long be remembered by those who had the good fortune to participate in them. When the purchase of an epidiastope was contemplated, the Club was fortunate in having the Ingram brothers to make enquiries and give advice on a matter of such great importance. Not only the Club, but individual members benefited, from time to time, by the help always so freely given, practical advice founded on the experience of a lifetime. Of their benefactions, few were aware, for they disliked publicity. The memorial flight aviary at the Sir Colin Mackenzie Sanctuary, at Healesville, was an accomplished fact before members of the public knew who were the donors.

For some years, it has been the practice to appoint a special Show Secretary, and Mr. W. H. Ingram rendered faithful service in this capacity. In Melbourne's centenary year, 1934, Mr. Ingram not only carried out the arduous duties associated with the Wild Nature Show in the Melbourne Town Hall, but also carried on (almost immediately after) when the Club was asked to organize the Wild Flower section of a greatly enlarged display at Garden Week, in the Fitzroy Gardens.

With a short leave of absence in the Coronation year, 1937, both brothers continued in office, Mr. John as Hon. Treasurer, and Mr. William as Hon. Assistant Librarian (and unofficially, as Assistant Treasurer), until their resignation in June, 1942. While quite conscious of the Club's loss, our deepest sympathy goes to the sisters and brother of our esteemed member.

BLANCHE E. MILLER

HISTORY OF THE GEELONG FIELD NATURALISTS' CLUB ADDENDUM

By EDWARD E. PESCOTT

In the *Victorian Naturalist*, (Vol. 61, March, 1945, p. 190) Mr. Charles Daley publishes an interesting and comprehensive history of the Geelong Field Naturalists' Club. Mr. Daley concludes his history with the note that the Club "ceased operations" about the time of the beginning of the Great War, referring to its "inglorious ending, after so long and honourable an achievement in studying and fostering natural history."

Owing to the fact that complete records were not supplied to Mr. Daley, he naturally arrived at such a conclusion. But the "inglorious ending" was not yet. I wrote to Mr. Daley directing his attention to a copy of the *Geelong Naturalist* dated June, 1926, which showed that the club was then still functioning, its President being the late Rev. W. C. Tippett, F.L.S. Mrs. E. E. Hill, of Sandringham, referred to a continuance, after 1914, at the F.N.C. March meeting.

Mr. Daley wrote that he had had considerable difficulty in collecting information from Geelong, at the same time requesting me to give an account of the Club after 1914. Mr. Daley also communicated with the Editor expressing a wish that the record be completed.

I was never a member of the Geelong Club, but I have very grateful remembrance of such men as Bracebridge Wilson, A. Purnell, W. Shaw, J. Hammetton, A. F. B. Wilson, and other pioneers. The Club was a great force in Geelong, and the meetings and excursions were always well attended.

The opening of the Great War somewhat disturbed the working of the Club. Mr. Daley left Geelong for Sale, and later for Melbourne, but he continued to act as Editor for the *Geelong Naturalist* until February, 1916. The Club continued to hold meetings regularly, but the *Geelong Naturalist* was published only at long intervals, the last Editor being the late George H. Brownhill.

The loss of Messrs. Charles Daley and H. W. Davey, owing to their transference from Geelong, was considerable. Well-known local men, such as Messrs. B. McKinnon, Geo. Hope, B.Sc., and Col. J. M. Edgar, carried the flag, a welcome newcomer being the Rev. W. H. Tippett, F.L.S. Two wild-flower exhibitions were held—one in 1922 and another in 1923—both of which I attended. The enthusiasm was very keen, and there was no sign of the "inglorious ending" soon to come. During the later period, the following occupied the presidential chair: Dr. Gavin McCallum, M.D., C.M., and Mr. Herbert A. Purnell, with Messrs. B. McKinnon and G. B. Hope, B.Sc., as good helpers.

The Club, weakened with loss of workers, and also with competition, finally passed out about December, 1932. Through the paucity of members, existing personnel was merged with the Science Club of the Gordon Technical College, this union resulting in the formation of the Kelvin Club which is functioning now, but is mainly carried on by engineers and engineering students. I would re-echo Mr. Daley's concluding remarks and earnestly hope "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."

Publications—

The "Geelong Naturalists' Club," born in 1880, a few short weeks before the corresponding Melbourne Club, issued its first *Journal* in 1891. Another journal, *The Wombat*, was first issued in 1895, as the official organ of the "Associations at the Gordon Technical College";

early proceedings of the Geelong Naturalists' Club are also here recorded. *The Wombat* continued till July, 1902, there being no issue in 1900. Following is a complete list of these Geelong Natural History journals.

The Wombat, August, 1895, to July, 1902—5 vols., 19 parts.

The Geelong Naturalist—

1st Series (vols. 1 to 6 inclusive): July, 1891, to June, 1898—4 parts each. Total, 24 parts.

2nd Series (vols. 1 to 7 inclusive): March, 1904, to December, 1931—7 vols (vol. 7, only 3 parts issued). Total, 27 parts.

The total number of this Journal is 51 parts, and the issues are numbered consecutively from 1 to 51.

COMMUNITY TREE PLANTING

We have received from the Save the Forests Campaign full details of this winter's community tree planting project. The aim is to have half a million trees planted by volunteers on public reserves and by owners on private property. The selection of trees available is varied and interesting. Of the sixteen species, pines, cedars, oaks, fast-growing poplars, the large-leaved Catalpa or Indian Bean and eucalypts provide a selection from which trees for planting in most parts of the State may be made.

For community tree planting—by voluntary effort for public benefit either for shade, shelter, beautification or timber—the Government has agreed to provide the trees free and freight free, provided the organizations undertaking planting are approved by the (municipal) council and the Forests Commission. This is to ensure competent planting and maintenance of the trees.

District Committees have been formed in the municipalities of Ararat, Ballarat, Beechworth, Benalla, Broadford, Ferntree Gully, Glenelg, Maldon, South Gippsland, Stawell, Wangaratta and Oxley, Warragul and Woorayl, and progress associations, riding committees and similar organizations have promised co-operation in Euroa, Hamilton, Hampden, Phillip Island, Tingamah and Yea. Committees are in process of formation in many other places. The Campaign Council believes that the formation of similar committees in every municipality undertaking community tree planting work will facilitate the successful organization and completion of a community tree planting project.

The important stages in such a project are: The formation of a committee; the selection of planting sites; planning the lay-out; the determination of suitable species of trees to plant; the ordering of the trees. When this stage has been reached, the fencing of the area—if necessary—and the organization of the necessary team work to dig the holes and plant the trees are the final parts of the preparations. Provided sufficient time is available to place full details before members of the Community, a good turn-out for the actual planting will be assured.

If a District Committee is in existence, then all applications for trees for the community tree-planting purposes should be made through it. The trees are being supplied from the Forests Commission's nurseries, and to reduce packing, handling and freight and conserve manpower, all trees for the one centre will be sent out at the same time to one consignee, who will arrange for their distribution.

Private property owners will have to pay for the trees supplied for their use, and the Secretary, Forests Commission, Melbourne, C.2, will supply full details to such owners. All enquiries regarding community planting can be made to either the District Committee, municipal council, or to the Hon. Secretary, Save the Forests Campaign, 314 Collins Street, Melbourne, C.1.

RECENT PUBLICATIONS

1 Mrs. M. Kathleen Woodburn, a member of the Field Naturalists' Club of Victoria, is to be warmly congratulated on the appearance of her book, *Backwash of Empire*. The volume (priced 10/6 at the bookellers) has been excellently produced by the publishers, Georgian House Ltd., of Melbourne. *Backwash of Empire* contains Mrs Woodburn's experiences and observations on certain Pacific Islands that fringe the Southern Melanesian shelf, principally the New Hebrides. It is no mere tourist's narrative. The author has the pre-requisites of a keen nature-lover; what to look for, how to write when discovered, and how to engross the reader with a continuous fluent style, enhanced with a lively humour. Further, her anthropological approach in dealing with the natives of the Islands visited places the book on a scientific level not usually attained by many travel works. A host of natural history notes and comments are recorded, with marine biology predominant. To introduce a small boy into the text is a novel procedure and the share of "John" in the itinerary will delight all sections of readers who obtain the book. Liberal use is made of photographs, in the main of natives in "civilized" garb. A minor omission is a mileage scale on the map of Erromanga, although the length of the one road is considerably shown. Possibly exact measurements were lost sight of in the numerous processes of "basings" to which the map was subjected!

The author gives, rather sadly, abundant evidence that the New Hebridians are a dying race. The summing up of her penetrating observations on the future of the islanders in her epilogue commands respect. The impact of the Pacific war on native races is bound to have a profound influence on new peace policies that will be formulated. As Mrs Woodburn says: "The part played by the natives in the struggle with Japan has brought them before the eyes of the world in a new light, and a future policy of assistance in all ways to the native population cannot help but eventuate therefrom." Mrs. Woodburn's written word is valuable in presenting an aspect of intelligent, humane Australian opinion, based on experience.

2. First-rate pictures and movie films, some in natural colour, have of course, been taken by bird enthusiasts in Australia. But at what expenditure of patience, skill and ingenuity has yet to be recorded. No Australian book on this subject appears to have been written. Eric J. Hosking and Cyril W. Newberry, English bird men of note, have partnered several books on Britain's bird life. Their latest combined work, *The Art of Bird Photography*, published by Country Life Ltd., London, (Melbourne price, 13/9) fills a gap in ornithological literature. Both the amateur and the seasoned nature photographer will learn a great deal from this fine book, written to interest and help the ordinary person, young or old.

The complete technique of bird photography is set out with clarity, including all about cameras, equipment, flashlight, cinematography, colour and light problems, darkroom notes, together with bird "hides" that may be constructed high up trees, on the ground, or on water. The quest of birds, at the nest or away from it, their behaviour, the recordings of observations in notebooks, the appropriate landscape setting and environment, also engages the attention of the nature lover. The text is illustrated by over 70 photographs and diagrams. A superb series show greenhanks at different nests and in varying positions, emphasizing the necessity of repeated observations in bird study. Shown on one page is a buzzard at a rabbit bait—a picture that took several years to secure, and the photographer refers with justifiable pride of its having been awarded an important prize. Australian readers of the book will, perhaps, bestow greater honours on the flashlight of a tawny owl squeezing through the

narrow entrance of its nesting hole. Every detail of the owl is perfect, and seldom has the personality of a feathered creature been so delightfully caught. There is no short cut to successful bird photography, but this book is of value in pointing out pitfalls and giving the benefit of a tried experience in the field and darkroom.

3. Many in the long list of Bulletins published by the Council for Scientific and Industrial Research possess a natural history interest. No. 159 is *Poisonous and Harmful Fishes*, by G. P. Whitley, F.R.Z.S., the well-known ichthyologist at the Australian Museum. This publication is not on bookshop shelves, and, though issued in 1943, has received scant notice in the press. Consequently its excellence remains unknown to the general public. The contents deal with some of the poisonous, venomous and predatory fishes found in Australian waters, and are clearly illustrated with plates and drawings. A feature is the coloured plate, depicting Toado fishes, the Red Bass, and the brilliantly hued Chinaman-fish (*Paradicichthys venenatus*) in three stages of growth. Venomous fishes are not necessarily poisonous gastronomically, as for example, the Stingray, which, though it can inflict a painful wound, is edible. Stonefishes are alluded to in detail, and the author points out that their life history is incompletely known, suggesting further field work on the species as desirable. The Bulletin is designed especially to be of use to members of the forces who may encounter these strange fishes in the coastal regions of Australia and the Pacific Islands. Field Naturalists who contemplate the study of fish will find in its pages an ideal beginning with this singularly attractive group. The Bulletin is obtainable from the Council's offices, 314 Albert Street, East Melbourne.

Reviewed by H.C.E.S.

LOPSIDEDNESS OF THE NATURALIST (and Other Journals)

The publication (with this present issue) of the Index to Volume 61 of the *Victorian Naturalist* reveals a few interesting facts, e.g.:

1. Not one article or paragraph on Geology appeared for the year.
2. 57 articles and paragraphs were published on zoological subjects (including 34 on birds).
3. 30 articles and paragraphs on botanical subjects appeared, and a third of these were devoted exclusively to orchids.
4. Two members contributed 25 articles and notes between them.

This state of affairs is not due to any editorial bias—every contribution of sufficient merit will eventually find a place in the Journal, and it is always the editor's aim to present a balanced reading "diet" covering the whole sphere of Natural History; he is simply limited by what he receives from the 400 members of our Club, 90% of whom do not write at all.

The journals and proceedings of the various Australian Royal Societies exhibit similar eccentricities: only those of Tasmania, South Australia and Queensland seem to have achieved a harmony among the sciences and to cater for a wide circle of readers. Western Australia tends toward geological and soil surveys, to the exclusion of other matter, Victoria gravitates even more toward geology, while New South Wales specialises in chemical and mathematical research.

J.H.W., *Act. Ed.*

ERRATA

In *Proc. Nat.*, May, 1945: on p. 5, par. 6, for "pilens" read pileus; on p. 6, par. 2, for "pileus" read pileus.

EXCURSION TO ZOOLOGICAL GARDENS

A large number of members attended the Zoological Gardens on April 7, Junior Field Naturalists being much in evidence, and, to swell the throng, came numbers of the public who, we hope, profited by the events of the afternoon.

The interest shown in exhibits was most gratifying, but, owing to the large attendance, the idea of lengthy talks was abandoned, and the party proceeded on a tour around the Austraban Fauna Section and listened to a commentary on the chief topics of interest. Superficial differences between native and tiger cats, *Dasyurus quoll* and *Dasyurus maculatus*, were noted, also the reasons why these two marsupials are not only of different species, but of different genera.

The inaptness of both the vernacular and specific names for many of our fauna came up for discussion, the Feather-tail mouse proving an exception, and demonstrating its ability to justify the name of *Acrobates pygmaeus*. The variety of colouration in one species of snake, particularly the tigers, and the importance of being able to recognize such variability, was pointed out. Admiration was expressed at the three allino Brush-tail possums, *Trichosurus vulpecula*, with normally coloured mother and brother, also at the yellow coloured kangaroo, a "lutino" of the species *Macropus major*. The poisonous spurs of a male platypus were examined by members, and the koalas came in for their usual share of approbation.

The pelicans put on their show at feeding time, whilst the cormorants, etc., demonstrated under-water acrobatics. While amongst the parrots, opportunity was taken by some of the party to become conversant with the eight members of the genus *Platycercus*, all of which are to be found in the aviaries. Of *Neophema*, the Scarlet-chested Parakeets (*N. splendida*) were most admired, whilst the aviary of mixed parrots was voted a most pleasing sight.

At about 4.30 p.m. the majority of members gravitated to the main section of the gardens, presumably to visit our "poor relations" of the Family *Simiidae*, some of the more ardent Bird Observers remaining behind to brush up their ornithology. A vote of thanks was tendered Mrs. Atcock, who had kindly given up her afternoon to assist.

—JACK FINCHES.

CAN RABBITS SWIM?

One summer I was trout-fishing on the Leven River in northern Tasmania, some 30 miles from the coast. It was lonely, burnt forest country with undergrowth, away from all farms with their dogs and cats. Fishing quietly one day where the Leven was some 60 or 70 feet wide and eighteen inches deep, with a moderate current, I saw a moving object ahead of me. Thinking at first that it was a platypus, which are not unusual in the Tasmanian streams, I watched it. I then saw that it was an animal steadily swimming towards the farther bank. When it landed, the rabbit, as it proved to be, quietly moved into the bush. I failed to see any reason for its taking to the water, and decided that it had done so of its own free will.

F. A. CUDMORE.

(To the Editor)

Sir,—In response to Mr. Fraser's question (*Vict. Nat.*, May, 1945, p. 2), "Do rabbits swim?", I would like to recommend Earnest Thompson Seban's book *Wild Animals I Have Known*.—Yours, etc.

E. J. COPE, Caulfield Nth.

The Victorian Naturalist

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No. 739

PROCEEDINGS

The annual meeting of the Club was held on June 11, 1945, at the Public Library Lecture Room, the President (Mr. Ivo C. Hammet) and some 120 members and friends attending.

Excursion reports were given as follows: Queen's Park, with Bird Observers' Club, Miss M. L. Wigan; Kallista (Cryptogamic Botany), Mr. J. H. Willis.

The following were elected as Ordinary Members: Misses N. Carrington, F. Oakes, P. Sweatman; as Country Members: Miss T. Y. Harris, Mr. W. Hartley, Mr. H. Heaphy; and as Associate Member: Master Frank Child.

The President announced that he had pleasure in proposing for honorary membership Mrs. C. H. Edmondson, Miss F. Bage, Mr. Alistair Clark, Mr. F. A. Cudmore, and Mr. David Fleay. These nominations were seconded by the Hon. Secretary.

The President welcomed to the meeting two visiting country members, Mr. W. Hunter, of Bairnsdale, and Mr. J. J. Johnson, of Sydney.

Annual Report and Balance Sheet

The Annual Report was read by the Secretary and adopted on the motion of Mr. A. D. Hardy and Mr. A. S. Chalk, who also read and explained the financial statements. Mr. Chalk later moved the adoption of the Balance Sheet, which was seconded by Mr. H. P. Dickins. The retiring President and Mr. G. Coghill paid tribute to the excellent work carried out by the Treasurer and other officers of the Club during the past twelve months.

Election of Office-bearers

In a few well chosen words Mr. Hammet thanked members for their loyal service to him during his past year of office and said he had much pleasure in vacating the chair in favour of Mr. Stewart, who was the sole nominee for the office of President. Mr. H. C. E. Stewart, in taking the chair, thanked members for the honour received and stated that it would always be his aim to further the interests of the Club.

Mr. Stewart announced that as only one nomination had been received in each instance, he had much pleasure in declaring election to office of the following: Vice-Presidents, Messrs. J. H. Willis and H. P. Dickins; Hon. Editor, Mr. A. H. Chisholm;

Hon. Secretary, Mr. F. S. Colliver; Hon. Assistant Secretary, Miss N. J. Fletcher; Hon. Treasurer, Mr. E. E. Lord; Hon. Librarian, Mr. A. Burke; Hon. Assistant Librarian, Mr. H. Preston. A ballot for Committee resulted in election of the following five out of eight nominees: Mrs. J. J. Freame, Miss I. Watson, Messrs. A. S. Chalk, G. N. Hyam and H. T. Reeves.

Chapman Memorial

The President proposed to close the Memorial Fund at next meeting, and urged members to show their appreciation for Mr. Chapman's work by supporting this appeal and handing contributions to the Treasurer.

New Excursion List

The Secretary solicited suggestions for leaders and localities for the new excursion list, to be in hand by the end of July.

PRESERVING OUR FLORA

Based on personal experience in propagating Australian plants in his Ivanhoe garden, Mr. Hammet's presidential address emphasized the importance of our indigenous flora. He instanced the dying out of wattle at Wattle Glen, where it was once a landscape feature, and the disappearance of the Sandringham flora, and stressed the fact that where native plants disappear, so do beneficial native birds and insects. The only way to prevent total disappearance of many rarer plants is by the cultivation of them in home gardens, and already a move in this direction has taken place among a few patriotic nurserymen. More native species should be offered for sale as more becomes known of their growth habits under cultivation.

A series of very fine slides illustrating some of the forms more easily grown, and other slides showing the preparation of terraced beds and anti-erosion methods, were shown.

EXHIBITS

Miss A. I. Quinsey: *Pterostylis emcinna* (Trim Greenhood) from Dromana.

Mr. Ivo Hammet. Garden-grown native flowers including *Eucalyptus cosmophylla*, *E. leucaxylon* var. *rosea*, *Templatonia retusa*, *Epacris impressa*, *Grevillea buxifolia*.

Mr. T. S. Hart: *Helichrysum* and *Cassinia* (illustrating note in the June *Naturalist*), *Acacia juniperina* with bark shredded by lightning.

Mr. C. French: Orchid *Laelia anceps* from Mexico.

Mr. R. D. Lee: Eight photographs of fungi (*Lepiota gracilentia*, *Xerotus Archeri*, *Mycena subvulgaris*, *Pholiota spectabilis*, *Psathyrella disseminata*, *Cartharellus* sp., *Pholiota* spp.).

Mr. T. A. Griffiths. Fresh water leech captured at Heidelberg Swamps (Feb. 24, 1945), with eggs produced one month later.

SIXTY-FIFTH ANNUAL REPORT

The membership is as follows. Honorary Members, 14; Ordinary Members, 261; Country Members, 112; Associate Members, 44; Members on Service, 32. Total membership 463, being an increase of 83 on the figures (380) for the last report. This is in striking contrast with the decrease of 39 reported just eight years ago (1937) and constitutes an all-time record in the history of the Club!

Members still with the services are: Messrs. K. E. Ash, E. V. Barton, B. S. Bellinger, G. Bickerton, J. L. Bignell, J. A. Blackburn, C. A. Burley, A. Carter, R. D. Clarke, A. Coulson, W. R. Cover, G. J. Dundas, J. Firth, H. Fulton, M. Furze, D. C. Geddes, W. Geroe, D. E. Greenwood, Keith V. Hatley, R. D. Kent, W. N. Kewley, M. F. Leask, R. G. Matthews, R. H. Mew, P. R. McFarlane, H. A. Nixon, C. C. Ralph, T. K. Slatter, B. M. Sloggett, N. A. Wakefield, J. Waterhouse, and R. Whitworth. Some of our lady members are attached to the Women's Services. Possibly others also are serving with the Forces, and the Committee would be glad to have their names.

We record with sorrow the deaths of the following members: Mr. J. Wilcox, Honorary Member (1898-1944), Mr. W. H. Ingram (1919-1945), Miss A. L. Ewins (1931-1944), Miss E. L. Keartland (1935-1944), Colonel B. F. Goadby (1933-1944). Two ex-members of high attainment, Messrs. P. R. H. St. John and D. J. Mahoney, also passed away this year.

Attendances at meetings have lately averaged about 100, so that we have not been able to seat all those who attended. In consequence, the committee successfully negotiated with the Trustees of Melbourne Public Library for sanction to use the lecture room there. The displays of exhibits have been well maintained, and nature notes and questions by members have been more frequent during this past year.

Excursions this year were as varied as the restricted transport facilities would allow, but attendances at all excursions have been excellent.

Volume 61 of the *Victorian Naturalist* has been completed, with published index and list of lectures for the year. Fortunately, we have not been obliged to follow many other societies in the adoption of newsprint, and the quality of paper compares very favourably with that of last year. We are still limited to a sixteen-page journal, but its place in scientific literature has been upheld. An Author Index, commenced last year, has been completed and is now being typed out in readiness for publication. To all who assisted in this work is extended the thanks of the committee.

War conditions again prevented due attention to matters affecting the protection of fauna and flora, but we have considered a

number of important items and contacted the relevant authorities. Among these may be mentioned: Grazing at Mt. Buffalo; Rabbit traps baited with rabbits and set to catch Wedgetail Eagles; Captive Wedgetail Eagles; Investigation into protection of the Wedgetail Eagle; Grazing at Mt. William; Preservation of mangroves at Williamstown; Tea-tree destruction at Mentone; Proposed sanctuary at Dimboola; Destruction of flora at Cardinia Creek; Sale of *Boronia Muelleri*; Burning of forest in the High Country; Preservation of the Aboriginal Cemetery at Coranderk; Additional land for Badger Creek Sanctuary; Preservation of Beaumaris flora when new settlement is begun; Renovation of the grave of Sir Frederick McCoy.

Matters in which the Club was called to collaborate included: Conference of Scientists' Resolution Committee; Proposed Cultural Centre; Advisory Committee to Sherbrooke Forest; Save the Forests Campaign; Chapman Memorial at Maranoa Gardens; Grazing in National Parks; and proposed Commonwealth Geological Survey

Our Honorary Member Mr. C. French was appointed curator of the Maranoa Gardens in succession to the late Mr. F. Chapman. Also during the last year Messrs. J. H. Willis and F. S. Collier were Club delegates to a committee exploring the possibility of forming a National Council of Scientific Societies, while Mr. R. H. Croll, succeeded by Mr. G. N. Hyam, officiated as delegate to the Save the Forests Campaign.

Mr. A. H. Chisholm, Honorary Editor, has been granted leave of absence for a period which will extend into this coming year, and Mr. J. H. Willis has agreed to carry on in his absence.

This year, on the suggestion of former delegates (Messrs Ivo C. Hammet and H. P. Dickins), we withdrew from the Council of Victorian Horticultural Societies, since the meetings were concerned primarily with fixing flower show dates.

We were asked to assist by making lecturers available to the Caulfield Society for Adult Education, Sandringham Junior Labour Club, and sundry clubs and societies in country districts. Members also lectured to the Junior Branch at Hawthorn; this junior club is now functioning well and has celebrated its first birthday. To Mr. and Mrs. J. J. Freame, Mr. S. R. Mitchell, Mr. P. F. Morris and others who have done so much toward the establishment and progress of this Junior Branch we extend our thanks. We have been asked to form junior branches in other suburbs, and the Committee will spare no pains, if this be possible.

The recent formation of a Field Naturalists' Club at Portland is important news and we hope this may be one of many such clubs which will carry the study of natural history into far country districts.

The Club was pleased to congratulate our fellow member, Professor W. E. Agar, O.B.E., on his receipt of the Clarke Medal this year—tangible evidence of his high standing in the scientific world. We record also that two members, Messrs. P. Crosbie Morrison and S. R. Mitchell, were appointed trustees to the National Museum, and that Mr. H. W. Davey was elected an Honorary Member at the last annual meeting.

The Australian Natural History Medallion for 1944 was awarded to Mr. J. M. Black, veteran botanist of South Australia, and the South Australian Field Naturalists' Club arranged the function at which this presentation was made. During the year we contacted a number of interstate societies, and asked them to nominate suitable recipients for the next medallion award, which must still be made from the Victorian Committee; the inclusion, however, of interstate bodies would vindicate the name "Australian Natural History Medallion."

A Wild Nature Show was held at Hawthorn Town Hall in October and was a pronounced success, the proceeds of £56 going to the Lady Mayoress's Red Cross Fund. We have been asked to hold a similar function at Footscray, but the incoming committee will need to consider a policy for the Club in this regard.

The Plant Names Sub-Committee has made definite progress and has almost completed revision of the section *Monocotyledonae*, thus covering about a quarter of Ewart's Flora, but this work is essentially slow and tedious. Comments are invited from interested members who read the findings published from time to time.

A sum of £67/17/3 was collected and given to Badger Creek Sanctuary on behalf of Mr. David Fleay, who allocated it for special breeding experiments. This donation was intended as a gesture of appreciation to Mr Fleay for his work in successfully breeding the Platypus, but he declined to take it for his own needs, and asked that it be added to the Sanctuary funds. Owing to ill-health, Mr Fleay has been unable to attend and lecture at the Club as promised.

With continued occupation of our library room by the R.A.A.F., books have not been so freely available to members, and we have had to lock some cupboards. Several "working bees" helped to achieve order among the large stocks of unbound *Naturalists*; the task is not yet complete, and we shall need to call for further assistance. After the checking of *Naturalist* stocks, the Library Sub-Committee's next task will be a complete stock-taking for the new edition of the C.S. & I.R. Catalogue.

During the year sundry additions to the series of old pamphlets, dodgers, lists, etc., relating to the Club were made, but there must still be large numbers lacking from our files. Book binding is almost at a standstill.

We have received a very valuable series of some 200 water-colour paintings executed by the late Miss Amy Fuller and bequeathed by her to the Club. Miss J. W. Raff, Miss F. Smith, Messrs. I. C. Hammet, F. Smith, G. Coghill, H. T. Reeves, and D. Greenwood presented books, and Mr. S. R. Mitchell presented back numbers of the *Naturalist*, for all of which we extend thanks.

To Mr. McCrae Howitt we give our best thanks for the continued use of his room as a committee meeting place, and we would again record appreciation of Mr. Cooper's work in addressing wrappers for the *Naturalist* each month.

A comprehensive expression of thanks is extended to all who have given of their time and energies toward the advancement of the Club and its ideals.

(Signed) IVO C. HAMMET, President.
F. S. COLLIVER, Secretary.

SUGGESTIONS FOR LECTURETTES AND EXCURSIONS

By S. R. MITCHELL.

I am convinced that the work of the Club could be improved by following more closely a dictum of the late Dr. T. S. Hall, viz.: "Papers given . . . should be introductory and explanatory and should assume no previous knowledge of the subject on the part of the hearers."

A large proportion of those who attend F.N.C. meetings are "beginners," while we have in our ranks members who could supply a wealth of information in simple, intelligible form concerning the subjects in which they have specialized. In our new and spacious meeting hall, and by means of the very fine epidiascope, many natural history specimens, together with photographs and diagrams, can be shown with explanatory comments. I have in mind such subjects as fruits, seeds, leaf variations, fungi, birds' nests, marine and land shells, fossils (e.g., graptolites), life histories of organisms, and the bases of classification (including a simple introduction to the binomial system and international rules of scientific nomenclature).

We might also profitably organize and conduct our excursions so as to cover as many branches of natural history as possible; it is impracticable for one man to impart useful information on one subject to several score of members in the field, when only a small group around the leader can see and hear what is being discussed. Far better to delegate certain specialists to deal with particular phases of nature study, for later incorporation in a general report, i.e., along the lines of some of the Club's earlier outings. For instance, the intimate relationship between the geological nature of a district, the climatic factors, the vegetation and its dependent mammal, bird, and insect populations could be worked out by means of separate observations and records, brought together over a period.

THE MALJEE EVERLASTING IN NEW SOUTH WALES

The lovely rosy-headed *Helichrysum adenophorum* var. *Waddellae* (see *Vict. Nat.*, April 1945, p. 217) has just come to my notice from the Newcastle district, where it was collected on Mt. Sugarloaf, six miles from Kurri Kurri, by Mr. M. W. Nichols in September, 1933. This extends the known range of the (in Victoria alpine) variety by 400 miles and, apparently, establishes the species as also New South Welsh for the first time. I am indebted to Mr. W. Hunter, of Bairnsdale, for communicating this interesting record, backed up by a good specimen.

J. H. WILLIS.

FIELD NATURALISTS' CLUB OF VICTORIA
BALANCE SHEET ON 30th APRIL, 1945

LIABILITIES		ASSETS	
Late Dudley Best Fund	£50 0 0	Arrears of Subscriptions—	
Subscriptions paid in advance	34 12 4	Estimated to realize	£40 0 0
	£84 12 4	Advertising charges due	4 0 0
Balance, being surplus of Assets over Liabilities	1,817 8 9	Bank Current Accounts	108 1 1
		Investments—	
		Commonwealth Bonds:	
		Late Dudley Best Fund	£50 0 0
		General	750 0 0
			800 0 0
		Library, Furniture and Epidiascope—	
		At insurance value	800 0 0
		Stock on hand of Books at valuation—	
		Fern Book	£30 0 0
		Fungus Book	15 0 0
		Platypus Book (Reprints)	5 0 0
			50 0 0
		Water-colour Paintings by late Miss Amy Fuller (insured for £200)	100 0 0
	£1,902 1 1		£1,902 1 1

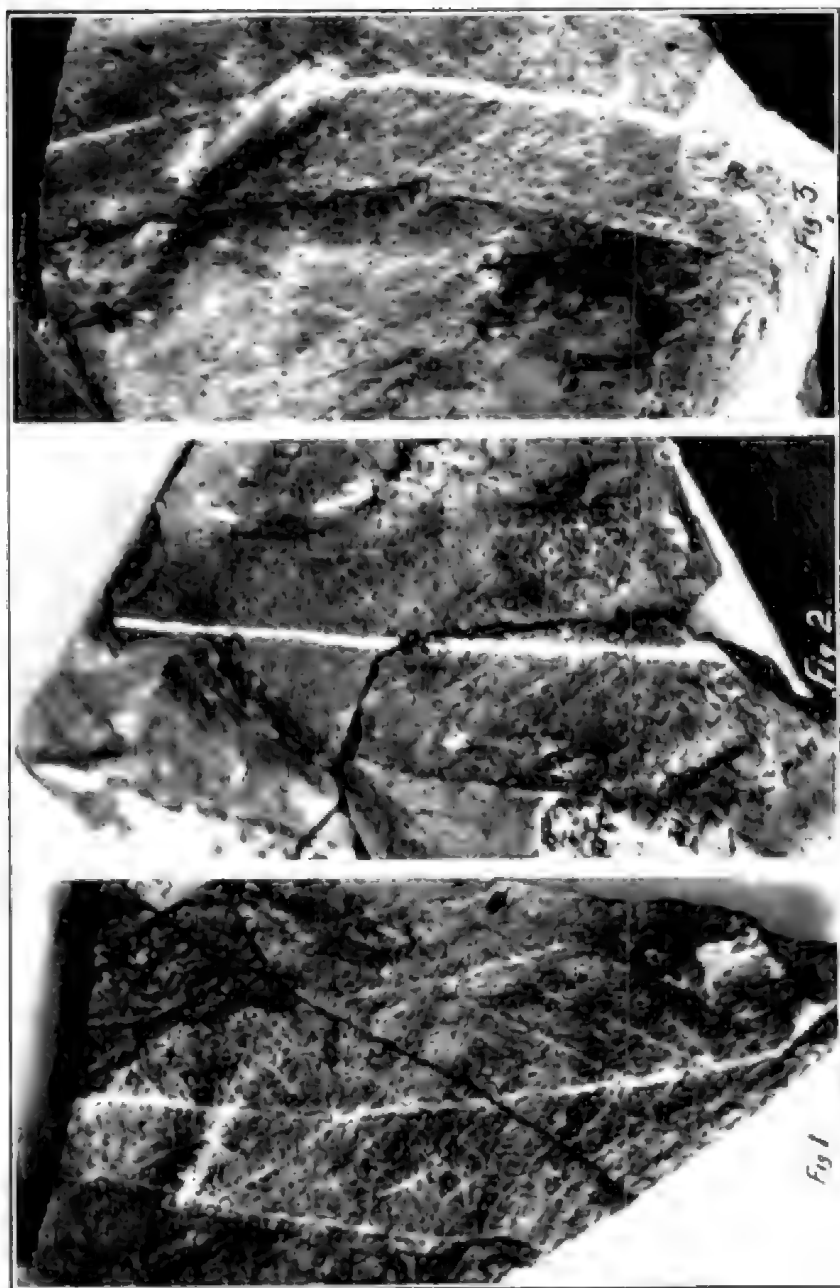
Balance Sheet

Audited and found correct on 1st June, 1945.

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

E. E. LORD, Hon. Treasurer.

PLATE IV



Fossilized *arrabidae* leaves from Purtila, Victoria, Dec. 1942

Photos: F. S. Collyer.

NOTES ON FOSSIL LEAVES OF *EUCALYPTUS* FROM
BULLA AND DAYLESFORD

By the late F. CHAPMAN and F. S. COLIVER.

Bulla Specimens

In view of additional material of well-preserved fossil leaves of *Eucalyptus* having been obtained by the junior author from the original locality of Bulla, in December, 1942, it seems advisable to publish further data on these examples. They are so well preserved that it was possible to photograph the fossils for illustration purposes. The clay bands containing *Eucalyptus* leaves occur in two sheets of about 8 ft. in thickness, light blue resting on dark brown, this brown bed being especially rich.

Dr. A. V. G. James,¹ the original discoverer, also records among these fossil remains acacias, ferns and other plants; the eucalypt leaves were described by Dr. R. T. Patton.² Dr. James refers to the bed as a lake deposit, the exact age of which is not certainly known, except that it is probably *Post Older-Basaltic*.

In his original remarks, Dr. Patton figures four examples (in outline) of these fossil leaves and states that "all of the leaves from Bulla belong to one general type." Later he says: "The Bulla leaves bear a resemblance to *Eucalyptus rostrata*, Sch., which is found growing along the river close by . . . but it would be unwise to say that the fossils are those of *E. rostrata*." With the present material, we think it is now possible to refer these fossil leaves to this species: by the character of the venation (i.e., midrib, secondary and tertiary veins), the angle of the secondary veins to the midrib, and the general shape of the leaf.

The examination of leaves of living *E. camaldulensis* Dehn. (syn. *E. rostrata* Sch.) from the same locality, viz. Deep Creek, Bulla, shows variation in angle of emergence of secondary vein to midrib from 30-50 degrees, i.e., 40° average. The intramarginal vein is wide, as in the fossils, and the midrib as seen from the back is also wide and strongly developed.

Daylesford Specimens

In this journal, one of us (Chapman³) remarked under *E. obliqua* L'Herit.: "This form (*E. obliqua*) appears to have been afterwards named by McCoy⁴ as *E. pluti*." After a careful re-examination of the figured type specimens of fossil *E. pluti* McCoy, which is stated by McCoy to be "extremely abundant in the Pliocene Tertiary, purplish, argillaceous strata of the gold fields at Daylesford," and careful measurements of the structural details figured by him, we agree that *E. pluti* McCoy, should now be regarded as distinct from *E. obliqua*. The fossil species has a proportionately broader leaf, with secondary veins at a greater angle from the midrib.

Undoubtedly, as McCoy suggests, *E. pluti* is related to *E. globulus* Labill. In the living *E. globulus* there are two more or less marked types of leaves: the juvenile, being comparatively large, membranous, and ovate; and the mature leaf, which is coriaceous or leathery, generally long-lanceolate or falcate, with the secondary venation closer together and emerging from the midrib at a more or less acute angle.

In the leaves that McCoy figures (of *E. pluti*) there seem to be included leaves of a fairly long falcate character, whilst others are shorter, tending to ovate, and in one case having a rounded or blunt tip—evidence of the affinities, if not identity, with *E. globulus* (*sensu lato*). From the limited material at present available for comparison, however, we prefer to regard *E. pluti* as a distinct species.

REFERENCES

1. *Proc. Roy. Soc. Vict.*, Vol. 32 n.s., pp. 323-349, 1920.
2. *Ibid.*, Vol. 31 n.s., pp. 362-363, 1919.
3. *Vict. Nat.*, Vol. 42, p. 231, 1926.
4. *Prodr. Pal. Vict.*, Dec. 4, T.39 (figs. 1-3). 1876.

DETAILS OF THE FIGURED SPECIMENS FROM BULLA

1. Actual length of leaf 46 mm.; width at broadest part: 18 mm.; general shape: long ovate, tapering; midrib width: 1 mm.; secondary veins in 10 mm.: 6-7; intramarginal vein width: 1.5 mm.; interspaces irregularly broken up by secondary veins; area between secondary veins is broken up by moderately reticulated tertiary veins, making an aerolate area; glands: very dense under the microscope, approx. 20 per sq. mm.
2. Actual length of leaf: 40 mm.; width at broadest part: 21 mm.; general shape: rather more broadly ovate at base than No 1; midrib width: 1.25 mm.; secondary veins in 10 mm.: 6 (measured near the base); intramarginal vein width: 1 mm.; interspaces irregularly broken up, but not so marked as in Nos. 1 and 3.
3. Actual length of leaf: 55 mm.; width at widest part: 18 mm.; top of leaf: 16.5 mm.; general shape: a much larger type of leaf than Nos. 1 and 2, originally of considerable length and recurved; midrib width: 1 mm.; secondary veins in 10 mm.: 8; intramarginal vein width: 1.75 mm.; interspaces have reticulation of tertiary veins very marked.

SCHOOL FOREST CAMPS

At the Children's Welfare Exhibition held in Melbourne in May, a model of the Bright school forestry camp was shown. It is typical of the experimental camps established by the Forests Commission for the instruction of youth in forestry. The camps are voluntary and are attended by secondary schoolboys during school holidays. The field work done at the camps varies according to the season, but planting, thinning, pruning, coppicing and bush-fire prevention work are all carried out. Expert officers of the Forests Commission instruct the boys in forestry and what it means to the community. It is the policy of the Save the Forests Campaign to urge the Government to extend the plan for the education of the youth of the State in forest conservation by giving each secondary schoolboy the opportunity of spending three weeks of the school year in an organized school forestry camp.

THE APPLE BOX OF VICTORIA

(Eucalyptus Bridgesiana R. T. Baker)

By A. K. CAMERON

Because of the widespread occurrence and the large number of specific forms of the genus *Eucalyptus*, together with the fact that many early type specimens exist only in European herbaria, a vast and complicated synonymy of the genus has developed. A species concerning which the confusion is worse than in most is the Apple Box of Victoria (which also extends through New South Wales to Stanthorpe in Queensland) for which the specific name *E. Bridgesiana* R. T. Baker must be adopted in place of the (at present) commonly accepted *E. Stuartiana* F.v.M. This paper attempts to sort out the tangled threads and to show that *E. Stuartiana* F.v.M. must be abandoned as a specific name.

The story begins in 1806 when J. J. Labillardiere published the second volume of his *Novae Hollandiae plantarum specimen* (p. 13) in which he described his *E. ovata*, but by a slip of the pen gave the locality as "terra Van-Leuwin" (Western Australia) instead of "terra Van-Diemen" (Tasmania). Labillardiere does not appear to have corrected this in any of his published works but specimens collected by him and labelled correctly exist in the Paris Museum. The mistake appears to have gone undetected until J. H. Maiden inspected the Paris Museum specimens and later published the facts in his *Critical Revision of the Genus Eucalyptus* (Vol. 3, pp. 136-7, 1916) 110 years after the original description. In the meantime botanists working on Tasmanian and mainland eucalypts have applied a variety of names to *E. ovata* (the "White Gum" or "Red Gum" of Tasmania and "Swamp Gum" of Victoria, New South Wales and South Australia).

In 1844, Sir Joseph Hooker published (*London Journal of Botany*, Vol. 3, 499) his description of *E. Gunnii*, the "Cider Gum" of Tasmania and a valid species which was unfortunately confused by later writers. In 1859, Miquel published (*Nederlandsch Kruidkundig Archief*, Vol. 4, p. 131) F. von Mueller's description of *E. Stuartiana* for the first time. This description is important because it clearly states that the species is based on specimens collected by Charles Stuart in Tasmania—no other locality is quoted. I have seen specimens at the Melbourne National Herbarium collected by Stuart in Tasmania and which have been labelled by Mueller "*E. Stuartiana*" and later "*E. Gunnii*." The specimens seen by Miquel were almost certainly selected from the same suite as were these (Herb. Melb.) specimens, which are *E. ovata*, Labill. In Melbourne Herbarium there are also a number of Victorian *E. ovata* specimens, collected

subsequently and labelled by Mueller *E. Stuartiana* F.v.M. So that clearly we have *E. Stuartiana* F.v.M. = *E. ovata* Labill.

In the same paper Miquel has a brief reference to *E. acervula* Sieb., but the locality given (Pienty Ranges, Vic.) and named specimens in various herbaria show that the plant he was referring to is also *E. ovata* Labill., i.e., *E. acervula* Miq., non Sieb. = *E. ovata*. *E. acervula* Sieb. is a N.S.W. Stringybark. Again (in the same paper) there is a reference by Miquel to *E. Baueriana* Schau. which he quotes as occurring in Tasmania and synonymises with *E. citrifolia* F.v.M. Herb. Specimens of the latter species labelled by Mueller are *E. ovata* Labill. Thus *E. Baueriana* Miq., non Sieb. = *E. citrifolia* F.v.M. = *E. ovata* Labill.

In 1860 Sir Joseph Hooker published his *Flora Tasmaniae* and made the same mistake as Miquel by referring this species (*E. ovata* Labill.) to *E. acervula* Sieb., so that we have *E. acervula* Hook. f., non Sieb. = *E. ovata* Labill. Notwithstanding the pre-occupation of the name by Sieber, *E. acervula* Hook. f. persisted in botanical literature until very recent years.

In 1862 appeared the second volume of Mueller's *Fragmenta Phytographiae Australiac*. Here Mueller gives a lengthy description of what he conceived to be *E. Gummi* Hook. f. and reduces *E. Stuartiana* F.v.M., *E. acervula* Hook. f. and *E. Baueriana* Miq. to synonyms of that species. What Mueller did, in effect, was to lump *E. ovata* Labill. and *E. Gummi* Hook. f. into one species. It is doubtful if he ever knew what true *E. Gummi* really was. The description is important, however, because of the synonymy of *E. Stuartiana* F.v.M. with *E. acervula* Hook. f., i.e., with *E. ovata* Labill.

Next came Bentham, the third volume of whose *Flora Australiensis* was published in 1866 and included the eucalypts. Bentham restricts *E. Gummi* Hook. f. to the "Cider Gum" of Tasmania, but includes the mainland form now known as *E. glaucescens* J. H. Maiden et W. F. Blakely. He also resurrects *E. Stuartiana* and applies to it a very wide description which includes true *E. ovata* Labill., *E. Bridgesiana* R. T. Baker and some *E. viminalis* Labill. (Bentham has a reference to "*E. ovata* Labill.," but, misled by the locality error, dismisses it as being insufficiently described.)

The confusion was now horrible and Mueller made it worse when he redescribed *E. Stuartiana* in the *Eucalyptographia* (Decade iv, 1880). This description excluded the references to *E. ovata* and *E. viminalis* (made by Bentham) but a new tree was introduced—the Silver-leaved Stringybark, *E. cephalocarpa* W. F. Blakely, thus Mueller's description of *E. Stuartiana* now included both *E. Bridgesiana* R. T. Baker and *E. cephalocarpa* W. F. Blakely. Mueller had thus completely abandoned his earlier (and correct) belief that *E. Stuartiana* was synonymous with *E. acervula* Hook. f., non Sieb., i.e. *E. ovata* Labill.

Then came R. T. Baker who, arguing from entirely wrong premises, gave the Apple Box the specific name it must now carry—*E. Bridgesiana*. Baker neglected the earlier literature and worked solely from the *Eucalyptographia* description. His reason for so doing is logical enough, viz., a certain amount of confusion already surrounded the name and Mueller's latest writings are most likely to be his most carefully considered views as to the correctness of the specific description. Baker overlooked the fact that the Baron was frequently a law unto himself concerning botanical nomenclature. Baker saw that the *Eucalyptographia* description of *E. Stuartiana* included two species—the Apple Box and the Silver-leaved Stringybark, but considered the description to be much more applicable to the latter than to the former. So strong were Baker's views that he argued that *E. Stuartiana* (of *Eucalyptographia*) was the Silver-leaved Stringybark. Now, continued Baker's argument, we have a tree (the Apple Box) which has not yet been separately, specifically, described and so *E. Bridgesiana* R.T.B. was born (*Proceedings of the Linnean Society of New South Wales*, Vol. 23, p. 164, 1898).

Finally came J. H. Maiden, who dealt with the confusion in Volume 3 of his *Critical Revision of the Genus Eucalyptus*. Maiden points out the confusion of the Apple Box and the Silver-leaved Stringybark (*E. cinerea* F.v.M. var. *multiflora* J. H. Maiden, later *E. cephalocarpa* W. F. Blakely) in the *Eucalyptographia*, but, with a cheerful disregard for the international laws of botanical nomenclature, adopts *E. Stuartiana* as the name for the Apple Box, dismissing *E. Bridgesiana* R.T.B. as "taxonomic surfeit." W. F. Blakely (*A Key to the Eucalypts*, p. 145, 1934) simply followed Maiden.

So, having sorted out the threads of this strange eventful history and having, I hope, "blotted out" *E. Stuartiana* from the list of eucalypts (see Maid. Crit. Rev. III, p. 67), I give a summary of the synonymy discussed in these notes:

- 1859. *E. Stuartiana* F.v.M. ex Miq. *Ned. Kruidk. Arch.* = *E. ovata* Labill. *Nov. Holl. Pl. Sp.* 2.
- " *E. acervula* Miq. *Ned. Kruidk. Arch.*, non Sieb. = *E. ovata* Labill.
- " *E. Baueriana* Miq. *Ned. Kruidk. Arch.*, non Schau. = *E. ovata* Labill.
- " *E. citrifolia* F.v.M. ex Miq. *Ned. Kruidk. Arch.* = *E. ovata* Labill.
- 1860. *E. acervula* Hook. f. *Flora Tasm.*, non Sieb. = *E. ovata* Labill.
- 1862. *E. Gunnii* F.v.M. *Fragmenta* 2, non Hook. f. = *E. ovata* Labill.
- 1866. *E. Stuartiana* Benth. *Flora Aust.* 3 = *E. ovata* Labill.
E. Bridgesiana R.T.B.
E. viminalis Labill. (p. part.)
- 1880. *E. Stuartiana* F.v.M. *Eucalyptogr.* Dec. 4 = *E. Bridgesiana* R.T.B.
E. cephalocarpa W.F.B.
- 1880. *E. Gunnii* F.v.M. *Eucalyptogr.*, Dec. 4, non Hook. f. =
E. ovata Labill.
E. Gunnii Hook. f. (?)

1898. *E. Stuartiana* R.T.B. *Proc. Linn. Soc. N.S.W.* 23, non F.v.M. = *E. cephalocarpa* W.F.B.
 1915. *E. Stuartiana* Maid. *Crit. Rev.* 3, p. 67, non F.v.M. = *E. Bridgesiana* R.T.B.
 1934. *E. Stuartiana* W.F.B. *Key Encyclypt.*, non F.v.M. = *E. Bridgesiana* R.T.B.
 (*E. Stuartiana* McMahon *Merchantable Timbers of Queensland* = *E. Cloeziana* F.v.M.)

NOTE.—The group *E. ovata* Labill., as used in this paper, includes *E. maculosa* R.T.B., *E. neglecta* J.H.M., and *E. Kitsoniana* (J. G. Luchm.) J.H.M., which were later separated as distinct species. Similarly, *E. viminalis* Labill. includes *E. rubida* Deane et J.H.M. and *E. Dactylosymplectena* J.H.M.; while *E. Gunnii* Hook. f. includes *E. glaucescens* J.H.M. et W.F.B.

IN A FOREST GULLY

The following is an extract of a letter from a country member, Dandenong Ranges:

"The railings of the bridge over our Mirror Pool and cross-poles have been studded with the most lovely pale blue fairy toadstools [*Amygena mlesnupta*, 'Pixie's Parasol.'—Ed.]. They are fading now, but I saw one old log covered with fresh ones on Friday. There is a heliotrope one here that attracts me too. It has a long stem. I had found them years ago, and did not see them again till this year. The pale blue ones are quite common here.

"I see 'Lady Frances' lyre-bird from time to time in our gully, but I do not know where she is nest building this season. I am half hoping it will be up a tree again, as twice recently neighbours have seen a fox here, and the other night we heard one ourselves. 'Francie' is much too sick and canny to be caught by a fox, unless she has a nest low down. Her plumage is beautiful this season. It shines like satin. Her back is richly chestnut brown and her breast like grey sequins in the sunlight. 'G. for George' (her son) was here all summer. He is very, very tame, but his territory is apparently not here and I do not know where it is. He 'blick, blick, blick'-ed down stream on Anzac Day. That is the last time we have seen him, though we heard loud singing from the gully at dusk on V-E Day. For two days after that there were no scratchings in the gully and I thought 'Francie' had departed too. But I was working in the lower garden one afternoon when I heard 'Quok qui! Quok qui!' coming nearer and nearer up the gully, so I went down, and sure enough there was 'Francie' in her old haunts near the Mirror Pool.

"The gully is full of interest. Time and time again I have disturbed an owl in the tree ferns. I think it must be a Masked Owl. It is always alone."

ALBATROSS AT FRANKSTON

On Sunday, May 13 (a day of heavy rain), a large black albatross was observed lying in the sand in Kanook Creek, about 100 yards from its entrance. The bird did not seem sick or injured in any way, but took little notice of bystanders, some of whom stood against it and even touched its tail, when the only reaction was a slight elevation of the head feathers. I do not know whether the albatross got away to sea again after the weather cleared.

A. K. FAIRHEAD.

"SCRATCH COCKY" (?)

It is customary, I presume, to exclude anything with an economic background from the pages of a purely scientific Natural History journal. The worthy potato which provides food for the body must give place to the orchid which provides food for the mind. The humble moulds and fungi may be mentioned provided there is no reference to the edible mushroom of the greengrocer's shop or to the economically important *Penicillium*. The depths where diamonds form and gold is made must contain only fossils. Birds that grace the pages of an Agricultural Journal should naturally give place to other kinds in a Naturalists' Magazine. With this in mind I am in some doubt as to whether it would be *de rigueur* to say something about *Kakatoë galerita*, the Sulphur-crested or White Cockatoo.

In the days of our pioneers, the cockatoo added flavour to many a meal, and there are still amongst us those who speak in rapture of the merits of cockatoo pie. Since its departure from the menu, however, *Kakatoë galerita* has entangled himself and herself rather seriously with agriculture and in so doing risks exclusion from the pages of the *Victorian Naturalist*. Personally I feel that this exclusion is merited.

The Sulphur-crested or White Cockatoo is a distinguished representative of the Parrot family and destined long to remain so in virtue of its longevity, its inherited and constantly acquired cunning, its wide selection of food and feeding grounds and its communal habits, to say nothing of its safety in high flying, its nesting in places very difficult of access and its system of sentinels to give warning of danger.

I am reluctantly and intimately very closely acquainted with one of these cockatoo communities numbering at least five hundred individuals, which I have come to regard as a community of highly destructive brigands. How the balance of Nature would be disturbed in this particular neighbourhood if these white-coated black-hearted ravagers were eliminated I cannot conceive. *How* to eliminate them is the question. In comparison, the rabbit is a very accessible pest. But let me list my charges against this particular cockatoo community from New Year's Day to New Year's Eve, the whole year round.

The fields in January are busy with the heat and sweat of human toil. The stooks and stacks newly harvested for hay and grain make fine plunder for the cockatoo. From summer's early sunrise, till the sentinels give warning that Farmer Smith is on his way, five hundred cockatoo crops are bulging with a thousand ounces of the new season's grain, not to reckon another thousand ounces scattered from the tops of fifty to one hundred stooks or torn from the sheaves of open stacks. With loud protests the

brigands depart to survey the countryside from the tallest treetops, with scouts posted in a half-mile radius to see whether Smith carries a gun or to discover his intentions. A mile away Brown's young potato crop is a patch of symmetrical green and brown in a frame of yellow grassland. A cockatoo must have his greens to be in keeping with modern dietetics, so the protests against Smith are hushed and the soft white wings carry the silent horde over to Brown's, where the scouts spread out. The young potato plant three to six inches above ground evidently provides some cockatoo delicacy of which small amounts only are required, but, to get this, the stalk must be nipped across close to the ground or pulled out with the young roots attached. Sometimes the ground is dug deeply enough to unearth the potato set, which is worth a few bites too. When a quarter to half an acre is so treated, a scout, who has recently left his greens to relieve a comrade on the treetop, gives warning and the pirates are on the wing again. An hour or so may now be spent frolicking in the trees along the creek with sentinels strategically posted. Then the gang divides, some to Jones' stooks or stacks, since it has just been reported that Jones has driven off in his car, others to the high banks to feed on thistle seeds, and some again to sample a field of rape a mile further on, or an unguarded field of peas where the going is sweet and easy until an enraged farmer tries a long-range rifle shot.

Midday and early afternoon is usually a resting time and a plotting time for the late afternoon depredations, with much chuckling and cacophony. Further onslaughts on stooks and stacks and potato crops wind up the day, when the various sections of the community wing their high way home from a three or four miles radius, well out of gun range, to the tallest treetops by the creek along the forest edge, where there is quite a concert of screeching and chattering about the day's looting. Some half a bag of oats has been eaten or scattered, a quarter to half an acre of potatoes has been damaged, unguarded vegetable plots raided and sheep and cattle robbed of the protein richness of thistle seeds. This goes on for seven days a week through January and February. Through March, April, May and June constant raids on hay stacks continue, the stubble lands are combed over and over to gather the grains they threshed from the sheaves in the months gone by. As potato crops mature, they are again attacked, the ground dug aside with powerful beaks and near-the-surface tubers bitten and rendered unfit for the domestic market. Apparently not much potato is eaten. The juice is extracted from the munched solid substance which is left in little heaps on the ground. These exposed, sun and frost damaged tubers are passed by on the morrow for newer and fresher unearthed samples, and so the damage goes on.

The sowing of grain crops provides new opportunities for further plunder. The stack tops have been well excavated, giving access to rain and water damage, since grain was less easily accessible, except where stacks are opened for stock feeding. Thus the sheaves whose heads should be heavy with grain for the ploughman's team or for the winter milk supply from the dairy herd are threshed in a matter of minutes by a flock of hungry cockatoos. But over the hill in neat drill rows the oats for the next season's crop are being sown. How nice of Smith to sow it all in such convenient channels; it saves a hungry cockatoo such a lot of walking about and digging! But that is not all. What "cocky" misses on the sowings, he picks up on the roundabout, and with the autumn rains the first green blade tells where the overlooked seed lies hidden. Here are cereals and greens together, what could be better? When summer comes, what should have been a three-tons-to-the-acre crop is barely two, so that the cockatoo community may go fat into the winter.

Across the fence, Brown has a similar story. His potato crop averaged five tons to the acre, if he left out the acre damaged by cockatoos. But the pasture lands meanwhile have not been overlooked. In the bare fields of autumn, the relatively large seeds of Subterranean Clover are easy gathering and, in the search, the seeds of rye, trefoil, clover, native and other introduced pasture plants are not disdained.

July, August and September are rather lean months for the cockatoo, but he stays on. The thistle patches on the hills and along the creeks are all gone over again, but the onion grass patches in the pastures and on the roads furnish corns for the digging and help to keep the sulphur crest and the white feathers together till the early potato crops and the heading grain crops are ready in October and November. The December menu is that of January.

Yes, the Sulphur-crested Cockatoos are a pest the whole year round. How they managed to exist before agriculture came to this country is difficult to imagine, so dependent do they now seem on man's reluctant co-operation. They have been destructive from the earliest days of settlement. From their habit of perching around the cultivation boundary, screeching for their share of the products, comes the term "cocky" (farmer), given to the land squatters who in the early days of settlement perched on the boundaries of the early selections and land grants, demanding their share of the land.

But what to do about my particular cockatoo neighbours who greet my coming with such protests of disapproval and with whom I am determined not to share the fruits of my toil? My store of bad language won't last for ever, and their determination to maintain their social security has already raised my blood pressure.

Of course, I've shot a few, and they haven't yet learned to spring a rabbit trap without being caught. With the coming of the white man and sheep, the New Zealand Kea bird learned his evil habits and went toward extinction with a price on his head. The slow-witted Kea was an easy mark compared with *Kakatoï yalerito*. The scouts soon learn that a scarecrow is but a thing of rags and straw.

Poisoning is difficult. The quickly acting poisons defeat their own object: the first strychnine convulsion with flapping of wings sends the protesting horde over to the neighbour's holding where there is no poison. Arsenic acts more slowly and should be more effective, but awaits a trial. Cockey is very suspicious, evidently possessing a good memory with his long years of cunning. I have not known apples poisoned for rabbits to cause any cockatoo casualties. I hesitate to take the risk of destroying other birds who are my friends and helpers and who earn a share in the cultivated products of the soil.

I cannot think of any insect pests destroyed, or help given, by the cockatoos, except it be in spring and early summer when, in strange black and white combination with an almost equally numerous flock of crows, they seem to join in attacking army worms or "cut worms" in the pastures.

Years ago I saw a cartoon depicting several angry, bewhiskered farmers in patched up aeroplanes, leaning out of the cockpits with long sticks in their hands and whacking the feathers out of a flock of cockatoos in wild disordered flight. I have often wished to be able to do just that! It is said that shot guns, used persistently over a period where the birds gather for their night roosting, will eventually scare them into leaving the district, but this needs valuable time and persistence, not to mention ammunition.

I have heard of cruelties being practised and that the Society for the Prevention of Cruelty to Animals had given warnings. To leave a cockatoo caught in a rabbit trap will keep the gang away from that spot till the trapped bird dies. I have heard, too, of a procedure called "firing a cocky." To the leg of a trapped bird is fixed a fine wire with a kerosene-saturated rag attached; the rag is ignited and the bird let go while the flock circles around. I cannot imagine this having much effect, apart altogether from its cruelty.

Maybe I could try to begin a campaign to reintroduce the cockatoo to the family table. Many of my well fed community should afford good eating, provided their years were not too numerous. By some means, yet to be devised, I am determined to rid myself and the neighbours of this persistent nuisance. Perhaps I'll end up with psittacosis, but then there is sulphadiazene and penicillin to aid me in this struggle for human rights. "Scratch Cockey" (?)!

—F.F.D.

RANDOM NOTES

By EDITHE COLEMAN, Blackburn.

"Anting" by Birds

The article on fumigation by Red-browed Finches (*Vict. Nat.*, May, 1945) is most interesting and suggestive.

In 1932 the *English Field* published a note on wood-ants as "fire-extinguishers." It was noted by a correspondent that a live cigarette-butt placed on one of their leafy nests was quickly extinguished. When the experiment was repeated, ants were seen to surround the glowing butt, and to squirt out clouds of acid (the smell of which was very powerful) and so to extinguish the "fire."

According to the writer, the acid ejected by those wood-ants contained 60 to 70 per cent. of pure formic acid. While it is quite feasible that the fire was extinguished by the ant-spray, we must assume, I think, that the ants merely used their weapon as they would spray an enemy. Being moist, it acted as a small fire extinguisher. Possibly when birds ant themselves the same method of protection is adopted by the ants, and having learned by experience that the acid is an insect repellent, birds make full use of it.

Richard Jefferies, in one of his last essays, appears to be one of the first to touch on the subject. Writing about wild bees and ants, he says:

"Is it correct, or only a generalisation, that insects like ants and hive bees, who live in great, well-organized societies, are more free from the attacks of parasites than the comparatively solitary wild bees?"

"Ants are indeed troubled with some parasites, but these do not seem to multiply very greatly, and do not seriously injure the populousness of the nest. . . . Have these highly civilized insects arrived in some manner at a solution of the parasite problem? . . . Ants live in communities which might be likened to a hundred Londons dotted about England. . . . Their immense crowds, the population of China to an acre, do not breed disease. Every ant out of that enormous multitude may calculate on a certain average duration of life, setting aside risks from battle, birds, and such enemies.

"Microbes are unlikely to destroy them. . . . In some way ants have found a way of accommodating themselves to the facts of their existence. . . . Are they more intelligent than man? Possibly we may yet use the ants, or some other clever insects, to find out the origin of that fatal parasite which devours the consumptive. . . . Has formic acid ever been used for experiment on bacilli?"

"It is the ant acid; they are full of it. It is extracted and used for some purpose abroad. *Perhaps the odour is repellent to parasites.*" (Italics mine. E.C.)

Mr. A. H. Chisholm took up the subject of "anting" by birds in 1927, and his publications elicited records from Germany, America, etc. Casual paragraphs appeared in German papers from 1911. Documented American reports, Mr. Chisholm found, went back to 1876, and one, by Gosse (1847), deals with the use, on the feathers, of bruised lime rinds which were rubbed under the wings.

Jefferies died in 1887. His writing on country life may be said to date from about 1878 (*The Gamekeeper*). The only report of "anting" which Jefferies is likely to have seen is the one by Gosse, published in London, which dealt with lime peel, not ants.

Noting the number of birds that bathe so thoroughly, even in winter, and dust-bathe in summer, one feels that they deserve to be free of parasites.

In this garden a pair of Java doves, perched, with widely spread wings, on a wooden bar just within reach of a garden spray, leaned right over, first on one side, then on the other, lifting and sloping each wing so that its under surface should be sprayed. It seemed surprising that they could keep

their balance at such an alarming angle. It was as though a man should lower his body to one side and raise his arm with the arm-pit exposed to the spray.

It has been interesting to watch, year after year, the marriage flight of large swarms of sugar-ants which emerge from two nests through the hard ground of our drive. They crawl away to blades of grass, scrambling up these and twigs—anything that will give them a good "take off." Birds capture some of them, yet not once have we witnessed any "anting."

Lizards and Tail-shedding

Referring again to the five little Healesville lizards which waved their tails, presumably as a tempting bird-bait (*Vict. Nat.*, Dec., 1944):

The habit is alluded to in a book by W. P. Pyecraft, F.Z.S., A.L.S. In *The Story of Reptile Life*, on p. 74, he writes: "Most lizards, like the Tuatera, are remarkable for their ability to part company with their tails at a moment's notice. When threatened, this organ in many species is temptingly raised, as if to invite, or perhaps challenge, the enemy to seize it" (Italics mine, E.C.)

It was pleasing to read this confirmation of my suggestion regarding the usefulness of a waving tail. It has been suggested to me that the habit is not protective, that lizards which lose their tails in this way will not have the same protection next time.

I think the chances are that such a "near miss" does not take place very often in the life of each lizard. When next the danger threatens a new tail will be ready to serve the same purpose, if not quite so effectively.

We may say, I think, that the waving tail will serve Nature's purpose if it enables only one of those five lizards to escape. Even should the lizard be wholly captured next time, the chances are that, in the meantime, it has played its part in the production of the next generation.

The lack of a tail should be no handicap in winning a mate. Its life will then have no value in Nature's rather cruel scheme of things. She cares nothing for the individual. It's the species she guards.

CAN RABBITS SWIM?

The most favoured burrowing grounds for rabbits are the banks of creeks—soft digging, green picking in the driest times and riparian bushes, blackberry, etc., for shelter. Depth of burrowing, roots of trees and the fear of starting major erosion discourages complete digging out. All too infrequently Nature solves the problem from time to time with widely spreading floods, killing the young and silting in the burrows. It is then that one realizes how rabbits *can* swim, when with dogs, guns and sticks the hunt is on. At these times rabbits prove strong swimmers, even in a fast current, and often gain safety on floating or stationary debris or on patches of ground above water. They lack, however, the climbing grip of many rodents and find difficulty in climbing on to logs, trees, or up steep embankments in flood waters, so large numbers are drowned. The exhaustion of swimming, the cold of immersion, and the added weight of wet fur greatly retard the speed of those that reach dry land and make them an easy prey even for the dog who is usually an "also ran" in the normal rabbit hunt.

—F.F.D.

[The Editor would here acknowledge a letter from Mrs. Frances Esperson, of Bungaree, who reports having twice witnessed rabbits that jumped into and swam across a stream.]

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PROCEEDINGS

The monthly meeting of the Club was held on July 9, 1945, at the Public Library Lecture Room, the President (Mr. H. C. E. Stewart) and some 160 members and friends attending. Mr. Stewart, commenting on the record attendance, took the opportunity to welcome visitors, new members and, in particular, Mr. P. Bibby, who had been absent for some months owing to ill-health. He read a telegram from Mr. A. H. Chisholm conveying greetings to the Club and new President, and intimating that he would be back in Melbourne soon.

Excursion reports were given as follows: Botanic Gardens, Mr. H. C. E. Stewart; Zoology School (Melbourne University), Mr. F. S. Colliver (for Prof. Agar); National Museum, Mr. F. S. Colliver (for the combined leaders).

The following were elected as Honorary Members: Mrs. C. H. Edmondson, Miss Freda Bage, Mr. Alister Clark, Mr. F. Cudmore and Mr. David Fleay. Mr. Cudmore, being present, received from the President the Certificate of Honorary Membership; others will be forwarded in due course. Miss G. M. Bryning, Miss E. R. Cox, and Mr. R. V. Smith were elected as Ordinary Members.

Mr. Stewart announced that the Club was represented at a service recently held in Sydney to commemorate the 100th anniversary of the death of John Gilbert, and a wreath of Australian wild flowers was placed on the memorial.

In connection with the Australian Natural History Medallion for 1945, the President announced that the Club's nominee was Mr. C. P. Mountford, well-known anthropologist of Adelaide. Seven other nominations had been received, mostly from societies outside Victoria.

Mr. J. H. Willis outlined the proposal for a "Members' Question Night" at the next meeting. Members were asked to write down brief Natural History queries of general interest, sign, and hand them to the Secretary before commencement time of the August meeting. A choice of these would be read out by the President and replies invited from the floor of the hall. This would enable discussion of many problems.

NATURE NOTES AND QUESTIONS

1. Miss M. L. Wigan recorded the fact that two nests of the Lyre Bird had been found in the National Park, Tasmania, this

being the first evidence of breeding in Menura gully. (Seven pairs were released during the past ten years.)

2. Mr. J. Ros Garnet reported the presence in his garden of many insects, similar in appearance to the spider generally called "Daddy Longlegs," and asked if they could be identified. Mr. P. Crosbie Morrison suggested that they were possibly "Harvestmen."

3. In reply to a question regarding the composition of Ayer's Rock (asked at last meeting), Mr. Colliver stated that in the Physical Geography section of the Horn Expedition Report it was mentioned that this rock had often been mistaken for granite, to which it bears some superficial resemblance, but it is nevertheless a rock of sedimentary origin, somewhat altered by metamorphic agencies. Michael Terry, following on Dr. Madigan's work, refers to the rock as being composed of a metamorphic grit, and Finlayson (in the *Red Centre*) calls it a conglomerate, so fine as to resemble granite. A figure of the rock showing bedding plains (*Red Centre*, page 48) illustrated the remarks.

4. Mr. F. G. Ilford asked if it were an abnormal habit for Koalas to feed on the tips of exotic cypress trees. Mr. Colliver (in replying) understood that, when sick, the animals often developed unusual tastes, e.g., drinking salt water and eating non-eucalypt foods.

5. A question was asked: "How can a piece of wood turn to stone?" Mr. Colliver, in reply, gave a brief outline of the process of mineral replacement.

EXHIBITS

Mr. P. Fisch: The fungi *Calostoma fuscum*, from Healesville, and *Contharctus lilacinus*, from Doncaster East. Garden-grown specimens, including *Acacia Jonesii*, *A. longifolia*, *A. subporosa*, *Grevillea alpina*, and *Westringia rigida*.

Mr. R. D. Lee: Photographs of fungi from the Dandenongs, including *Pleurotus cinerascens*, *Flammula excentrica*, *Mycena pullata*, *M. interrupta*, *Cortinarius austro-venetus*, *Polystictus versicolor*, and *Clavaria pyxidata*.

Mr. T. Griffiths: Internal "bones" of the Cuttle Fish (*Sepia*).

Mr. C. French: Pair of the rare Mueller's Golden Beetle, *Phalacrognathus Muellerei*, from Cairns, Queensland. Two specimens of *Draco volans*, the so-called Flying Lizard from Java. An interesting Mediterranean aroid, the "Friar's' Cow" (*Arisarum vulgare*), which bears a remarkable resemblance to the flower of our Long-tongue Greenhood orchid, *Pterostylis grandiflora*.

Mr. F. S. Colliver: A series of "Razor Shells" (genus *Solen*).

TREES AND TOADSTOOLS

Captain H. E. Young, D.Sc.Agr. (an active member of the Queensland Naturalists' Club) briefly and historically outlined the development of the fascinating study *Mycotrophy*—literally

"fungus feeding"—and emphasized throughout his illustrated address the dependence of most woodland trees upon fungal infestation of their root systems.

Most people, including many biologists, think about the absorbing roots of trees in terms of agricultural crop plants in *sand culture*, i.e., with orthodox root tips and root caps and numerous root hairs for food absorption. Such a concept, however, is not even remotely correct in the great majority of trees and in whole families of other plants, e.g., *Orchidaceæ* and *Ericaceæ*. Instead, the simple process of absorption by root hairs is replaced by an involved system of nutrient exchange between two widely different members of the plant kingdom—a fungus (often of the gilled type) and a tree.

In forest trees, the feeding roots are found to be quite normally invaded by fungus mycelium which either occupies the internal tissues, sending single threads to the root surface (*endotrophic*), or exists as a felted mantle or sheath all over the root (*ectotrophic*); in each instance, root hairs are entirely absent and the walls of the root tips so profoundly altered as to have no direct contact with the soil at all. These modified structures can be regarded neither as roots nor fungi, but are a combination of both, to which distinctive organs is applied the term *mycorrhiza*, meaning "fungus-root."

Fungal threads ramify far through the soil from their tree-root host, absorbing water and nutrients that are passed on to the conducting root tissues in return for a proportion of carbohydrates and other foods elaborated by the tree—a very harmonious relationship. Mycorrhizas enable trees to absorb much more effectively than they would do by means of root hairs, and are absolutely essential to the health of many higher plants.

Some of the factors necessary to good mycorrhizal development in trees were discussed, for instance an abundance of woodland humus with acidity of about pH5. Most plants will form mycorrhizas only with certain species of fungi (*Boletus elegans* and *B. viscidus* are associated with larch, *B. luteus* always with pines, *Amanita muscaria* and *Lactarius turpis* with birch, *Russula fellea* with beech, etc.), and where these fungi are absent growth will be retarded. In this connection, it is significant to record that Queensland Hoop Pine would not grow in Nyassaland until the soil there had been inoculated with fungus-infested soil from Australia. Potato plants grown from seed will not set tubers if their particular fungal associate is missing from the ground (as witness the early and fruitless attempts to raise potatoes in England from American seed).

The establishment of shelter belt trees on the great plains of America was a problem until mycorrhizal requirements were

fulfilled and the fungi peculiar to the trees were introduced. Arctic moors and treeless heaths have been successfully afforested only after the necessary mycorrhiza-forming fungi were incorporated in the soil. A *Cattleya* orchid has been grown from seed and flowered in total darkness, solely by virtue of its mycotrophy.

Captain Young traced the expanding interest in mycotrophy from the time of Theophrastus (372-287 B.C.), who recorded the existence of such an amazing partnership. Practically no serious enquiries into the phenomenon were made subsequently for more than 2,000 years, until Reissek (1847) gave the first accurate account of fungus mycelia in relation to root cells. Other German investigators took up the subject, chief of whom was Frank (1885), who added very substantially to our knowledge and invented the term "mycorrhiza," classifying the various types.

In latter times the name of Elias Melin (a Swede) stands pre-eminent. He actually synthesized mycorrhizas in culture and (in 1925) demonstrated that fungi were not only beneficial to the trees he studied (largely conifers), but were *absolutely essential* to vigorous growth. Since Melin's publications, a vast army of research workers has probed into the complexities of this highly important economic subject.

A hearty vote of thanks, proposed and seconded by Messrs. G. N. Hyam and P. F. Morris, was accorded Captain Young, who suitably responded and later briefly answered questions as to the types of fungi producing mycorrhizas in Australian eucalypts, the endotrophic symbioses in epiphytic orchids and certain ferns, the use of fungi as food by native animals, and the functional diseases and malformations of cultivated plants caused by an upset in the delicately balanced mycorrhizal system—heavy composting will often rejuvenate a tree that has been deemed a victim to some minor mineral deficiency.

[For a more detailed account of mycorrhizas, the interested reader is referred to Captain Young's article in *The Queensland Naturalist*, Vol. xi, p. 121, August, 1941.—Ed.]

HISTORY OF THE GEELONG NATURALISTS' CLUB

Messrs. D. J. Dickson and F. A. Cudmore have sent in further information regarding the *Geelong Naturalist* and *The Wombat*. I unfortunately missed an additional number of the latter journal, it should be Vol. 5, part 4, No. 20 (Dec., 1902). Title pages and indices of these publications seem mixed and the information given in Pitt's Catalogue is incorrect in several places, especially in the records of the National Herbarium set. The scientific clubs of Geelong all met at the Gordon College, and there was much intermingling in societies, in publications, and at meetings. Unfortunately, as before stated, field naturalists fell to a minimum number in Geelong, and their society became a Science Club. Thanks are offered to both the above members.

E.E.P.

ORCHID NOTES

(Including the Description of two New Varieties)

By W. H. NICHOLLS, Melbourne.

(1) *CALADENIA CARNEA*, R.Br., variety *ORNATA*, var. nov.

Planta circiter 15-25 cm. alta. Flores magni, carni-flavae, circiter 2-3 cm. in diametro. Labellum conspicue-ornatum; lamina rubra, marginibus integris et undulatis; calli lineares, irregulares. Columna erecta prorsus alata incurvata. Stigma prominens ovatum.

A slender or moderately robust plant about 15-25 cm. high. Flowers 1-2, rather large. Perianth segments pink, somewhat yellowish on the reverse, about 2-3 cm. in diameter. Labellum—the whole of upper surface bright red, conspicuously ornate with horizontal striae; lateral lobes with entire margins, prominently and irregularly undulate anteriorly. Calli linear as in the typical form (occasionally the "golf-stick" type of calli present), the rows irregular. Column wings incurved, with narrow, red transverse bands. Stigma prominent, ovate.

Habitat: Gorae, via Portland, Vic. (Mr. Clifford Beauglehole, Oct., 1943. TYPE.)

This attractively-hued variety with bright pink perianth-segments, which are rather broad and yellowish on the reverse, combined with the showy red labellum, is one of the most beautiful forms of Robert Brown's species. In the majority of the specimens examined the lateral sepals were connate—as in *C. unita*, Fitz-Gerald. The presence of an occasional "golf-stick" type of gland on the labellum-lamina is of interest also, for such a departure from the usual is important; such (apparently) is the chief differentiating character separating *C. Longii*, Rogers from *C. carnea* R.Br. (Figs. G, H, I, J, on page 63).

(2) *CALADENIA CARNEA*, R.Br., variety *SUBULATA*, var. nov.

Planta similis C. carnea typica. Flores 1-2, carni-colorati, virides. Segmenta-perianthi lineari-lanceolata; sepala-lateralia reflexa. Petala horizontalia patentia. Labellum pallidum; lobi-medii flava, setacei; lobi-laterales albi magni; lamina striata; calli pauci ad basin. Columna erecta; marginibus incurvatis, prominente villatis.

A very slender wiry plant similar to the typical form, but the perianth-segments consistently very narrow, pale pink, shaded to green, each with a prominent longitudinal red-brown stripe along the centre. Lateral sepals reflexed, often embracing the ovary and sometimes crossed. Petals more or less horizontally spread-

ing. Labellum erect. Mid-lobe yellow, narrow subulate, the margins entire; lateral lobes embracing the column, prominent, white, with rounded smooth margins; lamina with narrow red-brown horizontal striae; calli restricted to the immediate base only (usually 2). Column wings conspicuously incurved with bold transverse red-brown bands.

Habitat: Portland, Vic. (Mrs. E. Mellblom, Oct.-Nov., 1943. TYPE.)

This variety is reported as occurring plentifully in good seasons; it is characterized by the pale tone of the flowers and awl-shaped middle lobe of the labellum (Figs. A, B, C, D, E, F on plate).

(3) *THELYMITRA MCKIBBINII* F. Muell., in *Melb. Chem.*, p. 44, 1881. (Synonym *Th. Chisholmii*, Nich., in *Vict. Nat.*, lviii, pp. 98-101, 1941.)

In the original description of this *Thelymitra*, Mueller writes the specific name variously, viz., "*M'Kibbinii*," "*M'Kibbonii*" and "*Mackibbinii*." In his *Key to the System of Victorian Plants* (1888) it is rendered "*Mackibbonii*," and reference to his *Census of Australian Plants* shows it as "*Mackibbinii*."

However, reference to Mr. John McKibbins' personal letters to Mueller places the correct rendering beyond doubt as *McKibbinii*.

The three type specimens of this orchid (also the original description in pencil, with copious notes) are in the National Herbarium, Melbourne, having been located recently there among specimens of *T. carnea*, R.Br., and *T. rubra*, FitzG.

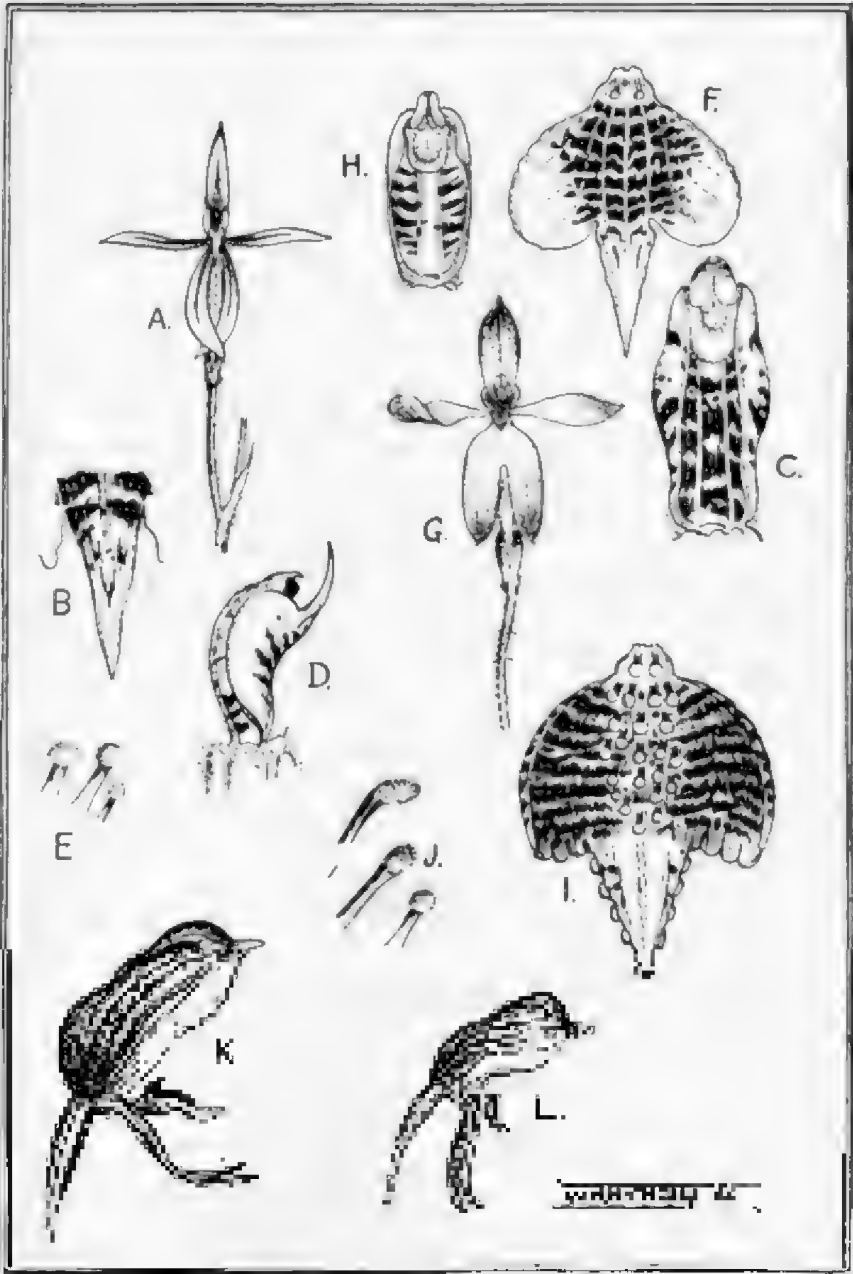
In the past, *T. carnea* was incorrectly known as *T. Elizabethae*, F. Muell. (the latter being synonymous), while *T. rubra*, which *T. McKibbinii* resembles very closely in its dried state, was thought to be the true *T. carnea* of Robert Brown. Mueller's diagnosis of *T. McKibbinii* is really insufficient as a basis for certain determination, and, in the absence (at the time I established my *T. Chisholmii*) of his types, I had considered *McKibbinii* synonymous with *T. rubra*.

(4) *PTEROSTYLIS GRANDIFLORA*, R.Br.

Very fine specimens of this terrestrial (over 20 inches high, with measurement of galea from base 2½" and height of galea 1½") were collected in June of 1943 by Mr. W. Hunter in an extensive colony 5 miles south from Orbost, E. Victoria, "growing in sandy loam among bracken in moderately well timbered country."

(5) *PTEROSTYLIS LONGIFOLIA*, R.Br.

The occurrence of exceptionally large-flowered plants of this



well-known orchid is not generally known, but I have collected a robust form (Fig. K, on plate) near Mt. Wallace in the Brisbane Ranges with flowers almost twice as large as in the typical condition (as portrayed by FitzGerald in *Austr. Orch.*, Vol. 1).

This form is found also in "Were's Paddock," near Greensborough, where Mr. A. B. Braine obtained it. In both localities (so widely separated) the normal form is present too, and fairly abundant (Fig. L).

KEY TO ILLUSTRATIONS

Caladenia carnea var. *subulata* var. nov.: A—Flower (nat. size). B—Labellum mid. lobe. C—Column, from front. D—Column and labellum, from side. E—Calli from base of labellum lamina. F—Labellum lobes, spread out.

C. carnea var. *ornata* var. nov.: G—Flower (nat. size). H—Column, from front. I—Labellum lobes, spread out. J—Calli from labellum lamina.

Pterostylis longifolia (nat. size): K—Flower of giant form. L—Flower of typical form.

GROW YOUR OWN GUM TREES

At the Scout Exhibition in the Melbourne Town Hall, the boys from Dandenong showed how easily eucalypts can be raised from seed. We have received a four-page illustrated leaflet issued by the Save the Forests Campaign describing how they can be grown. The method is simple and easily understood. Seed is sown in a shallow seed tray, but instead of "pricking-out" the young seedlings into flower pots, small metal tubes are used. They can be made by hand from scrap tinplate or used four-gallon tins, and an easily constructed appliance to aid in their construction is shown. A six-inch square of tinplate is formed into a tube. The sides clip together. The tubes are similar to those used by the Forests Commission to raise Mountain Ash seedlings to re-forest areas denuded of tree cover by man-made bush-fires. They can be re-used. Many people have tried to transplant forest-grown seedlings with varying degrees of success. They can now raise their own with every degree of confidence, provided fresh, sound, clean seed is used.

Local bodies organizing a community tree planting effort for shade and shelter, beauty and profit are urged to order their trees now. To assist the community tree planting effort being organized by the Save the Forests Campaign, the Forests Commission has published a planting guide, containing accurate information on the selection, raising and establishment of trees in Victoria. Descriptive notes on nearly one hundred species of trees, giving habit, size, hardiness, uses, site and climate required and methods of propagation, are included.

A distinctively coloured map illustrates the major planting zones into which Victoria has been divided. Species of trees suitable for each zone are listed. While the zones are based on the original tree cover, rainfall and accumulated departmental experience, the writer gives warning that local factors such as exposure, soil and permanent water all vitally affect any tree planting project.

Copies of these leaflets will be available free of charge from either the Secretary, Forests Commission, Melbourne, C.2.; District Committees of the Save the Forests Campaign; or from the Hon. Secretary, Save the Forests Campaign, 314 Collins Street, Melbourne, C.1.

AUSTRALIAN ORCHIDS, 1900-1945

By the Rev. H. M. R. Rupp, Northbridge, N.S.W.

This paper comprises the following sections:

- I. Introductory.
- II. An Alphabetical Index of Australian Orchids described or recorded from 1900 to April, 1945.
- III. A List of Species which during the same period have been transferred from the genus in which they were originally placed to another genus.
- IV. Specific Names now either (1) illegitimate (i.e., obsolete) or (2) regarded as of doubtful validity.

I. INTRODUCTORY

No comprehensive work attempting to deal with the *Orchidaceae* of Australia has been published since R. D. FitzGerald's *Australian Orchids*, the last volume of which was issued in 1892. As is well known, this great work was never completed; and even if we include the unpublished plates preserved in the Mitchell Library at Sydney, it embraces little more than half the number of orchid species now known to exist in Australia. Even F. M. Bailey's *Queensland Flora*, published eleven years after FitzGerald's death, contains many orchid species not represented in *Australian Orchids*. Since then, so many species have been added in all the six States of the Commonwealth, and they have been described in so many different publications (not all of them Australian), that it is often a very tiresome and tedious business to trace the original descriptions. It seems most desirable therefore, before still further additions are made to this accumulation of descriptions, to publish an Index of all the Australian orchids described or recorded since 1900, giving references to the original descriptions and in some cases to supplementary ones. I can discover no records of new species between 1892 and 1900.

In addition to the Index, I have compiled separate lists of (a) species which during the same period have been transferred from one genus to another, and (b) species which are now regarded as invalid or of doubtful validity.

In the Index, I have thought it useful to indicate briefly the distribution of each species within Australia, as far as is known to me; and this has been done by means of the initial letters of each State. Thus Q. stands for Queensland, N.S.W. for New South Wales, V. for Victoria, T. for Tasmania, S.A. for South Australia, W.A. for Western Australia, and N.T. for the Northern Territory. In order to economise space, when giving references to descriptions, I have made free use of the abbreviations *ibid.* and *l.c.*, and I wish to explain just how these are to be understood. Nearly all the references are to journals or periodicals. When "*ibid.*" is used, it refers to the last-preceding citation of a journal for the same author only. "*l.c.*" is only used when the reference is to the identical number of the journal cited.

It is possible that I have omitted a few species; but I have endeavoured to the best of my ability to make the Index exhaustive, and I hope that at least it will save time and trouble for students of our orchids who wish to cite or consult original descriptions.

II. ALPHABETICAL INDEX TO SPECIES DESCRIBED AS NEW
(Including new records).

ACIANTHUS *Ledwardii* Rupp in *Queensl.Nat.*, x (1938), 113. Q.
tenuissimus Nicholls and Goadby in *Vict.Nat.*, l. (1935).
22. W.A.

- ANAECTOCHILUS Yatesae F M Bail. in *Queensl. Agri. Journ.*, xix (1907), 148. Q.
- BULBOPHYLLUM adenocarpum Schltr. in *Pedde. Report.*, viii (1910), 568. Q.
 cilioglossum Rogers and Nicholls in *Trans. Roy. Soc. S. Austr.*, lix (1935), 204. Q.
 cochleatum Schltr., *l.c.*, 455. Q.
 globuliforme Nicholls in *Orchidologia Zeylanica*, v (1938), 123. Q., N.S.W.
 trilobum Schltr., *l.c.*, 455. Q.
 Weinthalii Rogers in *Trans. Roy. Soc. S. Austr.*, LVII (1933), 95. Q., N.S.W.
- CALADENIA alpina Rogers, *ibid.*, LI (1927), 12. N.S.W., V., T.
 Atkinsonii Rodway in *P. & P. Roy. Soc. Tas.*, 1922, 77. T.
 Audasii Rogers, *l.c.*, 295. V.
 bicallata Rogers, *ibid.*, XXXIII (1909), 17. S.A.
 bicolor Rogers, *ibid.*, LIV (1930), 46. W.A.
 Bryceana Rogers, *ibid.*, XXXVIII (1914), 359. W.A.
 cristata Rogers, *ibid.*, XLVII (1923), 337. W.A.
 Dorrienii Domin. in *Journ. Linn. Soc.*, 1912, *Bot.* xli, 251. W.A.
 Douthae Sargent in *Journ. Bot.*, LIX (1921), 175. W.A.
 echidnachila Nicholls in *P. & P. Roy. Soc. Tas.*, 1932, 13. T.
 FitzGeraldii Rupp in *Vict. Nat.*, LVIII (1942), 199, and *Austr. Orch. Rev.*, VII (1942), 64. Q., N.S.W., V., T., S.A.
 Gertrudae Ostenf. in *Dansk Vidensk. Selsk. Biol. Medd.*, III, II (1921), 43. (Copenhagen publication.) W.A.
 gladiolata Rogers, *ibid.*, XXXI (1907), 210. S.A.
 hastata (Nicholls) Rupp in *Vict. Nat.*, XLIX (1942), 198. V.
 Hildae Pescott and Nicholls in *Vict. Nat.*, XLV (1929), 235. V.
 integra Coleman in *Vict. Nat.*, XLIX (1923), 246. W.A.
 iridescens Rogers, *ibid.*, XLIV (1920), 328. N.S.W., V.
 lavandulacea Rogers, *ibid.*, LI (1927), 11. W.A.
 longiclavata Coleman, *ibid.*, XLVI (1930), 196. W.A.
 Longii Rogers in *P. & P. Roy. Soc. Tas.*, 1931, 105. T.
 ovata Rogers in *Trans. Roy. Soc. S. Austr.*, XXXIII (1909), 16. S.A.
 pectinata Rogers, *ibid.*, XLIV (1920), 352, and XLVII (1923), 341. W.A.
 praecox Nicholls in *Vict. Nat.*, XLIII (1926), 156. N.S.W., V., T.
 pumila Rogers, *ibid.*, XLVI (1922), 152. V.
 Purdieana Andrews in *Journ. Mucll. Soc. W. Austr.*, 1902, 39. W.A.
 radialis Rogers, *ibid.*, LI (1927), 296. W.A.
 rigida Rogers, *ibid.*, LIV (1930), 46. S.A.
 sigmoidea Rogers, *ibid.*, LXII (1938), 12. W.A.
 triangularis Rogers, *ibid.*, LI (1927), 10. W.A.
 tutelata Rogers, *ibid.*, XXXI (1907), 211. N.S.W., V., S.A.
- CALEANA Nublingii Nicholls, *ibid.*, I (1934), 239. N.S.W.
- CALOCHILUS cupreus Rogers, *ibid.*, XLII (1918), 24. N.S.W., V., T., S.A.
 gracillimus Rupp in *Vict. Nat.*, I X (1943), 28; and *Orch. N.S.W.* (1943), plate XII. N.S.W.
 grandiflorus Rupp in *Vict. Nat.*, I (1934), 239. Q., N.S.W.

- CALOCHILUS** imberbis Rogers, *ibid.*, I (1927), 4. V.
 Richae Nicholls, *ibid.*, XIV (1929), 233. V.
 -saprophyticus Rogers, *ibid.*, LIV (1930), 41. V., T.?
- CLEISOSTOMA** cornutum Rupp in *N. Queensl. Nat.*, Dec., 1935. Q
 gemmatum Rupp in *Vict. Nat.*, LIV (1937), 112. Q.,
 N.S.W.
 orbiculare Rupp in *N. Queensl. Nat.*, April, 1934. Q.
- CORYSANTHES** dilatata Rupp and Nicholls in *Proc. Linn. Soc. N.S.W.*,
 LIV (1928), 80. V., T., S.A., W.A.
 Fordhamii Rupp in *Vict. Nat.*, LVIII (1941), 83. Q.,
 N.S.W.
- CRYPTANTHEMIS** Slateri Rupp in *Proc. Linn. Soc. N.S.W.*, LVII (1932),
 58; *ibid.*, LVIII (1933), 225; *ibid.*, LIX (1934),
 118; *Austr. Orch. Rev.*, III (1938), 32, 37, 39.
 N.S.W.
- CRYPTOSTYLIS** Hunteriana Nicholls in *Vict. Nat.*, LIV (1938), 182. V.
- DENDROBIUM** aurantiaco-purpureum Nicholls in *N. Queensl. Nat.*, Mar.,
 1942. Q.
 bifalce Lindl. in *Lond. Journ. Bot.*, II (1843), 237. Q.
 Carrii Rupp and White in *Queensl. Nat.*, X (1936), 26. Q.
 Fleckeri Rupp and White, *ibid.*, *l.c.*, 25. Q.
 Grimesii White and Summerhayes in *Kew Bull. Misc. Inf.*,
 3 (1934), 106. Q.
 Jonesii Reindle in *Journ. Bot.*, XXXIX (1901), 197. Q.
 Kestevenii Rupp in *Proc. Linn. Soc. N.S.W.*, LVI (1931),
 137. N.S.W.
 Muellerianum Schltr. in *Fedde. Repert.*, III (1907), 316.
 Palmerstoniae Schltr., *l.c.*, 317.
 tenuissimum Rupp, *ibid.*, LI (1927), 570. Q., N.S.W.
 variabile Nicholls, *ibid.*, Sept. and Dec., 1938. Q.
 Wilkianum Rupp in *N. Queensl. Nat.*, Dec., 1941. and
 March, 1942. Q.
- DIPODIUM** stenocheilum Schwarz in *Fedde. Repert.*, XXIV (1927), 80.
 N.S.W., Q., N.T.
- DIURIS** brevifolia Rogers, *ibid.*, XLVI (1922), 145. N.S.W., S.A.
 brevissima FitzGerald-Nicholls in *Vict. Nat.*, LVI (1939), 125.
 N.S.W., V.
 Colemanae Rupp in *Vict. Nat.*, LVII (1940), 63. Q., N.S.W.
 fastidiosa Rogers, *ibid.*, LI (1927), 6. V.
 flavopurpurea Messmer in *Rupp, Orch. N.S.W.* (1943), 141.
 N.S.W., T.
 lineata Messmer, *l.c.*, 142. N.S.W.
 palachila Rogers, *ibid.*, XXXI (1907), 209. N.S.W., V., T., S.A.
 polymorpha Messmer, *l.c.*, 140. N.S.W.
 Purdiei Diels in *Journ. Muell. Soc. W. Austr.* (1903), 79. W.A.
 rhomboidea Rupp in *Contrib. Nat. Herb. N.S.W.*, I (1941), 125.
 N.S.W.
 semitumulata Messmer, *l.c.*, 139. N.S.W.
 venosa Rupp in *Proc. Linn. Soc. N.S.W.*, LI (1926), 313; and *l.c.*
 (1928), 336. N.S.W.
 victoriensis Messmer, *l.c.*, 140. N.S.W., V.
- DRAKAEA** FitzGeraldii Schltr., *ibid.*, XVII (1921), 81. W.A.
 Jeanensis Rogers, *ibid.*, XLIV (1920), 322. W.A.
- DRYMOANTHIUS** minutus Nicholls in *Vict. Nat.*, LIX (1943), 173. Q.
- EULOPHIA** Carrii White in *Proc. Roy. Soc. Queensl.*, XLVII (1936), 33. Q.
- GEODORUM** dilatatum R.Br. (F. M. Bailey in *Queensl. Bot. Bull.*, XVI
 (1903), 1). Q.

- GOADBYELLA *gracilis* Rogers, *ibid.*, LI (1927), 294. W.A.
- HABENARIA *Banfieldii* F.M.Bail. in *Queensl. Agr. Journ.*, XVI (1906), 564. Q.
divaricata Rogers and White in *Proc. Queensl. Roy. Soc.*, XXXII (1921), 136. Q.
ovoidea Rogers and White, *l.c.*, 140. Q.
- LIPARIS *Fleckeri* Nicholls in *N. Queensl. Nat.*, March, 1938. Q.
Swenssonii F.M.Bail., *l.c.* Q.
- MICROTIS *gymnadenioides* Diels, *l.c.* W.A.
magnadenia Rogers in *Trans. Roy. Soc. S. Austr.*, LIV (1930), 44. N.S.W.
oblonga Rogers, *ibid.*, XLVII (1923), 339. N.S.W., V., T., S.A.
orbicularis Rogers, *ibid.*, XXXI (1907), 63. V., S.A., W.A.
truncata Rogers, *ibid.*, XLIV (1920), 326. W.A.
- PHALAENOPSIS *Resenstromii* F.M.Bail., *ibid.*, XVII (1906), 231. Q.
- PHREATIA *crassiuscula* Nicholls in *Vict. Nat.*, LXI (1945), 151. Q.
robusta Rogers, *ibid.*, LIV (1930), 39. Q.
- PRASOPHYLLUM *acuminatum* Rogers, *ibid.*, LI (1927), 291. N.S.W.
album Rogers, *ibid.*, XXXIII (1909), 211. S.A.
aureoviride Rupp in *Vict. Nat.*, LVIII (1941), 22. N.S.W.
Braimei Rogers, *ibid.*, XLVI (1922), 149. V., T.
Beagleholei Nicholls, *ibid.*, LIX (1942), 9. N.S.W., V., T.
Colemanae Rogers, *ibid.*, XLVII (1923), 337. V.
ciliatum Ewart and Rees in *Proc. Roy. Soc. Vict.* (new ser.), 25, III (1912). V.
constrictum Rogers, *ibid.*, XXXIII (1909), 213. S.A.
diversiflorum Nicholls, *ibid.*, LIX (1942), 6. V.
ellipticum Rogers, *ibid.*, XLIV (1920), 323; and XLVII (1923), 340. W.A.
Elmae Rupp, *ibid.*, LIX (1942), 122. N.S.W.
FitzGeraldii Rogers and Maiden in *Trans. Roy. Soc. S. Austr.*, XXXIII (1909), 216. See also *Proc. Linn. Soc. N.S.W.*, LXIX (1944), 73. S.A., N.S.W.
gracile Rogers, *ibid.*, XXXIII (1909), 213. N.S.W., V., S.A.
Hartii Rogers, *ibid.*, LI (1927), 8. V.
Hopsonii Rupp in *Proc. Linn. Soc. N.S.W.*, LIII (1928), 341. N.S.W.
Horburyanum Rupp in *Vict. Nat.*, LIX (1942), 122. W.A.
lanceolatum Rogers, *ibid.*, XLIV (1920), 323; and XLVII (1923), 340. W.A.
Morganii Nicholls, *ibid.*, XLVI (1930), 179. V.
Morrisii Nicholls, *ibid.*, XLVIII (1931), 108. N.S.W., V.
Nichollsianum Rupp, *l.c.*, 123. N.S.W.
Nublingii Rogers, *ibid.*, LI (1927), 293. N.S.W.
occidentale Rogers, *ibid.*, XXXIII (1909), 214. S.A.
odoratum Rogers, *l.c.*, 209. N.S.W., V., T., S.A.
pallidum Nicholls in *Proc. Roy. Soc. Vict.* (new ser.), I (1933), 28. S.A.
parvicallum Rupp in *Queensl. Nat.*, Vol. 3 (1943), 52. Q.
parviflorum Nicholls in *Vict. Nat.*, LVII (1941), 191. V.

- PRASOPHYLLUM** plumosum Rupp in *Vict.Nat.*, LIX (1942), 127. N.S.W.
 pruinatum Rogers, *l.c.*, 211. S.A.
 pyriforme Coleman in *Vict.Nat.*, XLIX (1932), 195.
 V.
 regium Rogers, *ibid.*, XLII (1918), 27. W.A.
 Rogersii Rupp in *Proc.Linn.Soc.N.S.W.*, LIII (1928),
 340. N.S.W., V., T.
 rotundiflorum Rogers, *ibid.*, XXXIII (1909), 210. S.A.
 Ruppianum Rogers, *ibid.*, LI (1927), 125. N.S.W.
 sagittiferum Rupp in *Vict.Nat.*, LIX (1942), 125.
 N.S.W.
 subbisectum Nicholls, *ibid.*, LIII (1936), 72. V.
 Suttonii Rogers and Rees in *Proc.Roy.Soc.Vict.* (new
 ser.), XXV (1912), 112. See also *Vict.Nat.*, L
 (1933), 69. N.S.W., V.
 Tadgellianum Rogers in *Trans.Roy.Soc.S.Austr.*,
 XLVII (1923), 338. N.S.W., V.
 Tepperi Mueller-Rogers, *Trans.Roy.Soc.S.Austr.*,
 XXXIII (1909), 206. S.A.
 trifidum Rupp, *ibid.*, LVIII (1941), 21, and *Orch.*
N.S.W. (1943), 31. N.S.W.
 unicum Rupp, *ibid.*, LIX (1942), 124. N.S.W.
 validum Rogers, *ibid.*, LI (1927), 7. W.A.
 wilsoniense Rupp, *l.c.*, 126. N.S.W.
- PTEROSTYLIS** allantoides Rogers, *ibid.*, LXIV (1940), 139. W.A.
 alpina Rogers in *Proc.Roy.Soc.Vict.* (new ser.), XXVIII
 (1915), 108. N.S.W., V.
 alveata Garnet in *Vict.Nat.*, LVI (1939), 152; and LVII
 (1940), 152. V.
 Boormanii Rupp in *Orch.N.S.W.* (1943), 98. N.S.W.
 celans Rupp in *Vict.Nat.*, LXI (1944), 106. V.
 constricta Sargent in *Proc.Roy.Soc.W.Austr.*, 4 (1907).
 W.A.
 crypta Nicholls, *ibid.*, LXI (1945), 207. V.
 decurva Rogers in *Trans.Roy.Soc.S.Austr.*, XLVII (1923),
 339. N.S.W., V., T.
 falcata Rogers in *Proc.Roy.Soc.Vict.* (new ser.), XXVIII
 (1915), 106. N.S.W., V., T.
 furcillata Rupp in *Proc.Linn.Soc.N.S.W.*, LV (1930), 415.
 N.S.W.
 gracilis Nicholls, *ibid.*, XLIII (1927), 324. V., T.
 Hamiltonii Nicholls, *ibid.*, L (1933), 89. W.A.
 Hildae Nicholls in *Queensl.Nat.*, X (1937), 39. Q., N.S.W.
 longicurva Rupp in *Contrib.Nat.Herb.N.S.W.*, 1 (1941),
 125. N.S.W.
 longipetala Rupp in *Proc.Linn.Soc.N.S.W.*, LXVIII (1943),
 9. N.S.W.
 pulchella Messmer in *Proc.Linn.Soc.N.S.W.*, LVIII (1933),
 429. N.S.W.
 pusilla Rogers in *Trans.Roy.Soc.S.Austr.* XLII (1918),
 26. Q., N.S.W., V., T., S.A., W.A.
 robusta Rogers, *ibid.*, LI (1927), 296. V., S.A., W.A.
 Rogersii Coleman in *Vict.Nat.*, XLVI (1929), 100. W.A.
 Sargentii Andrews in *Journ.W.Austr.Nat.Hist.Soc.*, May,
 1905. W.A.
 Toveyana Ewart and Sharman in *Proc.Roy.Soc.Vict.*
 (new ser.), XXVIII (1916), 235. V., T.
 Vereenac Rogers, *ibid.*, XXXVIII (1914), 360. T., S.A.

- PTEROSTYLIS *Whitei* F.M.Bail. in *Queensl. Agr. Journ.*, xxv (1910), 11. Q.
- RHIZANTHELLA *Gardneri* Rogers in *Journ. Roy. Soc. W. Austr.*, xv (1928), 1. W.A.
- SACCOLABIUM *Tierneyanum* Rupp in *Queensl. Nat.*, xii (1942), 18. Q.
- SARCOCHILUS *Baucroftii* F.M.Bail., *ibid.*, xxviii (1912), 447. Q.
- Harriganæ* Rupp in *Proc. Linn. Soc. N.S.W.*, lxxiii (1938), 128. N.S.W.
- Longmanii* F.M.Bail., *ibid.*, xxiii (1909), 261; and xxviii (1912), 449. Q.
- minutiflos* F.M.Bail. in *Compr. Cat. Queensl. Fl.* (1912), 845. Q.
- Newportii* F.M.Bail. in *Queensl. Fl.*, vi (1903), 2014. Q.
- spatulatus* Rogers in *Trans. Roy. Soc. S. Austr.*, li (1927), 1. Q., N.S.W.
- Weinthalii* F.M.Bail. in *Queensl. Agr. Journ.*, xliii (1903), 346; and xxviii (1912), 448. Q., N.S.W.
- SCHOENORCHIS *densiflora* Schltr. in *Fedde, Repert. Beih.*, i (1913), 986. Q.
- THELYMITRA *azurea* Rogers, *ibid.*, xli (1917), 342. V., T., S.A.
- chasmogama* Rogers, *ibid.*, li (1927), 4. N.S.W., V., S.A.
- Chisholmii* Nicholls in *Vict. Nat.*, lviii (1941), 98. V.
- D'Altonii* Rogers, *ibid.*, liv (1930), 42. V.
- Dedmanæ* Rogers, *ibid.*, lxii (1938), 13. W.A.
- Holmesii* Nicholls, *ibid.*, xlix (1933), 263. V.
- Merranæ* Nicholls, *ibid.*, xlvi (1929), 139. V.
- Murdochæ* Nicholls, *ibid.*, l (1934), 219. V.
- psammophila* Andrews in *Journ. Nat. Hist. Soc. W. Austr.*, May, 1905. W.A.
- retracta* Rupp in *Vict. Nat.*, lx (1944), 176. T.
- Sargentii* Rogers, *ibid.*, liv (1930), 41. W.A.
- truncata* Rogers, *ibid.*, xli (1917), 343. V., S.A.
- ZEUXINE *attenuata* Rogers and White in *Proc. Roy. Soc. Queensl.* xxxii (1920), 123. Q., N.S.W.
- oblonga* Rogers and White, *l.c.*, 121. Q.

III. SYNONYMY.—SPECIES TRANSFERRED FROM THEIR ORIGINAL GENERA

Original Name.	Name now Recorded as Valid.
<i>Bulbophyllum lichenastrum</i> F. Muell.	<i>Dendrobium lichenastrum</i> (F. Muell.) Nicholls in <i>N. Queensl. Nat.</i> , Sept. and Dec., 1938.
<i>Prenticei</i> F. Muell.	<i>Dendrobium Prenticei</i> (F. Muell.) Nicholls, <i>l.c.</i>
<i>Cleisostoma Beckleri</i> F. Muell.	<i>Sarcanthus Beckleri</i> (F. Muell.) Rupp in <i>Vict. Nat.</i> , lvii (1941), 219.
<i>brevilabre</i> F. Muell.	<i>Saccolabium brevilabre</i> (F. Muell.) Rupp, <i>l.c.</i>
<i>congestum</i> F.M.Bail.	<i>Thrixspermum album</i> (Ridl.) Schltr. See Rupp in <i>N. Queensl. Nat.</i> , Dec., 1940.
<i>gemmaum</i> Rupp (see Index above)	<i>Sarcanthus purpuratus</i> (Rupp) Rupp in <i>Vict. Nat.</i> , lviii (1940), 41.
<i>Koffordii</i> F.M.Bail.	<i>Camarotis Koffordii</i> (F.M.Bail.) J. J. Smith in <i>Natuur. Tijdschr. Ned. Ind.</i> , lxxii (1913).

- Cleistanoma Macphersonii* F.Muell. *Sarcanthus Macphersonii* (F.Muell.)
Rupp in *Vict.Nat.*, LVII (1941), 219.
- orbiculare* Rupp (see Index above) *Saccalabium orbiculare* (Rupp)
Rupp, *l.c.*, 220.
- tridentatum* Lindl. *Sarcanthus tridentatus* (Lindl.)
Rupp, *l.c.*, 218.
- Cyrtostylis reniformis* R.Br. *Acianthus reniformis* (R.Br.) Schltr.
in *Engl.Bot.Jahrb.* xxxix (1906),
39.
- Huegelii* Endl. *Acianthus Huegelii* (Endl.) Nich. and
Goadby in *Vict.Nat.*, I. (1933), 106.
- Dendrobium cricaoides* F.M.Bail. *Lirio cricaoides* (F.M.Bail.) Rolfe
in *Orch.Rev.*, xvii (1909), 95.
- Gostrodia ovata* F.M.Bail. *Cheirostylis ovata* (F.M.Bail.)
Schltr. in *Engl.Bot.Jahrb.*, lvi
(1921), 452.
- Listera amplexicaulis* F.M.Bail. *Acianthus amplexicaulis* (F.M.Bail.)
Rolfe in *Orch.Rev.*, xi (1903), 344.
- Lyperanthus ellipticus* R.Br. *Rimacolo elliptica* (R.Br.) Rupp in
Vict. Nat., LVIII (1942), 188.
- Oberonia pusilla* F.M.Bail. *Phreatia Baileyana* Schltr. in *Fedde*,
Repert., ix (1911), 433.
- Osyricera purpurascens* Deane *Bulbophyllum Macphersonii* Rupp
in *Vict.Nat.*, LI (1934), 81.
- Sarcochilus Newportii* F.M.Bail. *Bulbophyllum Newportii* (F.M.
Bail.) Rolfe in *Orch.Rev.*, xvii
(1909), 94.
- phyllorrhizus* F.Muell. *Chiloschista phyllorrhiza* (F.Muell.)
Schltr. in *Engl.Bot.Jahrb.*, lvi
(1921), 492.
- platystachys* F.M.Bail. *Thrixspernum platystachys* (F.M.
Bail.) Schltr. in *Orchis* (1911), v, 55.

IV. (a) SPECIFIC NAMES (OTHER THAN THOSE INCLUDED IN THE PRECEDING TRANSFERS) NOW REGARDED AS INVALID

- Acianthus tenuissimus* Nicholls and Goadby. Identical with *A. Huegelii*,
q.v. in transferred species.
- Bulbophyllum punctatum* R.D.FitzG. Identical with *B. Baileyi* F.Muell.
See Nicholls in *N. Queensl.Nat.*, Sept., 1940.
- Caladenia alpina* Rogers. Identical with *C. Lyallii* Hook.f. in *Fl.Nov.-Zel.*
I (1853), 247.
- Caladenia Hildae* Pescott and Nicholls. Nicholls later (*Vict.Nat.*, LV
(1939), 165) pronounced this to be a form of *C. testacea* R.Br.
- Calochilus cupreus* Rogers. Identical with *C. campestris* R.Br. See
Nicholls in *Vict.Nat.*, LVIII (1941), 91, and Rupp
in *Orch.N.S.W.* (1943), 49.
- Chiloglottis Muelleri* R.D.FitzG. Identical with *C. cornuta* Hook.f. in
Fl.Antarct., I (1844), 69.
- Cleistanoma cornutum* Rupp. Identical with *Sarcanthus tridentatus* (Lindl.)
Rupp. See *N. Queensl.Nat.*, March, 1937.
- Dipodium stenochilum* Schwarz. In *N. Queensl.Nat.*, xi (1944), No. 71,
p. 2, I have expressed the opinion that this is not
a good species and have reduced it to a variety of
D. punctatum R.Br.

- Prasophyllum album* Rogers. The author omits this species (described in 1909) in his treatment of the *Orchidaceae* in J. M. Black's *South Australian Flora*, 1920 ed., but it is included as a variety of *P. odoratum* Rogers in the second edition (1943). The same remark applies to *P. pruinatum* (reduced to a var. of *P. patens* R.Br.) and *P. Tepperi*.
- Prasophyllum ciliatum* Ewart and Rees. Identical with *P. Archeri* Hook.f. See Nicholls in *Vict.Nat.*, XLVIII (1931), 109.
- Prasophyllum intricatum* C. Stuart. Identical with *P. Archeri* Hook.f. See Nicholls, *l.c.*, 105.
- Prasophyllum intricatum* of R. D. FitzGerald's *Australian Orchids*, II, 4. The plant figured here is not Stuart's species. It represents the species named by Hook.f. *P. nudum* in Tasmania. (Hooker's name appears to be invalid, having been previously applied to a New Zealand species.) It has been named by Nicholls *P. Beangleholei*. See Nicholls in *Vict.Nat.*, LX (1942), 9 (but the remarks on *P. rufum* R.Br. must be read in conjunction with later information; see note on *P. rufum* below).
- Prasophyllum rufum* of R. D. FitzGerald's *Australian Orchids*, II, 4. This cannot now be accepted as *P. rufum* R.Br. See Rupp in *Proc.Linn.Soc.N.S.W.*, LXXIX (1944), 277. FitzGerald's plant is at present without a valid name, and it cannot be said with certainty that it has ever been collected since its publication.
- Prasophyllum Tadgellianum* Rogers. Identical with *P. alpinum* R.Br. See Nicholls in *Proc.Roy.Soc.Vict. (N.S.)*, Pt. 3 (1933), 32.
- Pterostylis gracilis* Nicholls. Identical with *P. foliata* Hook.f. in *Fl.Nov-Zel.*, I, 249.
- Thelymitra Chisholmii* Nicholls. Identical with *T. McKibbinii* F.Muell. in *The Melbourne Chemist* (1881), 44. (See note by Nicholls in the present number of *Vict.Nat.*, p. 62.)
- Thelymitra Holmesii* Nicholls, *T. Merranae* Nicholls, and *T. truncata* Rogers. Nicholls (*Vict.Nat.*, LX (1943), 55) has reduced the first of these to a form of *T. pauciflora* R.Br., and the two last to forms of *T. ixioides* Sw. I am not convinced of the correctness of this treatment in regard to *T. truncata*, which seems to me sufficiently distinctive to retain specific rank. But I acknowledge that my experience with these forms has been very limited.

(b) SPECIES WHOSE VALIDITY IS AT PRESENT CONSIDERED DOUBTFUL

- Pterostylis alveolata* Garnet. In *Vict.Nat.*, LVII (1940), Nicholls has expressed the opinion that this is identical with *P. obtusa* R.Br. Garnet has replied at length (*l.c.*, 152). I have seen only two specimens of Garnet's plant, and am therefore not very well qualified to express a definite opinion; I can only say that had I collected these two specimens myself, I should have probably included them in *P. obtusa*, which varies a good deal from the type form.

Pterostylis Boormanii Rupp. In *Vict. Nat.*, LXI (1944), 22. Willis and Nicholls express the view that the description of this species fits *P. squamata* R.Br. Now the latter was named from the "scaly" character of the stem, which is almost covered by bracts. In none of the six known specimens of *P. Boormanii* are there more than two stem-bracts. Other differences, mostly in the floral structure, are tabulated in a note to the original description. The late Dr. R. S. Rogers, who was certainly familiar with *P. squamata*, had written on the folder in the National Herbarium of N.S.W. containing Boorman's specimens, "An undescribed species."

Pterostylis Whitei F. M. Bailey. By courtesy of the Queensland Government Botanist, C. T. White, F.L.S., after whom this plant was named, I have been permitted to examine the Queensland Herbarium material, collected by White many years ago. It is not in good condition, but I am strongly of opinion that it is identical with *P. parviflora* R.Br. Fresh material from the type locality would probably settle the matter.

SUPPLEMENTARY NOTE

Genus *Pogonia* Juss.—Schlechter in *Engl. Bot. Jahrb.*, xiv (1911), 402-4, restored to generic rank the section *Nervilia* (Comm. ex Gaud.). All the Australian species belong to *Nervilia*.

Genus *Corysanthes* R.Br.—Salisbury's name *Corybas*, having priority of publication, is now restored.

Phalaenopsis Rosenstromii F. M. Bailey.—I understand that this is now generally accepted as a variety of *P. amabilis* Bl., but I have not been able to trace any publication to that effect.

Pleurothallis limenophylax (Endl.) Benth.—This appears in Bentham's *Fl. Austr.*, v i, and in F. M. Bailey's *Queensl. Fl.*, v, as a Queensland species. In *Proc. Roy. Soc. S. Austr.*, LIV (1930), 40, Rogers explains how Bentham, through no fault of his own, was misled into supposing the Queensland plant identical with *Pleurothallis limenophylax* Endl., discovered by Bauer on Norfolk Island. Actually it is quite a different species, and Nicholls has now set the matter right by naming it *P. crassiuscula*. (Refer to Index.)

PRIMITIVE FIRE LEGENDS

"Myths in many parts of the world illustrate the fireless period. One from Cape Grafton, Queensland, relates that once there was no fire on the earth, so the Red-back Wren flew to the sky and got it—he wished to keep it a secret, so he hid the fire under his tail, and upon his return told his friends to try to make it with wood. They tried, but made their hands very sore in twirling and rubbing bits of wood together, until on one occasion one of them saw the fire hidden under the wren's tail; he laughed with great glee at the wren for having it stuck there, and the latter had to reveal the secret. Another myth, from Buka Strait in the Solomon Islands, relates that a man and his wife noticed that when the wind caused two branches of a tree to rub together sparks were produced, whereupon they produced fire with two sticks and were able to cook their taro. They were more generous than the wren and told all their friends how to make fire."—"Fire Without Matches," by F. D. McCarthy, in *The Australian Museum Magazine*, May 31, 1945, p. 368.

QUEER FOOD PREFERENCES OF CATS

By FRANCIS ESPERSON, Bungaree.

I have known cats to eat the most unexpected things. One of my cats had a taste for mushrooms and always helped herself largely when they were brought in; another one had a passion for iced cakes, while a third disliked fish. So it seems that, in dealing with such highly individualistic animals, there are sure to be some cats which do eat something another one could not. This may throw light on the conflicting experiences of observers that were aired in the *Naturalist* some time ago under the question, "Do cats eat bandicoots?"

[My cat has always been attracted by asparagus shoots, avidly devouring one after the other of these cooked delicacies, and doubtless other naturalists could add almost indefinitely to a list of feline food vagaries. In Tasmania I had a cat which made friends with a bandicoot and used to entice the marsupial into our garden and frolic around with it on moonlit nights. Eventually the play must have become too rough, for one morning the bandicoot was found lying dead.—]H.W.]

EXTENSION OF RANGE OF *ACACIA MUELLERIANA* AND
A. SUBULATA

The existence of the above very rare and beautiful species of the genus *Acacia* in Central Western N.S.W. has been proved by research by my brother Peter and myself. Previously both species were known only from the Upper Hunter River, N.S.W., and adjacent areas, and the range of both species has been extended approximately 100 miles westward to the fringe of the Western Plains near Dubbo. As long ago as 1943 *A. subulata* was identified 20 miles east of Dubbo on the Mendooran Road. Since then it has been found sparingly distributed from there to within 10 miles of Mendooran—a distance of 26 miles. *Acacia Muelleriana* occurs only over a half-mile wide strip, 29 miles from Dubbo on the same road.

Geologically, the area where these rarities are found is very interesting. It consists mainly of an intermixture of sandstone and ironstone ridges, gently undulating country, with a heavy growth of shrubs and trees—mainly *Eucalyptus sideroxylon*. It is said that the country represents the fringe of an ancient inland sea. Be that as it may, I think the most interesting feature is the incursion of typically coastal and mountain plants such as represented by the following genera: *Boronia*, *Eriostemon*, *Actinotus* (here represented by *A. helianthi* as an upright branching shrub to 4 ft.), *Isopogon*, *Acrotriche*, etc.

Acacia Muelleriana here is a shapely shrub of from 5 to 7 ft., densely branching, pyramid-shaped, with dainty pinnate leaves. Leaflets in the instances noted were always recurved (margins), otherwise they were like small replicas of *A. decurrens*. Flowers were of lighter colour than in this species and borne in abundance. Plants were seen flowering at only a foot high.

A. subulata, an upright, smooth-stemmed, small tree of from 8 to 12 ft., was nowhere plentiful. It is a handsome species with linear phyllodes, and in summer bears masses of lemon-yellow flowers. A feature of this species is the long, narrow seed pod (usually 6 to 8 inches). In the 26 miles where these species occur, upwards of 30 different *Acacias* have been found and the area is by no means systematically explored.

G. W. ALTHOFFER.

Dripstone, N.S.W.

EXCURSION TO QUEEN'S PARK, ESSENDON

The combined excursion with the Bird Observers' Club on May 26 was favoured with excellent weather. Between 50 and 60 members and a few invited local residents were present, including Mr. Ivo C. Hammet (President, F.N.C.) and Mr. A. S. Chalk (President, B.O.C.). Mr. Hammet welcomed the participants, and Mr. H. C. E. Stewart (Vice-President, F.N.C., and a resident of the district) spoke on the botanical features of the Park. His report is as follows:

"The Park is not without some attractive botanical features and Australian trees are well represented. One or two Bunya Bunya Pines (*Araucaria Bidrovillei*) attain a fair size, and eucalypts, principally Sugar Gums, are extensively set out on the north-west boundary, but lopping back gives them a bedraggled appearance. A "Marri" (*Eucalyptus calophylla*) was noticed in full bloom, and the Red Ironbark (*Eucalyptus sideroxylon*) still showed colour with red pendant flowers. A healthy young specimen of *Stenocarpus sinuatus*, the "Firewheel-tree," was profusely embellished with bright scarlet inflorescences. Silky Oaks, Sweet Pittosporums, Cabbage-tree Palms, Moreton Bay Figs, Lilly-Pillies, and Illawarra Flame Trees flourish in the limited area of the Gardens. The prevalent fashion in arboriculture of cutting the lower branches of trees and clipping under-shrubs to obtain an open park-like aspect gives rather an artificiality to the vistas so obtained. Swamp Tea-tree would be a good subject to plant on the lake islets, to replace such untidy species as exotic ivy."

Before moving to the lake with its full complement of winter inhabitants the party was interested in three species of black and white birds within a few feet of each other—a White-backed Magpie, a Magpie-Lark on the same branch of a tree and a Black and White Fantail flying lower down. A used nest of a Black and White Fantail was also seen. At the lakeside attention was called to the historical interest of the Park: here it was that Burke and Wills obtained water and made their last camp before starting on their famous journey northwards. A granite stone marks the tree under which the explorers pitched their tent, now in the busy Mt. Alexander Road.

On the lake was a pair of Black Swans and a cygnet about seven weeks old—an unusual time of year for these birds to have young. It was explained that these large-bodied birds rising for flight in numbers make a tremendous noise, caused by the rapidly beating wings and the paddling of their webbed feet on the water for considerable distances, the noise and distances being greater in calm weather. They do not touch the water with their wings.

Grey Duck were the most numerous of all birds seen. They nest most successfully on the three islets of the lake. Hard-head or White-eyed Ducks were in numbers. Grey Teal and our largest duck, the Chestnut-breasted Shelduck or Mountain Duck, were represented.

The Dusky Moorhen, with fully-grown young in very dusky plumage, and the Little Grebe, which nests in the open water, also had fully-grown young birds. The Australian Coot was a bird of interest, but the highlight of the afternoon was the Nankeen Night Herons: their habit of perching all day in the same trees allowed of close observation. No large striped young were seen, generally plentiful at this time of year.

It is pleasing to note that Mr. Greville (Curator of the Park) does not believe in pinioning birds, so they may come and go at will. General items of interest were hundreds of discarded nymphal cases of a species of dragon-fly, adhering to the holes and branches of trees on the lakeside. A very large specimen of "Witches' Broom" (caused by a fungus) on the top of one of the largest elms, was also a conspicuous object.

M. L. WIGAN.

GRAVEL ON ANT MOUNDS

(To the Editor)

Sir,—In the June issue of your journal there is a query by Marc Cohn, of Bendigo, regarding the gravel and stones on the mounds of the mound ant.

Several years ago I made a journey by caravan along the Murray Valley, and had plenty of opportunities to study the behaviour of these ants, for there were many mounds of populous colonies. I regarded these as *Iridomyrmex defectus*. As all naturalists are aware, there are few stones to be found in the red alluvial silt of the Valley, so in the absence of "native" stone, the top of the mounds was covered with a very liberal supply of small pieces of grey granite. Of course, there is none of this rock in the immediate vicinity, so the ants gathered it from the crushed material on the road. The pale grey granite appeared to be white in sharp contrast with the red of the silt. Investigation revealed that the granite had been crushed near Mount Hope, and had been transported to Gunbower Island by the Country Roads Board for the topdressing of the road, which was at least 200 yards distant from the mounds.

In this case at least, the ants carried the pieces at night, for I observed them many times at the work, although some of the granite fragments were very large.

Mr. Cohn suggests that the ants use the stones to guard against the erosion of the mound by rain. Of course, the stones would afford a protection in this way. There is, however, another aspect. The stones, when heated by the sun during the day, would radiate heat at night time and thus serve to maintain a more equable temperature in the nest. In Queensland, stony hillsides are much sought after for banana plantations, because the sun-heated rocks thereon render such situations warmer than they would otherwise be at night.

TARLTON RAYMENT.

Sandringham, Vic.

"VICTORIAN HISTORICAL MEMORIALS TO EXPLORERS AND DISCOVERERS"

A brochure with the above title has been prepared for the Historical Society of Victoria by Charles Daley, B.A., and the late Sir James Barrett, K.B.E., and issued recently. This booklet epitomizes the splendid work performed by the Society in perpetuating by suitable memorials the pioneer achievements of navigators and explorers in this State. Not only scholars in our schools and the public generally should read the record, but every Field Naturalist should acquire a copy and help to foster a reverent Australian spirit. Already fine statues in our cities and lines of stone cairns and tablets throughout the countryside have been erected to commemorate the great names of Cook, Flinders, Bass, Mitchell, Hume and Hovell. The work of the Society has been interrupted by war, but we trust its activities will be resumed in the future.

A scientist of renown, Robert Brown, of the Flinders expedition, and first botanist to visit these shores, requires adequate perpetuation of his memory. A small tablet exists at Arthur's Seat, Dromana, but we should see that a worthier expression is permanently established in Melbourne explaining the initials of R.Br. on many plant labels in the Botanic Gardens. Also inscriptions on stone at The Horn, Mt. Buffalo, and at Mts. Hotham, Feathertop and Bogong, to record the first ascent of these peaks by the explorer and botanist Baron von Mueller, merit consideration. The Historical Society of Victoria is not unmindful of the claims of such eminent men.

H. C. E. STEWART.

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PROCEEDINGS

The monthly meeting of the Club was held on August 13, 1945, at the Lecture Room of the Public Library, the President, Mr. H. C. E. Stewart, and about 140 members and friends attending.

The President welcomed back the Hon. Editor, Mr. A. H. Chisholm, who had been serving for several months as Press Liaison Officer to H.R.H. the Duke of Gloucester; and also welcomed a visitor, Sgt. B. Boinin, of the Canadian Forces.

The President announced that it had been decided to hold a two-days show (23rd-24th October) at the Hawthorn Town Hall, and that a committee to discuss preliminary matters would meet at the Club rooms on Friday, August 17.

The President announced that a Junior Branch at Toorak and a Country Branch at Bendigo were in the process of formation. The Bendigo branch would be inaugurated on October 27, and a week-end excursion for this purpose would be arranged.

Letters thanking the Club for Honorary Membership were received from Mrs. Edmondson, Miss Freda Bage, Mr. Alister Clark and Mr. David Fleay.

Recent excursions were reported on as follows: Bird excursion to National Museum, Mr. H. C. E. Stewart; Wattle Park, Mr. A. S. Chalk.

The following were elected as Ordinary Members of the Club: Mrs. E. Chugg, Mrs. C. Tollit, Miss A. Adams, Mr. K. W. Presser; and as Country Members: VX89007, Capt. L. C. Viney, and Mr. H. Woodlands.

General Business

A letter from the Misses Wilson re Cheltenham Park and native flora was read. Mr. Hyam, in commenting, recommended the setting aside of a special area, which could be replanted with original species and properly fenced off. It was emphasized that without proper protection from visitors any work along these lines would be wasted. Mr. V. H. Miller suggested that the matter be further discussed by the committee, which was agreed to by the meeting, and the President thanked the Misses Wilson for their interest in the matter.

Killing of Possums by Coursing Dogs

This matter, which had first appeared as a news item in the Press and which was commented on at length by Mr. P. C. Morrison in a broadcast, was brought before the meeting. Mr. Morrison added somewhat to his previous remarks, and after further discussion the matter was referred to the committee for action.

Miss R. S. Chisholm, speaking of a recent gift of money to the Botanic Gardens, asked if the F.N.C.V. would have any say in the way the money was to be used. Mr. Morris stated that the income from the donation would be about £1,000 per year, and suggested that a letter be written to the Director asking for details of the gift and the administration. Mr. Stewart said he thought the money should be used for enlarging the gardens, particularly in providing additional space for the Australian section.

Mr. Morrison stated that the sum was £30,000 and was to be administered by a specified board of trustees, including the Chief Justice (Sir Frederick Mann), Professor J. Turner, and others.

Nature Notes

Mr. V. H. Miller reported having recently seen and heard the love song and display of a White-throated Tree-Creeper at Ringwood. He suggested that this was something rarely seen.

Mr. C. C. Ralph reported that weeds have taken root on sand covering seaweed at Pt. Cook, and he suggested it was a natural reclamation taking place.

EVENING OF QUESTIONS

The questions asked and comments given were as follows:

1. State the difference between "Magma" and "Migma" in terms understandable by the ordinary person. Mr. O. P. Singleton gave a general reply to this question.

2. Will the indiscriminate introduction of D.D.T. as large-scale insect-destroyer result in undue upsetting of the biological balance of wild life? Capt. H. E. Young stated that D.D.T. definitely would upset the biological balance, as it damaged only certain types of insects, e.g., bees and wasps, whilst aphids remained unharmed. Thus aphids would multiply out of all proportion and the pollination of plants would be affected if the numbers of bees were greatly reduced. Lack of insect food would in turn affect the birds of the district, and they would either die out or leave the area. Again, fresh-water fish were also affected by D.D.T. and certain changes would take place in the rivers and lakes of the district. When the effects wore off, as they would after a time,

the insect and bird life would return, but the pests would be first back, with few if any of their enemies to reduce their numbers. Replying to a suggestion that D.D.T. had apparently no effect on flies, Mr. Morrison stated that D.D.T. was a comparatively slow killer, apparently penetrating through the feet to the nervous system; to take effect quickly it had to be used in conjunction with a "knock down" spray. In reply to a question by Mr. R. G. Painter as to whether D.D.T. would kill the Argentine Ant, Mr. Morrison said the substance was effective against all ants, as well as bees and wasps.

3. Do snakes walk? Mr. Morrison stated there were three elements in locomotion of land snakes: (a) Scales on under-surface connected to the ribs at each end. The ribs moved in pairs, moving the scales with them; (b) movement in sinuous curves; and (c) a "shimmying" motion to find the rougher parts of the ground. To illustrate these points a short film of a snake in motion taken at the Badger Creek Sanctuary was shown. Further to these remarks, Mr. Morrison stated that a snake on a smooth surface, such as glass, goes through motions akin to swimming. In reply to a question, "Can a snake reverse?" Mr. Morrison said that the scales prevent it from doing so. Mr. E. S. Hanks reported that he had definitely seen a snake jump backwards. Mr. Morrison, in comment, said that his reply was correct as regards a snake "back pedalling," but he had noted snakes pull backwards by virtue of their grip of the ground with the curves of the hinder part of the body.

4. Is it an established fact that no bird with pure white plumage or which lays a white egg has a tuneful song? Can any reason be advanced for this strange lack of singing ability? Mr. A. H. Mattingley suggested that it was known that the ancestors of the birds were the lizards, which apparently, like the living types, laid white eggs. These eggs were obvious and were in many cases destroyed, so attempts at concealment were soon established. Birds in time hid their white eggs, but others able to better defend their eggs gradually laid coloured types. Mr. A. S. Chalk stated that pure white birds were rare. Birds that laid white eggs included the Boobook Owl, Kingfisher, Dollar-bird, Doves, Finches and Pardalotes, and some of these had pleasing songs. Mr. E. S. Hanks remarked that swamp birds were generally unmusical. Mr. Morrison stated that layers of white eggs were of two classes—primitive birds and birds which nested in hollows. The former were primitive in song as well as in other characters; the latter included many good songsters, so the questioner's first statement was only half correct. Mrs. Pinches mentioned that a pure white canary at the Zoological Gardens had a definite song.

5. How does a case-moth caterpillar set about building the case around itself? Mr. Ros Garnet mentioned that there was a complete account of this in *Insect Wonders of Australia*.

6. A compass was affected by certain rocks in the Lamington National Park. Can anyone tell why the compass behaved so? Mr. Colliver said that a basalt at Cape Schank, Victoria, known as a magna basalt, had a large percentage of iron mineral in its composition, and certain pieces of this rock definitely affected the compass, and he would suggest that the rocks were basaltic at the Queensland locality with possibly a similar iron concentration. Mr. Singleton stated that magnetite iron ore was a component part of all basalts, and it was quite possible that there was a larger percentage of this particular mineral in the rocks of this Queensland area. Capt. Young said that rocks of the district were basalt. Mr. A. A. Brunton mentioned that rocks of North Spain caused shipwrecks through the compass being affected, and Mr. Morrison stated that Magnetic Island obtained its name from Captain Cook, through its apparent effect on the compass, and as far as he could remember the rocks were basaltic. Mr. H. C. E. Stewart suggested that the plane crash in the Macpherson Range some time ago may have been due to similar compass troubles.

7. Is there any law against pollution of the Yarra? Do firms on the river banks pay any pollution or damage charges, as pollution takes place from Hawthorn to Newport? Mr. C. C. Ralph explained that the matter of pollution was within the control of municipal bodies, and the Melbourne and Metropolitan Board of Works was also interested. Mr. G. N. Hyam stated that regulations were very definite about discharge of oil in the Bay, but leakages did occur.

8. Has it been established whether the Boobook Owl or the Podargus is responsible for the call "mopoke"? Miss Wigan stated that the Boobook Owl gives the "mopoke" call, the call of the Podargus being an "oom-oom."

9. What bird calls "mopoke" in New Zealand? Mr. Morrison said that a relative of our Boobook Owl, but a species confined to New Zealand, produced this call.

10. Does the dingo turn round and round like a dog before lying down? Mr. Colliver stated that this habit was an ancestral one in the dog family, and the dingo being a dog would certainly do it. This was confirmed by Mrs. Pinches, who had noted the Zoo dingos doing so.

11. Can anything be done to restore the colour in blue and pink hyacinth hulls which have reverted to the white-flowered condition? Mr. G. N. Hyam suggested that an acid soil might help, but this generally suggested a reversion to type and could not well be overcome. Similarly, pink gladiolus revert to the scarlet form.

EXHIBITS

Mrs. P. Fisch: *Eucalyptus Preissiana*, garden-grown.

Mr. N. A. Hausen: *Aspidistra* in flower.

Mr. P. Laird (through courtesy of Queensland Stations Ltd.):
Specimens and photographs of the Buffalo Fly.

Mr. C. French: Garden-grown specimens of the fine-flowered
Protea (*Protea compacta* or Ruby *Protea*) from South Africa.
Specimens from Canterbury.

Mr. Tom Griffiths: A book of pressed ferns, including Maiden-
hairs (*Adiantum*) from Australia, Brazil, New Zealand and
America.

Mr. R. G. Panter: Garden-grown native plants, including
Grevillea oleoides var. *dimorpha*, *G. rosmarinifolia*, *G. Thel-
maniana*, *Olearia flavescens*, *Cassia artemisoides*, *Banksia collina*,
and *Hardenbergia monophylla* var. *rosea*.

NATURAL HISTORY MEDALLION

The current award of the Australian Natural History Medallion has been made to Mr. C. P. Mountford, the South Australian ethnologist, in recognition chiefly of his fine work in studying, filming, and writing about the natives and the landscape of Central Australia. Several nominations for the honour were received from scientific and natural history societies in various States, and it is understood that Mr. Mountford won only after close competition with certain other sound workers. The presentation of the Medallion was made—Mr. R. H. Croll officiating on behalf of the societies concerned—at a meeting of the Melbourne Bread and Cheese Club last Sunday, September 2.

The choice will be generally applauded, for Mr. Mountford has greatly stimulated, both in Australia and America, interest in the Central Australian scene, mainly through his films but also through writings such as his book on the Art of Alvert Namitjira, the aboriginal artist. His recent lecture tour in the United States was so successful that he has been invited to return, and, moreover, he has been asked to direct an American expedition in Australia.

Aged 55 years, Mr. Mountford is an employee of the Postmaster-General's Department, Adelaide. Practically all of his natural history work has been done in his spare time. He was awarded the Sherlock gold and silver cups for amateur cine films in 1941 and 1942.

WILD NATURE EXHIBITION

The Hawthorn City Council has made the Hawthorn Town Hall available for a two days' exhibition by the Club on Tuesday and Wednesday, October 23 and 24, together with Monday, October 22, for setting-up the display. All Club members are earnestly requested to help make the show an outstanding "Victory" success. The co-operation of country members in forwarding suitable native flowers and objects of natural interest is specially invited. A meeting to formulate plans is fixed for Wednesday, September 12, at 7.45 p.m., in the Royal Society's Hall, Victoria Street. Will members kindly endeavour to be present, so as to prepare a show worthy of Club traditions and the splendid gesture of the Hawthorn Council?

COMMENTS AND WONDERINGS

By JEAN GALBRAITH. Tyers, via Traralgon.

I suppose there are many of us who enjoy *The Naturalist* every month, but who, for various reasons, contribute little to it. Either we have no time to write at length or our little notes seem too unimportant to send. If we were speaking with fellow-members we would often exchange observations and discoveries. Even if we wrote to them, as we used to do in pre-war days of greater leisure, there are many things we would tell them; I know I should. But time, as well as material, for a full length article on one subject isn't often available.

Realizing this, I have during the past year jotted down nature notes that I might have shared with fellow-members, had they been nearer. Not one of them was worth sending separately for publication in *The Naturalist*. Put together, they make a patchwork of the sort of odd bits of news that we nature lovers like to share when we talk together.

First, two comments:

One is on Mr. Beck's article on the non-migration of Welcome Swallows (*Naturalist*, Aug., 1944).

Until 1927 Welcome Swallows gathered here in hundreds in autumn, flocking before migration. One day they would go, and it would then be unusual to see a swallow until the return in spring. For several years following 1927 we were struck by the absence of swallows. We rarely saw any, and if we did see one or two it was as likely to be in winter as at any other time. Since that time there has been no autumn flocking and swallows are never seen in large numbers, but there are a few about all the year round. I can suggest no reason. Much of the timbered country in the district has been cleared in the last twenty years, but I cannot see how that would affect them.

The second comment is on "Notes on the Olive-backed Oriole" (C. E. Bryant, February, 1945).

Orioles frequently visit our garden, occasionally nesting here. Regularly every year they mimic (or "borrow") the notes of the Black-faced Cuckoo-Shrike, mimicking the birds so exactly that until I see them or hear them break into the familiar "Ori-ori-o-lee" I do not know whether Oriole or Cuckoo-Shrike is responsible for the calls. Less regularly, but very often, Orioles also mimic the chattering notes of Eastern Rosellas as they talk together in the trees.

The rest of my notes are wonderings.

I wonder:

1 Why *Acacia verniciflua*, when it grows on the ironstone north of our valley, has fairly straight phyllodes half an inch wide,

while in a gravelly hollow to the east of us, and on the limestone and conglomerate to the west, it has sickle-shaped phyllodes a quarter of an inch wide?

2. Why White-faced Herons, which we usually see alone or in pairs, and rarely in small flocks, should gather in a flock of about forty in July, and work over several riverside paddocks as systematically as ibis?

3. Why, when I had seen only one Nankeen Night Heron and one White-browed Babbler in this valley, and that in each case over ten years ago, I should see both in our orchard this week - and also this week hear a Whistling Eagle for the first time, the first "new" bird here since the visit of White-backed Swallows in 1942?

4. Why, when we visited a well-known patch of *Pterostylis pedunculata* on July 16, one should be in flower, while all the rest, apparently growing under exactly the same conditions, were hardly in bud?

5. How one *Hakea sericea* came to a paddock a mile from here when the nearest wild ones grow ten miles away? Isn't it more likely to be a seedling from the one growing in our garden, carried by wind or bird? If so, may not other attractive garden-grown natives be spread in this apparently natural way?

6. Why, after several years, a pair of possums (we suppose) have not learned that however many leaves and branchlets you drop into a hollow tree you can't fill it up when there is a hole at the bottom through which they fall out?

7. Why, every winter, three kookaburras go in and out through a hole in that same tree, and spend much time examining it?

BOOK NOTICE

"Dr. Hubert Lyman Clark reports that his long manuscript concerning the derivation of the Australian fauna has been completed and accepted for publication by the Carnegie Institute of Washington."—From 1944 Annual Report of the Museum of Comparative Zoology, Harvard, U.S.A.

PUBLICATIONS DESIRED AND OFFERED

1. Mr. D. Greenwood (35 Grandview Gve, East Prahran, S 1) would be glad to hear from any member who is prepared to sell a copy of the *Horticultural Colour Chart*, Vol. I, 1939, published by the British Colour Council in collaboration with the Royal Horticultural Society of London.

2. Mr. Harold Meeking (Flat 12, "Pajala," 25 Charnwood Rd., St. Kilda, S.2.) has certain back numbers of *Wild Life* which he would be pleased to offer any person desiring to complete their set. The numbers available are: Vol. 2 (Nos. 4, 5, 9); Vol. 3 (Nos. 4, 8); Vol. 4 (Nos. 4, 8, 9, 10); Vol. 5 (Nos. 4, 5, 8); Vol. 6 (Nos. 1, 2, 4, 7, 9, 10, 11, 12); Vol. 7 (Nos. 1, 2, 3).

SEA LIFE AT SORRENTO

By EDITH COLEMAN, Blackburn, Victoria.

For many years Sorrento has been for me a naturalists' paradise. A complete issue of the *Victorian Naturalist* would be inadequate to record the many interesting plants and animals seen in this locality during spring and summer months. It is an especial pleasure when the grey days of autumn and winter provide abundant specimens for study.

Some of the most beautiful of all sea creatures (*Beroa*) were an unanticipated prize in June. Hosts of the hollow, gelatinous bodies were seen in shallow water on the Bay beach. Longitudinal ridges, edged with cilia which act as oars for propelling the exquisite little craft swiftly through water, caught the light with every movement, turning almost colourless, glass-like bodies into some of the most beautiful of jelly-fish (*Ctenophora*). The shapes of the iridescent creatures changed freely, widening or contracting as they "dredged" for food. Some which were placed in a glass of sea water shed sand-like eggs into it. These hatched in a few hours into almost spherical larvae which navigated their little ocean as swiftly as their parents had done.

An Infant Cuttle-fish

Sorrento offers a wide range of molluscs, among them at least three fascinating members of the Cephalopoda. Although adult Cuttle-fish are often washed up on the ocean shores, a living specimen, not two inches across, is the only baby Cuttle I have seen. It was taken in shallow water on the front beach—another mid-June prize. Placed in a quart milk bottle, it instantly ejected its inky camouflage and as promptly disappeared from view. Twice the bottle was emptied and refilled with sea-water before the Cuttle again became visible. Even then, there was left in the clear water a patch of smoky mucilage, like sooty cobweb, which probably serves as a "bait" for pursuing enemies when the ink sac is exhausted.

In a large yellow pie-dish filled with water, this little sea-rocket delighted us with many swift movements and frequent colour changes, as it blushed and paled to harmonize with the surroundings we provided. When it came to rest on a tiny bed of sand, its silver, green and purple changed to the colour of the sand, into which, with a few rocking movements, it tried to sink; suggesting that, like the octopus, it was able to use its little funnel as a blow-pipe in hollowing out a bed in the sand. In this it probably lies quite invisible, waiting the approach of unwary prey.

Our Cuttle swam, or "rocketed," backward, forward or sideways with equal facility. It changed its course without pause,

PLATE V



(B) Cuttlefish with white, speckled mantle and dark, patterned arms. (Photomicrograph by Edith Coleman, 1945)



Photos by Edith Coleman.

A cuttlefish described in the text with the mantle and arms as shown in the above photos. Note that the mantle is more rounded than in the other photos. (Photomicrograph by Edith Coleman, 1945)

apparently altering the direction of its siphon to avoid hitting the edge of the dish. Well developed side fins undulated incessantly as it "trod water" or swam. In darting backward, with rocket-like speed, the eight arms streamed behind like a woman's hair. In shooting forward, they were closed together as one places the hands to cleave the water when diving.

Resting against the yellow surface of the bowl, the Cuttle too became bright yellow, of exactly the same hue. A tuft of greenish-brown sea-weed and a small rock were copied perfectly. Most remarkable was the sudden change in death to dull, silvery white.

At first I had mistaken the little creature for an octopus, despite the fins and four rows of suckers, for the eight arms were all of one length and I could see no tentacular arms. Even when the tips of the tentacles were seen protruding between the third and fourth arms, they appeared to be merely tiny bits of skin. These were a little more evident after death.

Then, as I arranged the little fellow for my photograph, I inadvertently withdrew one of the tentacular arms from its tiny pocket, to a length of about an inch. Except at the apex, where it was crowded with suckers, the tentacle was white, quite devoid of suckers. The accompanying illustration (A) shows the Cuttle after death, with the suckered tips of the tentacles just visible. Illustration (B) shows one of them withdrawn, and the other partly withdrawn, from the pockets.

I had always been puzzled over these retractile tentacles in adult Cuttles which I had examined. Some of them were up to 18 inches in length and thicker than the dowel of a child's play-pen. It had not seemed possible that these could be entirely retracted into the narrow, tubular "pouch" between the third and fourth arms. I had never found a dead specimen with the tentacles retracted; Always they were fully exerted, the power of retraction apparently being lost as life ebbs. The great suckers on those dead specimens look formidable. One can well imagine their power to adhere to their victims.

The use of these tentacular arms has frequently been questioned, but there can be little doubt, I think, that such specialized suckers seize and hold the prey, the retracted arm drawing it towards the mouth while the rest of the well-suckered arms hold their victim as in a vice. Captive Squids, so common along the foreshores, have been observed thus to capture small fish. It is interesting to recall the old belief that Cuttle-fish angle with these tentacles, withdrawing them when a "bite" is felt until the prey is in close proximity to the mouth.

Says Izaak Walton, whose book records many queer beliefs copied from Pliny, Gesner, Du Bartas and others: "The Cuttle-fish will cast a gut out of her throat which, like as an Angler doth his

line, she sendeth forth, and pulleth in again at her pleasure, according as she sees some little fish come near to her; and the Cuttle-fish, being then hid in the gravel, lets the smaller fish nibble and bite the end of it, at which time she little by little draws the small fish so near to her, that she may leap upon, then catch and devour it; and for this reason some have called this fish the Sea-angler."

As in many other old stories, there *was* an element of truth in Walton's, which, handed down by oral tradition from pre-literary times, has been absurdly embellished. It is evident from Walton's tale that early observers had noted the retraction of tentacular arms into the "throat" (pouch) but, knowing nothing of the piston-like action of the suckers and their power of adhering to prey, believed them to be the instruments of a very purposeful "angling."

Many small squids and octopuses are taken in the fishermen's nets on the Bay beaches at Sorrento and larger ones are washed up on the ocean shores (chiefly male specimens) after a big blow. One large female octopus weighing 10½ lbs. was an exceptionally interesting "find." I had watched large specimens crawling, spider-like, on the sandy sea-floor near the piers at Sorrento, Hastings and Eden (N.S.W.), but this was the first time I was able to examine so large a female. It was packed with an unbelievable number of immature ova, like small polished rice grains, many of which had broken loose and filled the mantle.

In a not very skillful dissection, I unfortunately cut into the sepia sac, which appeared to be imbedded in the liver. In a moment, every organ was hidden with the inky, rather viscid fluid, which seemed indelible. I doused it with several buckets of water before I could examine the parts, which even then were stained a dark brown. A 3-ft. circle of the grass, on which it lay, remained brown for many days. As I washed my hands I felt like Lady Macbeth: "What! Will these hands ne'er be clean?" Who would have thought an octopus had so much ink in it!

At Rosebud, after another big blow, I followed a smaller living specimen with a spread of 10 inches, which was making frequent attempts to get out into the angry surf, only to be tossed back time after time. I captured and placed it in a billy-can of seawater which it syphoned out four times, shooting the water to a distance of 18 inches beyond the can, as it tried to travel in the restricted space. No ink was ejected, the sac doubtless having been exhausted in evading enemies.

Many other interesting specimens are found after a good winter blow, even on the Bay beaches. At Rosebud I watched hundreds of stranded "Heart-urchins" burrowing swiftly into uncovered

sand-banks. These mouse-like creatures so readily shed their fine spines that dead specimens are usually quite devoid of them.

Thin-ribbed Cockles

For sheer beauty, I think nothing can equal hosts of newly stranded Thin-ribbed Cockles (*Cardium tenuicostatum*). They lay piled up in tens of thousands on the fringe of an ebbing tide, surpassingly lovely in their wonderful range of harmonious colour. We watched many an elbowed "foot" emerge, press against the sand, straighten and jerk its owner in a great, but hopeless, leap, always towards the sea, which they apparently sense even with tightly closed valves—a leap greater for their size than a man might make with the aid of a pole.

After lying on the sands, these delicate cockles lose much of their beauty, the colours soon bleaching in the sun, but while the living mollusc is within they are exquisite. One recalled Professor Beebe's words: "I am truly sorry for anyone, be he technical conchologist or casual naturalist, who, for some brief time, has never forgotten all science, all studied objective, in a wild orgy over unadulterated beauty."

DECENTRALIZATION PLAN OF SAVE THE FORESTS CAMPAIGN

The realization that forests are essential to the continued existence of the nation is one of the reasons why the Save the Forests Campaign is achieving success. Since its inception early in 1944, the Campaign has been directed by a council composed of representatives of some 50 organizations, together with a few individual members possessing special qualifications. To help achieve the objectives of the Campaign, district committees have been established to the number of 28 in various centres, as a result of meetings usually convened by the municipal authorities. Experience has shown that these committees, to be fully effective, should include representatives of all local organizations interested in community service and the preservation of our natural resources, as well as individuals with special knowledge. To evolve a practical way of giving these committees a direct voice in the Campaign, the present council held a special meeting on August 16th.

One way in which the Campaign can benefit is by grouping municipalities into regions along the lines proposed by the State Regional Boundaries Committee. A plan has been drafted and is under discussion whereby the Campaign will be directed by an executive of 27 members, 13 of whom will be direct representatives of groups of district committees, one group being established in each of the 13 regions into which the State is divided. It would be desirable to have more frequent council meetings than once a quarter, but at present travel disabilities and manpower shortages make it impracticable. Still, if our forests are worth saving they are worth saving now, and therefore the time has come when all of us must decide whether we are satisfied that all is well with our attitude towards forests and forestry.

COLOURFUL MYCENAS AND OTHER WINTER FUNGI IN THE DANDENONG RANGES

By R. D. LEE, Melbourne.

Sherbrooke is an excellent hunting-ground for the fungus enthusiast. More than 230 species from the different genera have been listed by Club members for the district, although one is not likely to find more than a few of these in a day's ramble.

Notwithstanding the abnormally dry autumn season, a private trip to Sherbrooke Forest during the month of May rewarded us with a good collection of fungi, and other species were found on the Club's excursion of June 10.



The Hooded Fungus, *Xerotus archeri*.

Photo. by R. D. Lee.

Dainty representatives of the genus *Mycena* were conspicuous, and the first species we saw was *M. sanguinolenta*, a dull red specimen growing on the end of a decaying log. There is no mistaking this toadstool on account of the reddish-brown juice which exudes from any damaged part, and another feature is the same colour which forms an edging to the paler gills. Noted also were red mycelial threads or hairs at the base of the stem.

Beginners in Mycology are surprised to learn that the spores of all *Mycenas* are white, despite the colour of the gills on the fruiting body generally. *M. pullata* was plentiful. With long slender stems (up to 6 inches) and slightly striated caps of smoky brown,

they were found growing on the ground amongst leaves, etc., or even from the bark of living trees.

Perhaps the most beautiful of the day was *M. rosella*, growing in a cluster of about 30 from a rotten stick on the ground. Varying in colour from pale lilac at the edge of the cap to a deeper shade at the umbo (the raised part or knob at the centre), they made a very pretty spectacle.

Numbers of *M. subcapillaris*, looking for all the world like white pins stuck in a dead stick, were intertwined by equally numerous thread-like *Marasmius equicrinis*, "Horsehair Fungus." The latter is a most remarkable fungus, growing in tangled masses on the ground or on logs. The stem, 12 inches or more long, terminates in a minute cap which is complete with the most symmetrical of gills, so tiny that one needs a strong glass to see them at all.

We mustn't forget *M. interrupta*, the "Pixie's Parasol," another really beautiful member of this genus. Surely no one can fail to find delight in this dainty little blue fungus. Its first indication on a log or dead branch is a tiny ball of bright blue which develops into a pileus or cap about a quarter of an inch across, pale blue around the edge and deepening towards the shallow umbo; this surmounts a 1-inch high stem, springing from the blue basal disc. *M. subgalericulata* was abundant on decaying timber, in dense clusters as though arranged in galleries, one over the other, hence the specific name. The colour of the pileus varies from nearly white to a very dark brown.

Not so common, perhaps, as the previous kinds was *M. epipterygia* with a pale cap, white gills and, in our find, a long slimy yellow stem growing from debris on the ground and more or less solitary; its cucumber-like odour is pronounced. Another slimy-stemmed species (so slimy that we could hardly hold a specimen for examination) was *M. subvulgaris*. Here the stem is white, pileus dark dingy brown, and all specimens growing in dense clusters.

But enough of the Mycenas, of which possibly only a few of our Australian species have been named and classified.

Other Toadstools

The genus *Collybia* was represented among our finds by the species *radicata*, *elegans* and *velutipes*. *C. radicata* can easily be identified by its long rooting "tail" with which the rigid stem terminates. A dull brown, flattish cap (three inches in diameter) has the margin incurved and is borne six or more inches aloft. The gills and spores are white, the latter, of course, typical of their genus.

Collybia elegans was named from its charming appearance, with

red velvety cap, white to cream gills and a stem somewhat the colour of the cap, but shading to nearly white near the top. Beautiful indeed are the groups found amongst leafy litter on the ground. *C. radicata* and *C. elegans* are essentially terrestrial, but *C. velutipes* is to be found clustered on dead trees or logs, particularly Acacias. Here is another beautiful species, which can easily be recognized by the moist honey-coloured cap and gills and the dark velvety brown stem from which it derives both the specific and common names of "Velvet Foot."

Sturdy *Cortinarius austro-venetus* was almost overlooked: the cap of dull bottle-green tends to make it inconspicuous, but seen from underneath the vivid yellow stem and gills help to brighten it.

Another gilled type is the rather uncommon *Xerotus archeri*, which grows in the shape of a little cowl or hood from the sides of logs and sticks, hence the common name "Hooded Fungus." My photograph is sufficiently descriptive so we will only mention that the colour is dull vieux-rose to warm cocoa-brown, or sometimes reddish.

One could continue describing, almost indefinitely, the different fungal gems we found: *Pleurotus cinerascens*, the tiny "Fairies' Fan"; *Flammula excentrica*, like a piece of orange peel, viewed from above; *Lepiota gracilentia*, the elegant "Parasol Fungus"; *Armillaria mellea*, "Honey Fungus"; *Psathyrella disseminata* in troops; species of *Pholiota* *Russula*, *Cantharellus* and *Clitocybe* were all observed among the agarics.

Of other families were the genera *Polystictus*, *Polyporus*, *Poria*, *Lycoperdon*, *Goastrum*, *Typhula*, *Stereum*, *Xylaria*, *Heterotextus*, several brilliant species of *Clavaria*, and the common giant "bracket," *Ganoderma*.

NORTHERN TERRITORY BETTER THAN ZOO

When Royal Navy men saw their first kangaroo near Darwin, one commented: "By Gooon! Chum, it beats London Zoo." The sailors had to go 35 miles inland for their first glimpse of the famous Australians, stated Captain Champion, A.C.F. Commissioner lately on leave from Darwin.

Many picnics into the tropical bush are arranged by Australian Comforts Fund for the men of the R.A.N. and R.N. and they enjoy every minute of them, showing a very live interest in our fauna. Australian Comforts Fund, besides arranging picnics, are doing their utmost to enable these men of our Royal Navy to see as much as possible during brief leave periods. If any interested readers would care to volunteer help in this regard, please contact Mrs. W. Riddell, Officer-in-charge, Aust. Comforts Fund Hospitality and Information Bureau, 243 Collins Street, Melbourne (MU 3130).

DEATH OF HARRY BURRELL.

A very distinctive and important contribution to Australian natural history was made by Harry James Burrell, O.B.E., C.M.Z.S. (London), F.R.Z.S. (N.S.W.), who died suddenly at his home at Randwick, Sydney, on July 29, 1945.

Born at Double Bay (N.S.W.) on January 19, 1873, Burrell had very little schooling and led a "knockabout" career (including some years on the stage) until he married Susan Emily Hill, of Caernarthen Station, Manilla, N.S.W., and began to take an interest in the wild life of the area. Soon, then, he developed a useful working knowledge of both mammals and birds, but his attention was claimed chiefly by the Monotremes, and in particular the platypus.

A keen, analytical mind, with a strong natural bent towards field research, became revealed as the former comedian continued his studies of *Ornithorhynchus*. Devoting all of his spare time to work on the rivers and at a "platypusary" of his own invention, during about 25 years, he discovered many new facts about "the world's most curious mammal," and eventually became the chief authority on the life-history of his subject. He was instrumental in having the voice of the platypus recorded, and in addition he had a film made depicting the habits at large of the Monotremes. Also, he was the first man to keep baby platypuses in captivity, and he provided the living adult specimens that were taken to America and caused such a stir there in 1922.

But Burrell's most notable monument is his book, *The Platypus* (1927), which remains the most authoritative work of its kind in the world. Only a mammal as remarkable as the platypus could have provided material for such a book, and only a man of Harry Burrell's resource and tenacity would have endured the many years of gruelling work that went to the gathering of that material. Originally the book was prepared in association with Professor L. Harrison (who assembled the historical and technical data), but after a difference with the publishers Harrison retired and left Burrell to carry on the work.

A great deal of valuable material was collected by Burrell during his years of study; some of this was presented to Sydney University, but the greater portion, a unique series of Monotreme exhibits, said to be valued at about £10,000, was given to the Australian Institute of Comparative Anatomy, Canberra.

It was through the medium of the platypus that Mr. Burrell gained the O.B.E. and various scientific honours. For his own part, however, being a hardy and breezy Australian, he was content to be known as "The Platypus Man," or, by way of variation, "Duckbill Dave"! It was in the "Duckbill Dave" spirit that he wrote his most amusing material, both prose and verse—oddments full of quaint fancies and puns and general toying with words.

Late in 1927 Burrell was stricken down—"donged," as he termed it—while working in the cold waters of the Namoi. His left leg, left arm, and side of the face became paralysed. It seemed then that the career of the "platypoditudinarian" (again his own phrase) had ended. But, unlike his younger fellow-worker Harrison, who sustained a similar affliction at about the same time, he made a remarkable recovery and continued to work and to jest in the old familiar way.

After that, however, he spent all of his time with his wife in Sydney. They sold Caernarthen eventually and lived quietly at Randwick. There they entertained many eminent men of science, both Australians and others. Mrs. Burrell died a few years ago, and the widower married again last year. There are no children.

Burrell was a very distinctive personality—not only a remarkable example

of a self-taught man rising to eminence in natural history, but a simple-witted, hearty, and amusing fellow who never lost his sense of fun. Many of us will hold him in fond recollection.

A. H. CHRISTOLM.

AUSTRALIAN ORCHIDS, 1900-1945

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

As the compiler of this Index in the August number of the *Victorian Naturalist*, I desire to express my regret for certain inaccuracies and omissions which escaped my notice. The following corrections should now be made:

- Page 66. For *Anaclochilus* read *Anoctochilus*. Both spellings have been in use, but the diphthong *oe* seems now generally adopted.
66. After *Caladenia Bryceana* add *C. cordiformis* Rogers, *ibid.*, XLIV (1920), 330, V., T.
66. *Caladenia hastata*. Read *Vict. Nat.*, LVIII, NOT XLIX.
66. *Caladenia integra*. Read (1933), not (1923).
66. *Caladenia rigida*. Read p. 45, not p. 46.
66. *Calceana Nublingii*. Read *ibid.*, XLVIII (1931), 15; not i. (1934), 239.
67. *Dendrobium Carrii* and *D. Fleckeri*. Read (1937), not (1936).
67. For *Diuris rhomboidea* read *Diuris rhomboidalis*.
67. *Drosera Jeunensis*. Additional reference, *ibid.*, XLVIII (1923), 340.
68. *Microtis truncata*. Additional reference, *ibid.*, XLVII (1923), 340.
68. *Prasophyllum ciliatum*. Read (new ser.) XXV (1912), 111; not as printed.
68. *Prasophyllum diversiflorum*. Read p. 8, not p. 6.
68. *Prasophyllum ellipticum*. For pp. 323 and 340 read pp. 325 and 341 respectively.
68. *Prasophyllum pallidum*. Read (new ser.) XLVI (1934), 33, not as printed; and add V. after S.A.
68. *Prasophyllum parvicellum*. Read Vol. XIV, not Vol. 3.
69. *Prasophyllum Rupprii*. Read p. 292, not p. 125.
69. *Pterostylis alveata*. After (1939) read p. 91, not p. 152.
69. *Pterostylis constricta*. Alter this reference to *Journ.W.Austr. Nat.Hist.Soc.*, II (1907), 24.
70. *Zenopsis attenuata* and *Z. oblonga*. Read (1921), not (1920).
71. Immediately before Section IV, for *Thrixspermum platystachys* read *Thrixspermum platystachys*.
71. In Section IV (a), insert after *Caladenia alpina* the following: *Caladenia cordiformis* Rogers. Identical with *C. clavigera* Cunn. See Nicholls in *Vict.Nat.*, LVIII (1941); 126.

I am much indebted to Mr. J. H. Willis, of the Victorian National Herbarium, for calling my attention to the necessity of making the above corrections.

SEARCH FOR TASMANIAN "TIGER"

Naturalists everywhere will be interested in an excursion which Mr. David Fleay, Director of the Healesville Sanctuary, is shortly to make to the north-west of Tasmania in search of living specimens of the Thylacine, the curious Tasmanian "Tiger," or Marsupial Wolf. No specimen of this now rare mammal has been held in captivity for many years. Mr. Fleay hopes to capture a pair and cause them to breed. His record justifies belief that he will succeed.

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PROCEEDINGS

The monthly meeting of the Club was held on September 10, 1945, at the Public Library Lecture Room, the President (Mr. H. C. E. Stewart) and some 150 members and friends attending.

Mr. Stewart, referring to the end of the Pacific war, which had occurred since the last meeting, suggested that we should be able to go forward as a club and do our part toward the creation of friendly relationships between individuals and nations. The Club had suffered under the necessary restrictions imposed, but membership had grown and was still growing, and we could look forward to an impetus in the study of flora and fauna in the post-war period.

The President announced that Mr. Chas. French, an Honorary Member and a constant attender at meetings and excursions, had suddenly been taken ill. Letters from the committee and himself had been sent to Mr. French and now it was pleasing to know that he was progressing towards recovery.

The President reported that the lecturer for the evening (Mr. Tarlton Rayment) had been taken ill and it had been impossible to arrange a substitute at short notice. It was proposed therefore to have extended remarks on the exhibits and nature notes.

Excursion reports were given as follows: Greensborough, Mr. A. S. Chalk; East Kew, Mr. A. J. Swaby. Mr. Chalk in his report mentioned the deliberate shooting of a yellow robin on its nest. It was agreed that a letter of thanks be sent to Mr. Tonge of Eltham for his hospitality to the excursionists on this trip.

The following were elected as Ordinary Members of the Club: Miss E. Dixon, Miss D. G. Collier, Mr. and Mrs. A. Leigh, Mr. W. Mortill; and as Country Member, Mr. C. O. Dunn.

It was announced that a Wild Nature Show would be held in the Hawthorn Town Hall on October 23 and 24.

The Secretary announced the proposed formation of a Geological Discussion Group, which would meet monthly for the exhibition of specimens and discussion of geological matters in general. Members interested in this are asked to advise Mr. A. A. Baker, 53 Carlisle Street, Preston.

NATURE NOTES AND REMARKS

Mr. E. E. Lord spoke on some outstanding exhibits of Eucalypts and a Hakea (*H. cucullata*) forwarded by Mr. G. A. Hatcly of Stawell.

Mr. R. G. Painter added some remarks on the Eucalypts and commented also on specimens from his own garden.

Mr. C. J. Gabriel exhibited and spoke on the Cone Shells (*C. textile* and *C. geographus*) noted for their poisonous properties, and he mentioned that deaths had occurred through stings received from these animals. Mr. Gabriel stated further that Mr. Cotton, conchologist of the South Australian Museum, in a recently published paper, had proved that our common Victorian species (*C. anemone*) was also poisonous. Anyone handling living specimens of these shells should take care to hold the shells by the large end, and keep the hand away from the opening at the small end.

Mr. H. P. Dickins commented on his exhibit of water-colours of native orchids.

Mr. Savage spoke on some specimens of garden-grown native flora, and stated they were all grown on clay soil.

Mr. Dickins mentioned that the Kew Council had decided to acquire the remaining portions of the river bank now in private ownership, and suggested that the Club could advise the Council on replanting problems. Mr. Hammett mentioned similar river frontages at Heidelberg, and suggested that the Kew Council should learn from that experience and never allow a mixture of Australian and exotic flora to occupy river frontages. Mr. Stewart reported having inspected portion of the area concerned whilst on the East Kew excursion and having noted that many of the trees were badly infested by borers.

Mr. R. D. Lee reported having stopped boys catching silvereyes at Middle Brighton, and said that the boys had told him they were going to sell them to dealers at the Market. Mr. Lee asked what was the position regarding this bird, and what could be done about it. Mr. P. C. Morrison stated that the silvereye was known also as the Blight-bird and was protected all the year round. He suggested that the committee give consideration to the matter.

Regarding the killing of possums by coursing dogs, Mr. Stewart stated that the matter had been discussed by the committee, who understood the difficulty of collecting evidence to satisfy the law. A letter had been sent congratulating the Chief Inspector of Fisheries and Game on the action he had taken.

Mrs. Pinches reported that a collector with a permit to collect birds' eggs had recently taken five complete clutches, which were certainly more than his permit allowed. Mrs. Pinches will make further information available to the committee and the matter will be discussed with a view to taking action.

Mr. Lord reported that crimson rosellas were destroying the tree ferns in Sherbrooke Forest in their quest for the fern spores. Mr. Morrison suggested that the birds were not doing this apparent destruction for mischief or even food but rather to trim the beak in a quite natural manner.

Miss Ina Watson reported having seen a female lyrebird minus her tail in Sherbrooke Forest. The bird had looked very odd and self-conscious.

Mr. Colliver read extracts from the annual report of the Royal Zoological Society of N.S.W. concerning permits to shoot native animals. In a case quoted the police had stated that the animals were not doing the damage claimed, and in most cases the permits were asked for during the period when skins were at a high price.

Mr. Colliver further reported having had a reprint from Dr. Flecker of Cairns (North Queensland) which dealt with "More Cases of Bites by the Taipan." One case occurred in Waters Street, Cairns, a street well within the city, although near a swamp.

Mr. Stewart read portion of a letter dealing with Cheltenham Park in which it was stated that several small lots of orchids had been found recently.

Mr. Stewart also read portion of a letter from Mr. Fleay giving the amount of land being asked for as an addition to the Healesville Sanctuary, and commenting on a recent question asked at a Club meeting as to whether use had been made of the middle claw of a cassowary for native weapons.

The secretary read a letter from Miss Adams asking could not something be done towards informing people that the wattles were protected plants and could not be taken without the permission of landowners. This matter was referred to the committee for further action.

EXHIBITS

Mrs. J. J. Freamo: Marine specimens and spiders.

Mr. R. Savage: Twenty-one species of garden-grown native flowers, including "*Acacia McReighana*," *Cassia Brewsteri*, *Hardenbergia heterophylla*, *Kennedyia coccinea*.

Mr. G. A. Hately (Stawell): *Eucalyptus caesia*, *E. mitrata*, *E. Desmondensis*, *E. Prossiana*, *E. sepulchralis*, *E. tetragona*, *E. tetraptera* and *Hakea cucullata*.

Mr. H. P. Dickins: Five water-colour drawings of Victorian orchids.

Mr. C. J. Gabriel. Victorian marine shells, *Conus anenome*, Lam.; *C. segravei*, Gatliff; *C. rutilus*, Menke. Also *C. textile* and *C. geographus*.

Mr. Tom Griffiths: Orchid, *Sarclochilus parviflorus*, and a Strap Fern, *Blechnum Patersonii*, from Mt. Wilson, N.S.W.

MARSUPIAL MICE AT HOME

By SER. T. V. GIVENS

The little Fat-tailed Marsupial Mouse (*Sminthopsis crassicaudata*) is now fairly well known to naturalists, having frequently been kept in captivity. However, much less seems to be known about its near relative *Sminthopsis murina*, variously known as the Pigmy Marsupial Mouse and Little Mouse *Sminthopsis*.

The establishment of a military camp in moderately timbered country about sixty miles north of Brisbane, in 1942, presented an opportunity to study the species at home, for it soon became evident that a small mouse-like mammal was not uncommon in the area. A trap baited with ant pupae was successful in catching a specimen, which, upon examination, proved to be *S. murina*. The little creature was a female, and from the fact that the mammary area was in the active condition it was evident that she had young in some hidden spot; she was therefore released and the trap reset. In all, five specimens were eventually caught, two of them with young (seven and eight respectively) in the pouch. Only one male was discovered, hiding in a hollow log—apparently the daytime resort of the species, located with the aid of a dog.

The nesting-place of this little marsupial mouse was discovered accidentally when a young specimen in a weakened condition was discovered at the base of a stump. Investigation revealed a hole leading down into the rotting debris and earth filling the hollow of the stump. When this loose material was removed, the nest, a hollow ball of dried gum-leaves, came into view at a depth of about twelve inches. Further search revealed a second nest, containing a female and eight young, in a similar situation—underneath the earth and rubbish in the hollow of a stump in which a young tree two feet high was growing. For the purposes of observation this female was removed and kept in captivity for a time.

In captivity, and still carrying her eight young in the pouch, she was given a jam tin as home, and soon constructed a new nest, carrying each leaf singly to the nest until it was completed to her satisfaction. Twigs were often picked up experimentally, but always rejected in favour of dead leaves, each of which she carefully pushed into place with her nose. If disturbed during the day, she always attempted to block the entrance to the nest by pushing leaves into it.

At first, while the young were still of minute size, they were carried about in the mother's pouch as she went about her nightly activities, but they grew rapidly in size and soon protruded from the inadequate pouch. At this stage, still naked and blind, they were one by one carefully detached by the mother each time she made a journey. Before long, however, they acquired a covering

of fur and opened their eyes, while the mother began carrying the largest of the insects with which she was provided, such as moths and grasshoppers, into the nest, where the young nibbled experimentally as she ate.

The experiment was tried of placing the young some distance from the nest. They would at once utter a plaintive rasping call and invariably endeavour to climb up the sides of the box. In response to this appeal the mother would instantly leave the nest and cast anxiously about for her offspring, seeming to locate them more by the senses of hearing and smell than by sight. Even with the object of her search not more than a foot away and in plain sight she still cast about with her ears cocked and nose wrinkled until she found what she sought. Once found, the lost baby would eagerly attach itself to the mother's fur with mouth and claws: one by one she would collect the whole eight until, completely obscured by her offspring except for her head, she was barely able to stagger back to the nest.

Like its better known relative, *S. murina* appears to be almost wholly insectivorous; raisins and sultanas were the only other foods observed to be eaten, and then very sparingly. As with her young, much of the food provided seemed to be located more by sound and smell than by sight. The fluttering of a moth or the jumping of a grasshopper was sufficient to bring the little marsupial post haste out of her nest, when she would seek intently in the direction of the sound until it occurred in another direction. Once having sighted them, she would often spring high into the air and catch slower insects like moths in flight: Aggression, and even ferocity, was often displayed in dealing with a struggling insect: whenever possible the head was seized and bitten off.

Two different calls were observed to be made by this captive female: a rasping hiss, made when disturbed at the nest, and a sharp explosive cough, delivered with the mouth wide open and uttered only when foraging at night.

When about half the size of the mother, the young would leave the nest at night and seek insects on their own account. When their box was provided with small boughs a major portion of their time was spent in running up and down these and in crawling upside down on the wire covering the top. Gaps between boughs were frequently bridged by leaping from one to the other, while the mother was occasionally observed to leap a height of eighteen inches to the covering wire. From these observations, and from the situation of the two nests discovered, it would appear that the species is considerably more arboreal than *S. crassicaudata*.

In marked contrast to the gentleness of the captive female, the sole male discovered proved to be most intractable, hissing continually when inspected and biting viciously if handled.

OBSIDIAN AND ITS USE IN THE STONE IMPLEMENTS OF NEW GUINEA

By MAURICE F. LEASK, Ballarat.

Lavas which cool quickly become glassy and structureless; indeed they are dark-coloured glasses. W. W. Watts (in *Geology for Beginners*) points out that more usually there is sufficient time taken in the process of cooling to allow for the formation of small imperfect crystals, which are well seen in a slide of obsidian lava.

Obsidian, then, is a brown, black, or red glass, transparent in thin splinters, and sometimes containing porphyritic crystals of sanidine, a glassy-looking form of orthoclase. In a frothy, scoriaceous state it is called pumice.

Rocks in which silica predominates, over 65% being present as against 35% of the basic oxides, are called acid rocks and obsidian lavas are good examples of these. Quartz consists of silicon dioxide (SiO_2), an acid compound; orthoclase felspar may be regarded as a silicate of two basic oxides, alumina and potash. Thus, obsidian is a lava containing silica, alumina and potash, being the volcanic, rapidly cooled, glassy counterpart of granite, which is a plutonic, slowly cooled, coarsely crystalline rock.

These geological characters determine the use of this rock as a cutting tool, and the shape of the typical implements. A specialized form is the spear point. Margaret Mead (*Growing Up in New Guinea*) indicates that obsidian is found on the islands of Balowan (Baluan) and Lou in the Admiralty Islands, and on the main island, Manus, where "the men use spears with bamboo shafts and cruel arrow-heads of obsidian."

On the Finsch Coast (in the Aitape area) and the Hansemann Coast (around Wewak) no such working has yet been seen by the writer; some hundreds of pieces examined assume the more usual form of hand knives, scrapers and gougers.

Many of these flakes could be used as soon as broken. Here a long straight edge characteristic of a glass break, flattish on one side and bulged with the arcs of conchoidal fracture on the other, serves as a forefinger knife without further shaping (Fig. A).

Long thin "snouts" are usually converted into more prominent points and used as gougers, gimlets and drills (Fig. B). Both knives and gougers, when re-sharpened and worn down to some extent, present the appearance of rounded stumps, in themselves all round cutting implements (Fig. C).

Around the north-eastern coasts of the Territory of New Guinea, anywhere from Huon Peninsula to the Aitape Roads, may be found collections of obsidian flakes left by Stone Age man. Instead of the heaps of fragments from quartz, chalcedony, jasper

and flint used in other areas—parts of Papua and Australia—this volcanic product has found favour.

Pieces of obsidian usually indicate an old village site, and only rarely do they occur in localities resembling the true kitchen middens or sandhill camping spots. The hand of man is unmistakably seen in secondary chipping forming the typical saw-like edge.



There are volcanic cones studding the islands and coastlines of those northern seas, as well as the eastern margins of New Guinea; in the latter area Mt. Victoria (5,967 feet) is an active volcano overlooking Collingwood Bay. The resultant effusive rocks, belonging to the Late Tertiary to Recent periods, include obsidian; in other places andesites, basalts and trachytes take its place.

Near Aitape, on the sites of former villages at Sapi (Tumleo Island) and Vokau, the largest obsidian flake measured $2 \times 1\frac{3}{8} \times \frac{1}{2}$

ins. In this area the fragments are lying some 320 miles from their probable *in situ* position in the Admiralty Islands, and some 108 miles from their possible origin on Kairiru Island. Mr. N. H. Fisher, former Government Geologist of New Guinea, writes to me as follows.

"I can find no reference to obsidian having been observed *in situ* in this area and I have never seen it there myself. However, it is not impossible that it might occur either in the recent volcanics of Kairiru and other islands or in the volcanics interbedded in the Tertiaries of the mainland, and islands off Aitape. On the other hand, it is known that the Manus natives have long been in contact with the Aitape natives and also with the Talasea and Siassi natives of New Britain, so the source of the obsidian flakes may be very difficult to trace. You may be able to get some assistance from the older natives."

Evidently this rock formed one of the important articles of trade in former times. A possible trading spot occurs at St. Anna (Aitape), located about 300 yards from the sea coast, where sparse pottery remains suggest an unimportant village site. A large proportion of the chips are thicker pieces, up to 11/16 in. thick, more like cores; there are numbers of grey flakes that may represent inferior quality not destined to be traded further.

At Wom and Wirui (Wewak) considerable quantities of obsidian flakes are associated with pottery fragments and hammer stones where once populous villages stood. This area is some 230 mile from Manus and within 10 miles of Kairiru Island, and there are indications that in general the rock in question appears in consistently larger size, with a higher percentage of finished implements.

Material culture has long since been altered by white contact, and adzes shod with iron have completely replaced the older, clumsier tools of obsidian.

THE WILD NATURE EXHIBITION

Members are reminded of this year's Wild Nature Exhibition, to take place in the Hawthorn Town Hall on Tuesday and Wednesday, October 23-24. The official opening by the Mayor of Hawthorn, Cr. J. Fowler, is timed for 8.30 p.m. on the first day. The exhibition will be open afternoon and evening each day.

A meeting to make final arrangements is fixed for Wednesday, October 10, at 7.45 p.m., in the Royal Society's Hall. Will members please endeavour to be present?

A further appeal is made by the President and the show committee for every member to take an active part to ensure the show's success. Those who can obtain or suggest suitable material for exhibits are requested to notify the show committee as soon as possible. Sponsors are urgently required to demonstrate and explain the sectional exhibits to visitors throughout the course of the exhibition.

Ladies are invited to attend in force to assist to set up the exhibition on the preceding Monday afternoon and evening. A maximum effort by all will be necessary on the morning of Tuesday, the 23rd.

Tickets (adults 1/- and juvenile 6d. each) are obtainable from the ticket secretaries, Miss N. Fletcher and Mr. H. Preston.

FLOCKING OF INDIAN MYNAS AT BLACKBURN

By EDITH COLEMAN.

Owing, doubtless, to the dry season, a surprisingly late flocking of mynas commenced here on June 25, 1945, ending on July 7. For the first few days they alighted on our house at about 4.15 p.m. The chimneys, ridges, and gables of a dormer window were beautifully outlined with birds, all evenly spaced.

Leaving in small bands, the birds roosted in some cypress trees in a garden just across the road, where they slept for almost two weeks. At about 5 p.m. the cypress trees were alive with the noisy flocks—occasionally a perfect Bedlam. Sometimes the mynas would fly out and cruise round before settling down. They chattered until about 5.45, when all was silent. All had left by about 7.15 a.m.

I rose early on several mornings in order to discover whether they went in a band, as swallows do, but they appeared to depart only in two and threes. The following notes, jotted down each day, will give an idea of their movements. There were about 130 or more in the flock:

June 25th, 1945: Alighted in small bands on the house at 4.50 p.m. Entered the cypress trees until 5.20. Occasionally flew out and cruised round, when the setting sun turned them into a lovely rose colour, beautiful as galahs. Noisy until 5.40 p.m., when all was silent.

June 26th: Arrived at 4.50 p.m. All in the trees at 5.15 p.m. Noisy until 6.15 p.m. Cold and windy; a few heard in the night (moonlit).

27th: 6.40 a.m., a few were heard. Had departed at 7.20 a.m.

28th: Heard at 6.45 a.m. Many still in the trees at 7 a.m. Saw one or two leave. Bitterly cold at 5 p.m. Small flocks cruising round before settling.

29th: All back at 5 p.m. Several lots cruised round as if to warm up before settling. Very cold and windy.

30th: 6.5 a.m., no sound in cypress trees. Moon still bright and Venus beautifully clear. Watched stars pale and disappear. Still no sound of birds. Sky flushed with rose, and later the colours of a lovely sunrise. At 6.30 a.m. heard first bird-voice in the garden (grey thrush); at ten to 7 an English thrush, and soon others were singing, but no mynas heard—apparently late risers. I came in at 7 a.m., having seen none leave the trees. Certainly no "mass" departure. At ten to 5 p.m. about 80 came in from the south and went straight to the cypresses; others came later.

July 1st: All in the trees at 4.50 p.m.; terribly noisy until 5.10; all quiet 5.25 p.m. Fine day, lovely sunset.

2nd: 5.30 a.m., bright moon (three-quarter full), Venus intensely bright. No sound of birds in garden or cypresses. It seemed quite bright enough for them to fly if they wished. I went back to bed.

3rd: No sound at 6 a.m. Sky very dark blue against which many white clouds stood out. Too dark for flight. Returned to bed but mynas were heard at 6.30 a.m.

4th: 7.20 a.m., garden full of bird voices. Could see mynas in the tops of cypresses. Appeared to drop to lower branches and leave one by one. Gone at 7.30 a.m. Home at 5.10 p.m.; noisy until 5.55 p.m.

5th: Cold and wet. Still in cypresses at 7.20 a.m. Bitterly cold all day. Worse at 5 p.m., when they returned; very noisy. A wet night. Silent at 5.25 p.m.

6th: Still in trees at 7.20 a.m. Did not see them leave. Rain at intervals all day. All back at 5 p.m. and silent at 5.20 p.m.

7th: Wet and cold. One or two mynas heard at 7.30 a.m., but no sign of them since.

They certainly chose a dismal day for their journey. One hoped they had not to travel far to find warmth and shelter.

THE JOHN GILBERT CENTENARY

On June 28 last, the 100th anniversary of the death of John Gilbert, pioneer naturalist and explorer, was commemorated in Sydney. This took the form of a pilgrimage to St. James' Church, Sydney, where the impressive memorial to John Gilbert stands. The ceremony, arranged by Mr. K. A. Hindwood, President of the R.A.O.U., was attended by representatives of various interested societies, including the Royal Australasian Ornithologists' Union, the Royal Australian Historical Society, the Australian Museum, the Linnean Society of N.S.W., the N.S.W. Naturalists' Club, the N.S.W. Gould League, and the Sydney Wattle League. The Field Naturalists' Club of Victoria and the Bird Observers' Club, Melbourne, were represented at the gathering by Mr. and Mrs. A. E. Watson and Mr. E. S. Davies, through the kind instrumentality of Miss Thistle Y. Harris, a country member resident in Sydney.

ERRATA

In the article on Winter Fungi in the Dandenongs (*September Naturalist*, Vol. 62, p. 88) an erroneous caption was unfortunately applied to the text illustration, which should be entitled: The Slimy Mycena (*M. subvulgaris*), not "Hooded Fungus (*Xerotus archeri*)," as printed.

In the same article (p. 90, sixth and third lines from bottom), "*Cantharellus*" and "*Xylaria*" should read *Cantharellus* and *Xylaria* respectively.

FUNGI IN THE ORCHARD

By PAUL FISCH, Doncaster.

After the lecture on "Mycorrhizas" by Captain Young at the July F.N.C. meeting, a discussion took place among Doncaster orchardist members and the question arose, Do our fruit trees benefit by any symbiotic relationship with mycorrhiza forming fungi? The immediate, rather automatic, answer was, "Probably. Why not?" After more leisurely reflection, and considering observations made throughout the years I have been on the orchard, I would consider this happening to be rather unlikely.

The specimens of fungi observed actually in orchard land are very few indeed and are invariably introduced, I should say, with organic manures scattered over the soil. Beautiful specimens of *Polyporus speciosus* and *Lepiota naucina* have been found growing upon stable manure applied to orchard soil. To my amazement, one hot December day, out of the parched, well cultivated surface of orchard, a crop of *Coprinus comatus* emerged! Closer investigation showed that these fruiting bodies grew out of a lump of cattle-dung, which I had been spreading on the soil some months before. A shower of rain two days previously must have accelerated the saprophytic growth of the mycelium in the manure, causing it to produce the "Shaggy-caps."

Other toadstools found growing in orchard land at Doncaster are *Boletus luteus* and *Loectarius deliciosus*, but these are only found along the edges of orchards that have been sheltered by rows of pines (*Pinus radiata*) whose roots have grown into the orchard; they are good examples of fungi growing in symbiosis with the end-roots of *Pinus radiata*. That the two plants rely on each other is verified by the disappearance of fungi as soon as the pines are cut down. On one occasion I found also a beautiful specimen of *Boletus portentosus* growing in ploughed orchard about 20 feet from a gum tree. This would seem to indicate that *B. portentosus* lives in symbiosis with eucalypts.

Mycorrhiza-forming fungi are growing very vigorously during the months from April to November, when there is usually abundant moisture and when eucalypts and pines also flourish and are producing the white roots. This means that the periods of maximum fungus activity and the formation of white roots on the trees coincide and they obviously must coincide if there is to be any symbiosis between fungus and tree. Mr. A. Q. Barrett, in his book *The Essential Eucalypts and their Effects on the Soil of Australia*, points out that the formation of white roots, and generation of CO₂ gas by them, together with the fermentation of humus, is at its optimum during winter months. At such time our native trees make their growth.

But in Europe, whence come our deciduous fruit trees, the case is altered: soil activity and tree growth takes place during spring, summer and autumn. During wintertime both the soil and trees are inactive, i.e., resting. It thus follows that our orchard trees are spending their resting period under somewhat unnatural soil conditions. Through the increased soil activity, many plant foods are made available for the trees and yet they cannot benefit from them, as they have no white roots and are dormant. I can even imagine that the effect on the dormant roots is detrimental to them and might in some way explain the drying off of fruit trees (especially peaches) early in spring.

Now, the old orthodox way of attending to the orchard late in autumn is to plough up against the rows of trees, thereby leaving a good furrow between them so that much of the surplus winter rain water can drain away. It seems to me that in this ploughing operation the best possible soil-condition for dormant trees is achieved. Organic manures should be applied only towards the end of winter, when their stimulating effect

coincides with the new growth of trees. Although I am very much impressed by the new idea of Ploughless Farming, I think it is very essential to provide a well-drained soil for deciduous trees and also deliberately retard the chemical activities of the soil as much as possible during winter-time.

WIMMERA PLANTS UNDER DROUGHT

By E. Muir, Dimboola

As a resident of the Wimmera, I have been able to note the effect of recent droughts upon the plant life in this district. The years 1944 and 1945 were particularly dry ones in the north-west, less than half the average rain fell, and in such small amounts that it was of little use. Many plants failed to appear at all, notably the orchids.

I found no specimens of *Caladenia*, *Pterostylis*, or *Thelymitra*, except a few very small ones of *C. carnea*. At Serviceton, *Lyperanthus nigricans* was growing in hundreds on the sand hills under stringybarks; however, they did not bloom at all. In the same spot, *Acianthus cærtus* bloomed in thousands, together with an odd specimen of *Pterostylis parviflora*. Will orchid tubers survive underground and bloom again when conditions are favourable? There were many blooms of *Prasophyllum fusco-viride* at Dimboola, but in both 1944 and 1945 a good fall of rain occurred prior to flowering time.

There were very few species of the daisy family. *Helipterum corymbiflorum* was exceptionally scarce. *Helichrysum apiculatum* was uncommon, as was *H. adnatum*. The only other member was *H. Blandowskianum*, observed growing in the dry bed of the Wimmera River at Dimboola.

In the Little Desert, most shrubs growing near the river did fairly well, probably due to the proximity of underground water (about 20 to 30 feet). *Callistemon rugulosus*, *Leptospermum scoparium*, *Melaleuca uncinata*, *M. Wilsonii* and what I take to be *M. ericifolia*, growing in the salt swamp, all bloomed very well along the river. Away from water, in the heavy soil, *Myoporum deserti*, *M. platycarpum*, *Bursaria spinosa* and *Stenochilus longifolius*, all produced an abundance of bloom, showing how well they thrive under dry conditions. In the Little Desert itself *Banksia ornata* thrived as usual.

All the Eucalypts, including *E. bicolor*, *E. rostrata*, *E. leucocylon*, *E. hemiphloia* and *E. capitellata*, had abundance of bloom. Some mallees did not bloom at all; I could not say why, but it may not have been due entirely to climatic conditions.

The most favoured spot in the district was the Lawloit Ranges near Diapur, possibly due to heavier falls of rain. It was here that I saw the only specimen of *Diuris maculata*. With a lack of grass in the lower Mallee around Lake Hindmarsh, rabbits have stripped the bark and eaten wood from the lower parts of trees; they favour *Myoporum* and *Stenochilus*. Where these trees do not grow, they eat the bark of Mallee eucalypts. Will the *Myoporums* survive the attack and sprout again, like the Mallees?

When the drought broke in early May last, many plants bloomed out of season. Among such were *Baeckea*, Tea-trees, Flame-heath, Grampian Heath-myrtle and members of the daisy family, like Common Everlastings and Minnie Daisies. The *Baeckea*s are still blooming a little. In mid-July two exceptional freezes were recorded (of 20°F.). Among the plants to be severely frost bitten was *Stenochilus longifolius* ("Berrigan"), which does not show promise of flowering this spring.

PARASITES OF ANTS

In the *Naturalist* for July, I was much interested to read Mrs. Edith Coleman's "Random Notes" on Bird Anting and Lizard Tail-shedding. She has quoted Richard Jefferies, as follows: "Have these highly civilized insects arrived in some manner at a solution of the parasite problem?" My own experience is that ants are utterly unable to control parasites infesting their nests, and, no matter how intelligent they may appear in other matters, they seem to have no idea of controlling parasites of any kind.

In my search for Inquilines (those insects that habitually live with ants as guests or "lodgers"), I have examined many ant nests—probably hundreds. Inquilines embrace many Orders, some of which are *Thysanura*, *Orthoptera*, *Hemiptera*, *Coleoptera* (several families), *Hymenoptera*, *Diptera*, and *Lepidoptera*, and last, but not least in point of numbers, *Acaridae*, belonging to the class *Arachnida*.

In many instances these guests appear to be very welcome, others seem to be just tolerated, while others again are hostile to the ants. Some beetles such as the *Trichopterygidae* (smallest beetles known) are often plentiful in nests in moist localities like the Dandenong Ranges and may be quite useful to the ants in controlling moulds, etc. Others such as *Staphylinidae* and *Pscolaphidae* destroy acarids in the nest, and, in all probability, also remove these pests from the ants' bodies.

Several years ago, when living at Geelong, I was engaged in marking out the life histories of small butterflies that are associated with ants. The caterpillars of one species, viz., *Miletus ignita*, which feed nocturnally on Golden Wattle leaves (*Acacia pyraantha*) spend the daytime in nest galleries of the ant *Iridomyrma nitidus*. The ants actually conduct them to their food-plants and later return them to the nest, where they eventually pupate (deep down in the galleries) and finally emerge as butterflies.

To find out the manner of emergence of this butterfly, I brought home portion of a dead stump, from a nest containing several caterpillars, and also a large quantity of the ants in a bag, the latter being a necessary factor in this symbiotic arrangement: the caterpillars excrete a sugary substance beloved of the ants, which in return not only guard the caterpillars, but keep them clean by removing the excretions; if allowed to remain, the exuded matter would almost certainly attract fungi, which would be deleterious to the caterpillars.

Nests of these ants usually contain acarids, and are also noted for the many beetle guests usually present (belonging to several families, of which the *Pscolaphidae* appear prime favourites—frequently, when picking up these small beetles by means of a fine camel-hair brush, I have seen an ant rescue the beetle from my brush, only to release it again at once).

In bagging the ants that were swarming on top of their nest, due to my disturbance, practically no beetles of any species would be gathered with them, and, on my return home, the ants and caterpillars were placed in a large square glass box for feeding observations, etc. Later on, acarids increased alarmingly, to such an extent indeed that some ants could hardly walk on account of the acarids clustered on their legs and bodies; others must have been almost blinded by the huge number of mites fastened on their heads.

Now, if ants in general had the intelligence attributed to them by Jefferies, surely these would have removed the acarids. In all probability, *Iridomyrma* has from time immemorial been kept free from parasites by the attentions of inquilines, so that now they just depend for assistance (that failed to arrive!), instead of removing the acarids themselves, which they could do very easily, had they enough sense.

H. W. DAVEY.

IS THE CORMORANT AS BLACK AS PAINTED?

By P. F. MORRIS

A feeling of repulsion for snakes or snake-like forms seems almost instinctive, or it may be instilled by wrong teachings, false associations, bias or hearsay.

In June, 1942 (*Vic. Nat.*, Vol. 59, p. 23), I recorded a most fascinating combat between a Little Black Cormorant and a long departed common eel. Much has been written in favour of or against the bird with the snake-like head and neck, but as an angler I have always regarded it with suspicion.

Further investigation of the feeding habits and analysis (or count) of stomach contents of cormorants in this State is long overdue. However, I now wish shortly to commend the "Investigation of the Stomach Contents of the New Zealand Fresh-water Shags," by R. A. Falla and G. Stokell, published in the *Transactions of the Royal Society of New Zealand*, Vol. 74, p. 320. Here, indeed, the authors (or the cormorant) rise to the occasion with a well-timed "knock-out." A perusal of this interesting and informative article seems to prove that, for food, a cormorant will at least try anything once.

The following is a summary of the food taken and the number and class of birds examined:

Number of birds examined all containing food—4 adults, 3 fully-fledged flying young, 11 downy nestlings—total 18 birds.

Stomach contents.	No. of birds in which found.	Highest No. in any one bird.	Total from all birds.
FISHES			
Salmonoid fishes	13	3	24
Galaxias species	1	1	1
Isospondylid fishes	4	2	5
Undetermined	2	1	2
INSECTS			
<i>Trichoptera</i> (Caddis flies)	17	500	2594
<i>Archichauliodes</i> (Toe Biter)	8	4	20
<i>Stenoperla</i> (Stone flies)	1	1	1
May flies, beetles, weevils	12	6	15
MOLLUSCS			
	3	10	11
MISCELLANEOUS MATTER			
Willow leaves, gorse, thistle heads, coal, pebbles, clay, sheep droppings, etc., etc.	14	Too variable to record.	

The birds were not fully gorged and the amount of food taken is actually the amount required, which did not vary with conditions, place of feeding or availability. It seems to me that the cormorant is unlucky in his snake-like construction and he is *not* as "black" as he is painted with regard to alleged destruction of fish.

In Ireland (*Nature*, March 24, 1945), M. J. Hickey and J. R. Harris found adult Diphyllobathrid tapeworms in seagulls and cormorants as well as in trout, pike and other fishes. The English Pike is known to be a second intermediate host of tapeworm of man. I have found large numbers of "worms" in two cormorants that I have examined. Can any reader enlighten me as to the nature of these parasites?

SUGGESTIONS FOR LECTURETTES AND EXCURSIONS

By F. G. ELFORD, B.Sc., Teachers' College, Melbourne.

The opinions expressed by Mr. S. R. Mitchell under this heading in the July *Victorian Naturalist* are worthy of serious consideration by the committee, especially in view of the increasing membership and the policy of establishing and fostering junior clubs.

As suggested by Liberty H. Bailey in *The Nature-study Idea*, there are two objects with which one may study Nature—to discover new truths for the purpose of increasing the sum of human knowledge, and to develop a sympathetic attitude towards Nature for the purpose of increasing one's joy of living. The first, a practical object, is that of Science, and aims at making investigators and specialists. The second, a cultural object, is essentially that of Nature-study, and aims at enabling a person to live a richer life, irrespective of what his or her business or profession may be.

I am of the opinion that this Club is, or should be, primarily concerned with the second object, although some of its leading members are also investigators and specialists in the field of science. In the Club's activities, there is a danger of the first object dominating the second. For the large proportion of members, the beginners, this is a case of "putting the cart before the horse," and may arise from the tendency of specialists to lose sight of a beginner's point of view.

Nature-study has been defined as the habit of "seeing what one looks at and drawing proper conclusions from what one sees." Seeing, enquiring, interpreting are the steps leading to appreciation. If based wholly on sentiment, appreciation tends to be superficial and artificial; if based on knowledge, especially that gained by direct observation, it is real and lasting. The social and entertainment values of Club meetings are not to be derided, but the educational value should not be subordinate to them. One of the basic functions of the Club should be to give beginners some knowledge of first principles and methods of study, as well as encouragement in the pursuit of their chosen branch of natural history.

While there is room for some lectures on "foreign" and technical topics, the majority should cater for local interests, and lecturettes would be preferable to lectures. Topics suggested by Mr. Mitchell are admirable. In addition might be included the functions of living things (nutrition, respiration, reproduction, etc.) and natural phenomena such as camouflage, parasitism, evolution, and the like. From time to time, talks on collecting and preserving technique, and the use of keys in classification and identification would be useful for beginners.

At all times, speakers should aim at simplicity rather than talk "above the heads" of the audience, emphasize significant facts and cover a small field thoroughly rather than try to present a mass of information in a hurried manner, use a few well-chosen illustrations effectively for teaching purposes rather than show many for effect, and allow plenty of time for questions and discussion at the end. After the meeting, the majority should leave feeling that they have gained something worthwhile in the way of knowledge or ideas for further study.

Excursions should be organized so that a leader is in charge of not more than twenty people, beginners and advanced students being catered for separately. Some attention should be given to methods of study, e.g., points to observe as aids to classification, the use of keys, methods of collecting and preserving specimens. As Mr. Mitchell suggested, ecological surveys of small areas might be attempted, with some attention to the evolution of landscapes and geographical surveys (human-environmental relationships). The type of field work carried out by the Le Play Society of England is suggested for consideration.

Now that meetings are held in a larger room, and in view of large attendances at meetings, the committee should also give some attention to making displays of exhibits more effective than they are. More space is needed for display, and more time for members to inspect. The value of exhibits would be greatly increased if exhibitors would place a few simple explanatory notes beside each one. Labels giving nothing but scientific names are useless to most beginners—in fact, they may even be discouraging. It would also be helpful if exhibitors were in attendance to answer questions and explain points to those particularly interested.

Would it be possible for the committee to plan a syllabus for meetings, in addition to excursions, and distribute it at the beginning of each club year? As an initial step towards its preparation, it might be worth considering a questionnaire by which members could indicate their interests, desires regarding lecture topics and field work, as well as their qualifications and willingness to assist the Club's activities. Would beginners favour small study groups in the various branches of natural history in which they are interested? These are but a few ideas that may help to further Mr. Mitchell's suggestions.

MISS G. NOKES AND *CALOCHILUS IMBERBIS*

Many members will share my regret for the recent death of Miss Grace Nokes, to whom I was personally very much indebted during the former big shows of our Club. Almost invariably she came to relieve the tedium of emptying innumerable jars and packing up when I was very tired at the end of a crowded two or three days.

Orchid-lovers in particular should be interested to know that we really owe the discovery of a remarkable species to Miss Nokes. At the 1923 Wildflower Exhibition, she was helping to unpack the country supplies of flowers and carrying them to various tables. To my orchid table came a bunch of Brownheards (*Calochilus Robertsonii*) that included several whose labella lacked the customary hairiness of the genus. My daughter's and my own curiosity was aroused and we immediately sought Miss Nokes, who remembered the box in which these specimens had arrived—from Mrs. F. Rich of Rushworth. Next day I wrote to Mrs. Rich, who sent along further material, and upon this Dr. R. S. Rogers was able to set up the new endemic species *Calochilus imberbis*. Later, I found an identical plant in full bloom at Ringwood; it was also sent to Dr. Rogers, who expressed great delight at finding the range thus extended to southern Victoria.

EDITH COLEMAN.

FOREST WEEK, 1945

With a background of experience gained during the very successful Forest Week in 1944, the "Save the Forests" Campaign is again organizing a Forest Week, to commence on Monday, 29th October. Delegates at the August Council meeting approved the planned activities.

The highlight of the week will be a forestry exhibition in the Melbourne Town Hall. Exhibits emphasizing the importance of forest preservation will occupy the main hall, while films will be shown and short talks given in the lower hall. District Committees of the campaign are being asked to arrange meetings and demonstrations and to co-operate with rural Fire Brigades, the Forests Commission and other public bodies in the removal of fire hazards.

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PROCEEDINGS

The monthly meeting of the Club was held on October 8, 1945, at the Public Library Lecture Room, the President (Mr. H. C. E. Stewart) and some 150 members and friends attending.

Mr. Stewart referred to the recent death of Mr. W. H. Stevens, who joined the Club in 1908 and had attained his 87th year, and Mr. A. B. Braine (aged 91), well known for his interest in Victorian orchids. Members stood in silence as a token of respect to their memory.

Mr. Stewart welcomed to the meeting Mr. C. Daley, one of our old members who had not been able to attend for some time, and Mr. Cliff Beauglehole, an enthusiastic country member from Portland. It was announced that Mr. C. French was still very ill, and fitting reference was made to his very regular attendances at Club meetings during more than 60 years.

Excursion reports were given as follows: Hurstbridge, Mr. A. S. Chalk, who mentioned the birds seen; Brisbane Ranges (char-à-banc trip in which 93 participated), Mr. J. H. Willis; Ringwood to Heathmont (orchids), Mr. H. P. Dickins.

The following were elected as Ordinary Members of the Club: Mrs. C. C. Scott, Miss Lola Lehmann, Miss H. C. Wilkinson, Mr. and Mrs. N. G. Gibson, Messrs. Max Bennett, H. J. Brady, and Wilkinson Joules; and as Associate Member: Miss E. B. Plumridge.

THE SOCIAL STATE OF INSECTS

Mr. Tarlton Rayment, dealing mainly with bees, explained with the aid of excellent slides some of the wonderful adaptations among larvae and complete insects, and discussed some transitional habits from primitive native bees to the present day hive bee.

The structure of the cell for specific purposes was accomplished with mathematical precision and reflected a high degree of intelligence, as shown by the results of experiments made in this regard. Details of micro-dissection were also given by Mr. Rayment and many interesting anecdotes were told.

Mr. A. H. E. Mattingley, in proposing a vote of thanks, asked

Mr Rayment if the aborigines had any honey before the advent of the white man. Mr. Rayment instanced certain types of native bees (mainly tropical in habitat) that *did* produce small quantities of a rather acidic honey, which was an article of diet among northern tribes. The motion was carried.

EXHIBITS

Mr. H. P. Dickens: Six Australian flower studies, comprising two cultivated *Boronias*, *Melaleuca exarata* (W.A.), *Grevillea chrysotheca* from the Brisbane Ranges, *Dampiera sacculata* (W.A.), and *Caladenia alba* from Heathmont

Mr. C. J. Gabriel: A series of mollusc opercula from various localities.

Mr. Tom Griffiths: Young praying mantids, 36 hours old.

Mr. Grassick: Rock phosphate from Ocean Island.

Mr. F. G. Elford: *Pterostylis alpina*, the Alpine Greenhood from the Dandenong Ranges.

Mr. Paul Fisch: Basket Fungus (*Clathrus gracilis*) found in orchard country at Doncaster.

Mr. E. E. Lord: Remarkable example of V-shaped fasciation in *Bellis perennis* (double-flowered English Daisy) from a garden at Flemington.

Mr. F. S. Colliver: Coal-field fossil plants, including *Lepidodendron* (nodulose stage), *Stigmoria ficoidea* and *Stigillaria*

ROCK TYPES AND TOOLS OF STONE-AGE MAN

In *Wild Life*, May, 1945, Vol. 7, No. 5, pp. 147-8, it was stated that an aboriginal stone workshop is indicated by the occurrence of "stones of a fair geological variety, not natural to the spot." The same journal, in a leading article on p. 131, points out "if there are stones of several different types in the one spot," further proof may soon be found that ancient man has been responsible for their collection.

Few localities could show this to better advantage than Wom village, Cape Wom, Wewak district, in the Territory of New Guinea. There on the beach canoes were built. Among the vast quantities of imported stone—Wom Peninsula consists of upraised coral—some 363 implements were examined. These showed geological types in a series right through the Plutonic, Hypabyssal, Volcanic and Sedimentary rocks. The variation is better understood when it is appreciated that the material comes mainly from the volcanics with their numerous associated types, and from the plutonics which include the sills and metamorphic products; the former are prevalent on the adjacent islands, while the latter occur in the coast ranges, the Prince Alexanders and the Torricellis.

MAURICE F. LEASK.

SAFEGUARDING WILD FLOWERS

The committee of the F.N.C. at its last meeting discussed the question of protection of native plants, an obligation that seems to have been neglected by officialdom in Victoria in recent years. A letter from the Rangers' League of N.S.W. conveyed the information that the Native Plants Protection Act in that State had been tightened up recently (mainly in regard to the sale of flowers from private lands) and it was suggested that the two bodies should co-operate with regard to interstate trading in wild flowers. Opinions on this matter from members will be welcomed by the committee.

AMONG ALPINE FLOWERS ON THE BARRY MOUNTAINS, COBBLER, STIRLING AND BULLER

By J. H. WILLIS, Melbourne.

To the "Barries" via Bright

"Barry Mountaineer"—what magical words! In walking circles, the title is assumed by those who have trodden that section of the Divide between Mounts St. Bernard and Speculation—generally conceded to be the roughest and toughest bit of hill climbing that Victoria can offer. Every summer a few stalwarts make the crossing and I had long wished to be numbered among them; moreover, there seemed to be nothing known about the plant life of these high ranges, and that fact alone was sufficient enticement to a young botanist hungry for field explorations.

At last my chance came: Professor T. M. Cherry was to lead some experienced Rover Scouts over the Barries and invited me to join the company. The preliminary—but all-important—details of clothing, camping gear, and eight-day food supply having been settled, our small party of five entrained from Spencer Street at 7.30 a.m. on December 27 last, with packs each weighing 40-50 lbs. It was not until 10½ hours later, after a tedious journey, that we alighted at Bright, only to learn that another four hours must pass before the departure of the late bus for Harrietteville, 16 miles distant.

There was time to take stock of Bright, so clean and so prettily placed on the tree-girt Ovens that it amply deserves its name and reputation as Victoria's most attractive country town. We prepared our first *al fresco* meal on a well-grassed camping ground against the river, and I thereafter climbed a high hill to the north-east to watch the sun disappear behind Mount Buffalo, now in deep purple relief against a sky of salmon and gold. Eleven p.m. found us at Harrietteville and we were directed to a nearby paddock where a long, iron-roofed stable gave good promise of a comfortable night's rest; there was a stall and manger apiece and the floor, though earthen, was deep with soft warm chaff on which we gratefully spread our sleeping bags.

Next morning we were up at daybreak, took breakfast on the bank of the West Ovens (the river forks at Harrietteville), where several blue flower-heads of "Paterson's Curse" or Viper's Bugloss (*Echium plantagineum*) were in evidence, and, after carrying our packs into the town, persuaded a local bus-man to drive us as far as Mount St. Bernard (5,060 ft.) for the sake of 10/- each. This obviated a long up-hill climb of 13 miles with heavy loads, and saved us at least a half day's walking. Hill slopes were everywhere covered with the dreaded St. John's Wort (*Hypericum*

perforatum) in pretty golden masses, heralding a copious harvest of seed for 1945, but biological control of the pest (by means of *Chrysolina* beetles) is now fortunately under way in this district.

It was sad to look where St. Bernard Hospice had stood for generations, perhaps the most romantic, if primitive, hostelry in the State. A heap of fused bottles and a few scraps of rusted iron on the hillside are all that now mark the spot where so many distinguished people had stayed—I thought of Baron von Mueller, who accompanied the Australasian Association for the Advancement of Science there in January, 1890, visiting his beloved Alps for the last time. Sadder still it was to gaze down the East Ovens valley on a scene of desolation—gaunt stands of dead timber, recently and deliberately fire-killed to make grass for a handful of mountain cattle.

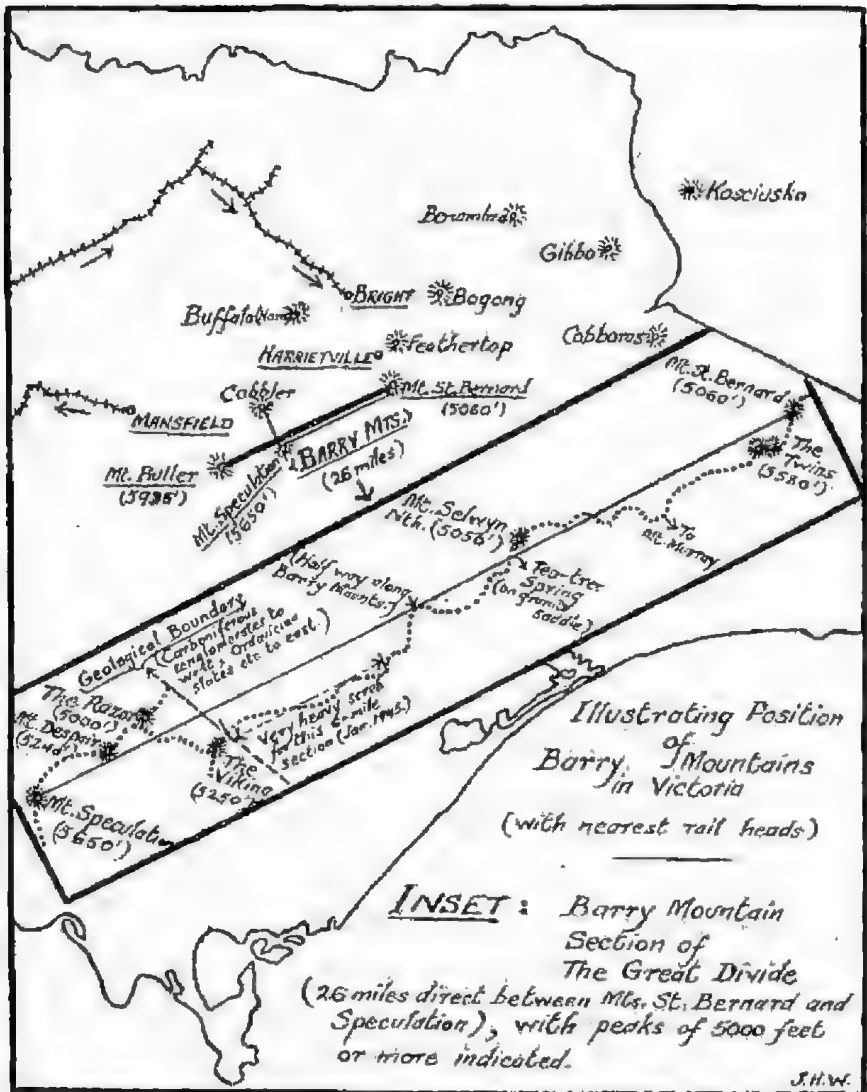
But the Barries lie south-west from here, so we turned our backs upon the Alpine Highway to Hotham, passed over the scarcely perceptible crown of St. Bernard, and struck out for The Twins, our prospective lunching stop two miles distant.

Paucity of Scientific Data

Before embarking on a detailed narration, it is relevant first to state a few significant facts about the area covered. As indicated on the accompanying sketch, *Barry Mts.* is applied to the watershed between St. Bernard and Mt. Speculation, from where the Divide takes a sudden turn southward over the rugged "Cross-cut Saw" to Mt. Howitt—a great hub of Victorian waterways, giving rise to the Wonnangatta, Macallister, Jamieson, Howqua, Delatite, King, Rose, Dandongadale and Catherine Rivers, which radiate from Howitt like the spokes of a wheel.

Lands Department maps show the 26-mile Barry section of the Divide as a nearly straight line, yet this traverse is anything but straight (see inset) and cuts across the "bee line" at four different points. Terminal peaks are the highest, i.e., The Twins (5,580 feet) and Speculation (5,650 feet), only four other intervening points attaining an altitude of 5,000 feet or more (viz., Selwyn, The Viking, The Razor, and Despair). For the remainder, our Barry Mountains lie mostly between 3,500 and 4,500 feet—of sub-alpine elevation. It is doubtful whether any accurate official map exists; none was available to me at the Department of Lands and Survey, but Mr. K. L. Cairncross had kindly given me access to a 4 mile/3 inch, form-lined traverse that he made for his own use in 1941, and this plan proved invaluable (altitudes had been carefully determined by aneroid and were indicated against each peak and "saddle"),

Neither could any reliable geological data be obtained from the



Mines Department; even the boundary line between the two principal rock outcrops (Ordovician and Carboniferous) was found to be placed too far west by more than two miles! Botanical information was non-existent, except for several orchid recordings by Mr. W. H. Nicholls, who had made the crossing; Baron von Mueller had never been there.

Probable reasons for the Barries having remained officially a *terra incognita* are their remoteness from tracks and roads, their inaccessibility to horses (at least in the Razor-Viking region) and

their lack of water—you can walk for a whole day in the summer-time without encountering a spring, and much time may be wasted unless one knows exactly where to go down to water from the low "saddles."

The Twins to Mt. Selwyn

And now, to resume our itinerary, slipping down the southern slope of St. Bernard, we were immediately confronted by the towering, rounded, double-headed mass of The Twins—a formidable looking obstacle, appearing very bald and wind-swept, its scattered Snow Gum (*Eucalyptus niphophila*) cover reduced to low twisted thickets. The stiff 900-foot climb up the face of The Twins provided a good introductory test of "wind" and pack-shouldering, and Professor Cherry wisely enjoined to "take it very slowly."

At the commencement of the climb, a small patch of rare leafless Alpine Sunbush (*Bossia bracteosa*) was passed, but observed nowhere else between St. Bernard and Mt. Buller; this pea has flattened stems or *cladodes*, as in the introduced Ribbon-bush ("Centipede Plant"). Grassy inclines were everywhere resplendent in daisy flowers, the more conspicuous kinds being: Hoary (golden form) and Camomile Sunrays (*Helipterum albicans* var. *auriceps*, and *H. anthemoides*); Azure, Fringed, and Snow Daisies (*Brachycome scapiformis*, *H. ciliaris* var. *robusta*, and *H. nivalis* respectively); Violet Flea-bane (*Erigeron pappochroma*); Hoary and Silky Daisy-bushes (*Olearia Frostii* and *O. myrsinoides*); Silver Daisy (*Celmisia longifolia*); and Yam Daisy (*Microseris scapigera*). I was reminded forcibly of Dr. James Small's remark (1919) that, "The Compositae, indeed, seem to have been formed with the mountains, by the mountains, for the mountains." On this particular trip, two in every thirteen species recorded were of the daisy family, and it is interesting to note that *Saussurea tridactyla* lives at a higher altitude than any other flowering plant, viz., 19,000 feet in the Himalayas (Sikkim region).

The very crest of The Twins is above tree-line (which descends lower on the cold southern side of the mount) and among rocks there flowered the honey-scented *Grevillea australis*—dwarfed by exposure to an utterly prostrate habit. The substantial cairn commands breath-taking views in all directions, with spectacular Mt. Cobbler dominating the western skyline and Feathertop's regular cone rising well above ridges to the immediate north-east. While sitting for lunch among cushions of Alpine Tussock, Graceful Bent, and Bristle Grasses, we drank in the glorious panorama and traced out our route toward Mt. Selwyn and The Viking away beyond. It was surprising to see mounds of the jumping ant at

such an elevation, where the then very active little insects must surely be frozen under for months during winter. The entomologist of our party was delighted at finding a small bright red mantis on The Twins, which also yielded the one and only snake we saw—a baby Black (*Pseudechis porphyriacus*), coiled beneath a stone against the cairn.



Summit of The Twins, 5,580 feet, looking west.
Photo, by Fritz Hauer.

The drop off The Twins (south-westerly) is almost as steep as the ascent from St. Bernard and on the way down I noted some gay flower patches of Digger Speedwell (*Veronica perfoliata*) and a few stunted plants of Snow Aciphyll (*Aciphylla glacialis*). Cattle were numerous, and their pads led us up and down rocky hummocks of the Divide, through open Snow Gum groves where Silver Daisies rose majestically all along the track. Here and there were evidences of early prospecting—is there a quartz reef anywhere that those doughty gold-seekers failed to discover? The day was warm and towards mid-afternoon we met two perspiring hikers, stripped to the waist and laden with knapsack tanks of water in addition to their ordinary camp impedimenta. They had walked from Mt. Selwyn that day and warned us about the miles of very dense scrub with which we would have to do battle on the waterless stretch between Selwyn and The Viking. At several points, one must guard against the temptation to branch off along side spurs, higher than the actual Divide. Valuable time can be lost that way.

The sun was declining when we reached Mt. Murray stockyard, and, to pitch camp at running water, we were obliged to descend (more correctly "slither") more than 1,000 feet, in vertical height, to one of the Buckland River heads. Beds were made on layers of tree-fern fronds and a very comfortable night passed—warm and starlit. Near the old stockyard were shrubs of Ovens Everlasting (*Helichrysum Stirlingii*), the only ones I observed, while Cluster-flower Geebung (*Persoonia confertiflora*) and the uncommon grass *Deyeuxia contracta* were met with for the first time here.

Next day I was surprised to find a clump of *Viola tricolor* in bloom beside the track, doubtless introduced by stock, as were brome grasses, thistles, and the ubiquitous sorrel. Variable Groundsel (*Senecio laetus*), a form with finely dissected foliage, made splashes of bright yellow in rocky places, but the most abundant and floriferous plants right to our journey's end were Pale Vanilla Lily (*Arthropodium milleflorum*) and Derwent Speedwell (*Veronica derwentia*); the latter clothed acres of many hills with white or mauve-tinted blossom that harboured innumerable nectar-seeking insects, notably flower-beetles. Our entomologist was kept so busy that he ran out of collecting tins and bottles. Willow-herb (*Epilobium Billardierianum*) and a tall, large-flowered Blue-bell (*Wahlenbergia* sp.) were also plentiful; but the only orchids so far seen were musky *Caladenia angustata* (leaves and capsules), and a few late flowers of Bird Orchid (*Chiloglottis Gunnii*) on a very low grassy saddle where we stopped for lunch this second day.

Soon the bulk of Mt. Selwyn loomed near and we made good pace towards it. Now and then a slight carrion odour betrayed the presence of humble Stinking Pennywort (*Hydrocotyle laxiflora*), but failed to dim our delight in the panoramas unfolded from every high vantage-point—we were completely enveloped in a world of mountain ranges, rolling back to far horizons like the waves of a purple sea; the changing moods of lofty Feathertop and Buffalo were ever a constant source of pleasure. Just before the final stiff climb to North Selwyn's (5,050 feet) summit—an outlook probably unrivalled anywhere in the Victorian highlands—we passed along a short but extremely narrow razor-back, of the sort which early surveyors had to "shave" down so that the wheels of their drays would touch ground on either side! At this "razor" I noted my first plants of Dwarf Geebung (*Persoonia chamaepeuce*)—later found abundantly all over the Cobbler plateau.

Selwyn is a mount of contrasts: the higher northern peak is smooth in outline and composed of Ordovician sedimentaries, the southern a tumbled mass of whitened, Devonian granite boulders.

Between these high points a sheltered grassy saddle, where Woolly-butt (*Eucalyptus delegatensis*) forest comes up to meet Snow Gum, invites you to make camp. It is but a few minutes' walk, down the north side of the saddle, to where a spring of clear water bubbles permanently from a grove of tall tea-trees (*Leptospermum pubescens* var.) beset with Alpine Water-fern (*Blechnum pennamarina*). Musk Monkey-flower (*Mimulus moschatus*) is well established there, also in several other highland water-courses. At the time of our visit, the tea-tree spring and, indeed, the whole southern granitic peak had been badly scarred by recent fires. That night on Mt. Selwyn was windy, with gathering nimbus cloud, so we arose early and were away by 7 a.m., hoping to negotiate the worst of the threatened heavy scrub before rain might add to our difficulties. A clump of Royal Grevilleas (*G. Victoria*) stood out where our path left the south-west base of the granite knob.

Selwyn to The Viking

Throughout next day, the leaden sky was tinged red with dust, and views of all but the nearest hills quite obscured. Well defined cattle pads rendered the going easy for some five miles from Selwyn, whence the Divide turned sharply south from the intersection (theoretical) of Youpella and Coolungubra Parishes—exactly half way along the Barries. Then followed a succession of dreary burnt-out hills, steep and stony—evidence that the firebrands had been at work, ever striving to push their stock farther and yet farther back along the range, with what disastrous results to soil and timber!

Pale green heads of the indigenous Graceful Fescue (*Festuca asperula*) nodded from tall stems in this region, while floral swards of mauve and white showed how effectively the Pale Vanilla-lily and Prickly Starwort (*Stellaria pungens*) were re-colonising many charred slopes. One solitary orchid spike each of *Thelymitra media* and *Prasophyllum brevifolium* was taken hereabouts, though "Cinnamon Bells" (new name for our Potato Orchid, *Gastrodia sesamoides*) were not infrequent.

Then came the scrub! Progress was reduced to crawling pace for six painful hours, during which we covered only as many miles, sometimes going backwards and using our packs as battering rams against the hedge-like density of regenerated eucalypt and wattle saplings, often interlaced with wild raspberry brambles. Messmate (*Eucalyptus obliqua*) and Blanket-leaf (*Bedfordia salicina*) were noted on a small granite outcrop some seven miles west of Selwyn, but they appeared on the crest of the Divide at only one other spot, viz., The Viking's north-eastern foot. We had hoped to make The Viking by this third evening, but were

still wearily struggling with heavy scrub at sunset and were forced down to water before the twilight waned—another vertical scramble of 1,200 feet or more to a steep head of Riley's Creek; the babbling water made welcome music, but we had actually to find it by candle-light among the enveloping canopy of gully vegetation. Tree-fern fronds again provided soft bedding and it was mild enough to dispense with tents. Refreshed by a long sleep, we re-climbed the ridge at 10 a.m. and beheld The Viking against a clear sky; yesterday, the prevailing cloud and dust (but mercifully *not* rain) had marred its bold relief, in the few glimpses we had while "scrub-shoving." Lyrebirds were frequently heard and we stumbled across many of their dancing mounds in the thick undergrowth. An occasional eagle was seen, soaring aloft, but smaller birds did not seem at all numerous—strange, in view of the copious insect population.

(To be continued.)

PROPOSED SANCTUARY AT DIMBOOLA

(To the Editor)

Sir.—I notice in the annual report that among the activities of your Club for 1948 was a proposed sanctuary for Dimboola. I was the mover in this idea, and had the local Progress Association on the job, but like many other bodies, after due consideration (some six months), nothing has been done.

Adjacent to the High School is about 10 acres of land of a very light nature. It is covered at the present time with virgin scrub native to the district, and is unfenced. If this block could be fenced at a later date we could have a belt of eucalypts, as *E. leucosylon* and *E. cladocalyx*, of which we would in later years be very proud. The local school would benefit greatly by the idea.

This block is the habitat of a fairly rare Australian orchid, *Prasophyllum fusco-viride*, found, as far as I know, only around Dimboola, very rarely at a spot near Portland, and at one spot on Eyre's Peninsula, South Australia. I would like to see at least 4 acres of the land declared a sanctuary for native plants, because there are many plants peculiar to the north-west of Victoria therein, and patches of virgin scrub are particularly rare near Dimboola. The matter has been before the Dimboola Decentralization League, but they have not moved in the matter of a sanctuary. A specimen of the orchid was exhibited at a Field Naturalists' meeting last year and a Melbourne member of the Club proposes visiting Dimboola this spring to see it. This could be the forerunner of other such visits by naturalists to study our flora and fauna. *Prasophyllum fusco-viride* was found and described by an old Dimboola resident, Mr F. M. Reader. What better memorial to the Reader family than a park where can be grown the plants that they, and other old district naturalists, loved so much? At the present time this area is a menace to the town; small boys armed with axes and matches go a-pioneering there in summer months! I hope to attend a meeting of the Club at an early date and would appreciate an opportunity to amplify these remarks.

E. MUTR.

Dimboola, Vic.

EVERYDAY APPLICATIONS OF ASTRONOMY

By J. A. BLACKBURN, (A.I.F.)

"But what is the use of it?" This question is often asked of naturalists by their unscientific friends. And it is a hard question to answer, for it is difficult to express the floral anatomy of a minute orchid in terms of money, or to justify hours spent poring over a new crustacean. By the common concept, astronomy is even further from everyday life: you can handle a botanical specimen or closely examine geological strata, but the stars are millions of miles away. A sceptic may even doubt their real existence, saying they are merely an optical illusion.

But the science of navigation brings astronomy down to earth. The most humble sailor realizes only too well that, without the stars, it would be impossible to travel far from land. And the services of the astronomer are required to collect the data which the navigator uses in calculating his position from the stars.

Astronomy is a science which demands a knowledge of higher mathematics and is obviously beyond the scope of all but the most erudite. Fortunately, for the purposes of navigation, it can be reduced to a comparatively simple form. Copernicus stirs in his grave, for once more it is imagined that the earth is the centre of the universe: the stars are studded like gems on the inside of the "celestial sphere" which rotates; the sun and moon move along fairly uniform paths among the stars, and the planets wander, apparently, at will. Of course it is the earth that really rotates, so the apparent motion of the celestial sphere takes place about an axis which coincides with that of the earth. This axis cuts the celestial sphere at two points known as the north and south celestial poles, which, in the respective hemispheres, are elevated above the horizon at an angle equal to the latitude of the place of observation. A star situated right at the celestial pole would appear quite stationary in the sky. Stars fairly close to it appear to move in small circles with the celestial pole as centre. These stars never dip below the horizon as do others farther away.

Right above the head of the observer is a point in the sky known as the zenith. This, of course, does not move with the celestial sphere and its distance from the pole remains constant for the one place of observation, but varies according to latitude. This distance is known as the "co-latitude." If the line joining the zenith to the elevated celestial pole is produced downwards to cut the horizon, it does so due south of the observer, and if produced the other way, cuts it in the north. This line is the meridian or north-south line and the angle between an object (star or otherwise) and the meridian is known as its azimuth. A line

joining the zenith to any star is its zenith distance and can be deduced by measuring its altitude above the horizon. A line joining a star and the elevated pole is known as its co-declination or polar distance and can be found from the Nautical Almanac or similar tables.

So we have three points: the zenith, the pole, and the position occupied by a particular star, and three lines joining these points, viz., the co-latitude, the zenith distance, and the polar distance, thus forming a triangle on the celestial sphere. Of the angles in this triangle, the one taken at the zenith between the star and the pole clearly gives the azimuth of that star. Since the star apparently travels in a circle centred on the pole, the angle at the pole between the zenith and the star is a measure of the time which has elapsed since the star last crossed the meridian (which it does every twenty-four hours). This angle is known as the hour angle and enables us to determine time. The third angle, that at the star, is not used.

This triangle on the celestial sphere is a spherical triangle and its mathematical properties are similar to those of a plane triangle. It has six angles and sides, and if any three are known, the other three can easily be calculated. Two can always be found: the zenith distance by direct measurement and the polar distance from the Nautical Almanac. One of the other three useful components must be found in order that the remaining two may be calculated.

That is briefly the theoretical basis of navigation. The methods by which zenith distance may be measured and the missing component found are numerous and varied. On land a theodolite or some modification of it is used to measure the altitude, but at sea and in the air a sextant is needed to overcome the effect of constant motion. Moreover, if observations are made to heavenly bodies in certain positions, the calculations are considerably reduced. For instance, a star is at maximum altitude when it is on the meridian: that is to say, due north or due south of the observer. So a star is followed with an instrument until its altitude ceases to increase. The altitude is then measured. At that instant, the star, zenith, and pole are in one straight line; the celestial triangle has ceased to exist, and the latitude of the place is deduced merely from the sum or difference of the zenith and polar distances. It is this observation which is made to the sun at midday on board ship.

From another observation taken to a star or the sun when it is fairly low in the east or west we can compute the azimuth and hour angle, using as the third component the latitude obtained as described, or scaled from a good map. From the hour angle, either the longitude of the place or the correct time may be obtained, but

one must be known to give the other. If the correct Greenwich time is known the Nautical Almanac will give the time interval which has elapsed since the star last crossed the Greenwich meridian. The difference between this time and the hour angle is the longitude of the place of observation. If longitude is known exactly, as in the case of an observatory, the reverse process may be applied and the exact time of transit of a star across the meridian computed. The actual transit is observed and the time noted on the observatory clock. Any discrepancy is the error of the clock, which is then adjusted. Thus wireless time signals are controlled, checking ships' chronometers, and permitting accurate longitude to be determined at sea.

In this brief article, enough is given to enable the layman to realize that astronomy, that mystic science, is of very great practical value. Surely the stars influence our lives far more than we realize.

STRANGE ROOT FORMATION IN WEEPING WILLOW

(*Salix babylonica*)

In a letter (25/6/45) Mr. A. O. Barrett describes a very interesting root formation in a Weeping Willow which emphasizes the value of willows along water-courses, where one may often see their roots holding the elsewhere much-eroded banks. In building a factory, the men had to remove a large pollarded Weeping Willow. It was quite rotten inside the trunk. About 8 feet 6 inches from the ground, issuing from a large branch 6 inches thick at the trunk, a root had made its way down through the rotted wood and had penetrated the ground. The roots reminded Mr. Barrett of an old English besom.

At first glance this appears to be an instance parallel with that of the strange root formation in *Exocarpus* (*Pict. Nat.*, March, 1944), but, in the case of willows, one frequently sees roots reaching down to a stream from a portion of the stem well above the water. In the first instance, these probably shoot for balance and, as the tendency is for roots to grow downward, they soon reach the water. One may see this in cuttings placed in a jar of water, when roots will appear on the cutting, six inches or more above the water, and grow downward towards it.

According to Prof. E. J. Salisbury (1936), "the facility with which willow cuttings strike is probably largely, if not entirely, due to the presence of rudimentary roots in the stem, already developed within the tissues of the parent axis, and merely awaiting the appropriate stimulus for their development." In the case of Mr. Barrett's willow, one wonders just what the stimulus may have been to call forth a root at 8½ feet from the ground.

Probably other Australian trees besides *Exocarpus* are able to save the situation when danger threatens. At Sorrento, where *Casuarina stricta* is still abundant, and where their ornamental value is recognized, a fine sapling she-oak is growing right from the centre of the still sound parent trunk. This fine specimen (2 feet thick) had been sawn off at about 4 feet from the ground. No other shoots had issued from the trunk. I have watched this sapling *Casuarina* for several years.

EDITH COLEMAN.

FOSSILS FROM JERUSALEM CREEK, EILDON DISTRICT, VICTORIA

By EDMUND D. GILL, B.A., B.D.

South-east from Eildon Weir is rough mountainous country, seldom traversed. The bedrock consists of sandstones and mudstones with a few grit and conglomeratic bands. Intrusives have penetrated the bedrock in a number of places. The general character of the country rock can be seen in the many cuttings along the road from Eildon to Fry's Bridge, which one traverses on the way to the well-known fossiliferous strata at Howe's Creek, Loyola.

The area referred to is drained by Jerusalem Creek, which rises on Mt. Torbreck (5,090 feet) and travels northwards to the Eildon Reservoir. The strike of the country rock averages about N. 45° W., i.e., it is transverse to the direction of the stream. The sandstones and mudstones are not highly diversified and so do not seem to exercise a very strong influence on the direction of the principal streams at this point.

Many years ago, Mr. O. A. L. Whitelaw made a sketch physiographic map of the country from the better-known Wood's Point area to the Eildon-Fry's Bridge Road. On this map a small amount of geological information was also filled in. Mr. W. Baragwanath, of the Victorian Geological Survey, has kindly made this map available to me. The original purpose was to continue in a north-westerly direction (i.e., along the line of strike) the geological mapping of the Walhalla-Wood's Point district.

While mapping the country, Mr. Whitelaw collected a number of fossils, and these are now listed, as they provide some interesting evidence of the geological age in an area where the stratigraphy has not yet been described. The fossils have been preserved as casts and moulds, the original calcitic material having been leached away. Many of the fossils are poorly preserved, but those named below were capable of identification. The numbers given are Geological Survey Museum reference numbers. They are given so that anyone desiring to do so can check the determinations made. Nos. 18207, 18209, and 18210 are from "Bend two chains north from junction of Jerusalem and Barnwell's Creeks, Jamieson Quarter Sheet."

No. 18207—Speckled grit, with brown, rust-red, buff, and whitish patches; fine-grained matrix with inset larger grains of quartz (clear and milky), felspar, etc., up to $\frac{1}{2}$ cm. diameter usually. *Reptaria* sp., and a crinoid stem joint.

No. 18210—As. No. 18207 and containing the same fossils, with the addition of an undetermined polyzoan.

No. 18209—Heavy, compact, indurated buff sandstone, mostly feldspar but with some quartz and other minerals. *Chonetes* sp.

The rest of the specimens come from "Spur between Wilson's and Barnwell's Creeks, 70 chains south-east from junction of Jerusalem and Barnwell's Creek, Jamieson Quarter Sheet."

No. 18218—Light greyish to buff felspathic sandstone, with whitish patches; contains occasional large grains of quartz; compact in mass, but small pieces are crumbly.

Anoplia australis Gill, with faint incipient ribbing at edge.

Nuculites maccoyiana Chapman.

Chonetes sp.

Also a small solitary coral, two spiriferids, orthids, and three kinds of crinoid stem joints.

No. 18222—*Anoplia withersi* Gill (small and large specimens).
Spirorbis sp.

Dalmanella sp. of the *elegantula* gens, but small and with muscle ridges much less developed than in the specimens from Lilydale district (Yeringian).

Chonetes sp. with about 30 rounded ribs mostly bifurcated at the anterior ends; median sulcus; large papillae; longer median septum than *Chonetes robusta* Chapman with which it has affinities. This species is new but the material is not well enough preserved to be made into a type. However, it is very interesting in that it is probably the forerunner of *C. robusta*.

No. 18223—Many of the fossils named above appear on nearly all the specimens, but only those that are different are now named as all the material comes from the same locality.

Tentaculites sp.

No. 18224—Fragment of trilobite.

No. 18227—cf. *Penestrellina*.

Stratigraphical Position

The beds, from which the fossils listed above have come, are Lower Yeringian in age, as defined by the present writer in a paper on "Chonetidae from the Palaeozoic Rocks of Victoria and their Stratigraphical Significance" now in press in the *Proceedings of the Royal Society of Victoria* (Vol. LVII). The plentiful occurrence of the Devonian genus *Anoplia* indicates this, as also does the faunal and lithological similarity between the Jerusalem Creek and Yankee Jim Creek beds (*Proc. Roy. Soc. Vic.*, 53, Pt. 1, p. 157). The fossils suggest that the Jerusalem Creek beds are at or near the base of the Yeringian Series. However, it must be kept in mind that the base of the Yeringian Series in the type area has

not yet been proved, owing to the unfossiliferous nature of the rocks there. It may be anticipated that Jordanian beds will be found in the vicinity of the Jerusalem Creek fossiliferous strata. Whitelaw, and recently Thomas (personal communication) found plant remains in the district, but not adjacent to the beds described here. The writer is indebted to Mr. W. Baragwanath of the Geological Survey of Victoria for the opportunity of studying the Jerusalem Creek fossils.

DEATH OF MR. A. B. BRAINE

A distinguished figure was lost to Australian orchidology through the death in Melbourne on October 6 of Mr. Arthur Belgrave Braine, who had reached the age of 91 years on September 9. English-born, Mr. Braine migrated to Ceylon as a young man and engaged for many years in coffee-planting. That experience prompted him to become in later years a champion in Australia of the Cingalese and to urge that they could be an important and healthy factor in the opening-up of the northern parts of this continent.

Transferring from Ceylon to Victoria, Mr. Braine entered the Education Department and served in various parts of the State. Moreover, he married a teacher, and a happy alliance produced nine children, eight of whom remain. One is the wife of Mr. W. H. Nicholls, the well-known orchidologist. Mrs. Braine, a cultured and charming woman, predeceased her husband by little more than three months.

Students of Australian orchids have reason to hold the name of A. B. Braine in warm regard. He took up the study purely as a recreation, and his sound education and fraternal spirit combined to make him a source of assistance and inspiration to others. In addition he made some interesting discoveries, notably *Chiloglottis Pescottiana* (the Bronze Bird Orchid), a rare species first found when Mr. Braine was stationed at Cravensville, in the north-east. Another of his achievements at Cravensville was the finding for the first time in Victoria of the remarkable little Elbow Orchid, *Spiculosa Huntiana*. It was through such work that the late Dr. R. S. Rogers commemorated him (1922) in *Prasophyllum Brainoi*, the Green Leek Orchid.

Mr. Braine was "orchid-minded" to the last. Even on the verge of 90 years he continued to enjoy bush rambles. "Isn't it time," he was asked at the age of 89, "that you left the tramping to younger men?" "Tut-tut," said the old orchidologist, "I'm only a young man myself. But," he smiled, "I must confess that I'm not quite so good at the hills as I used to be!"

A.H.C.

DEATH OF MR. BASSET HULL

The Field Naturalists' Club of Victoria extends its sympathy to the Royal Zoological Society of New South Wales on the death of its experienced secretary and editor, Mr. A. F. Basset Hull. Born in Hobart in 1862, Mr. Hull became a barrister and served for many years in a legal capacity in the N.S.W. Department of Mines. Meanwhile he developed strong interests in ornithology, conchology and philately, and was at various times president of the Royal Australasian Ornithologists' Union, the Royal Zoological Society of N.S.W., the Linnean Society of N.S.W., and the Sydney Philatelic Club. He was awarded the M.D.E. in 1936. A courtly and sage personality, Mr. Hull will be much missed.

ADDITIONS TO THE VICTORIAN PTERIDOPHYTA

By N. A. WAREFIELD, *Orbost.*1. *Marsilea angustifolia* R.Br. (in *Prod. Fl. Nov. Holl.*, 1810).

"Leaflets narrow-oblong, very obtuse truncate or slightly toothed at the end, the stipes slender, filiform, 2 to 3 in. long . . . glabrous or nearly so. Involucre hirsute and nearly sessile, and usually solitary at the nodes." (G. Bentham in *Flora Australiensis.*)

This plant, known originally only from North Australia, has since been placed on the lists for Queensland, New South Wales and Western Australia. In the Melbourne National Herbarium there are Victorian specimens from the Wimmera, collected by F. M. Reader in 1887; and Mr. J. H. Willis has noted the species at Mildura.

Following is a key suitable for distinguishing between the three Victorian species of *Marsilea*:

Leaflets obovate; involucre clustered, on long stipes . . . *M. Drummondii*.

Leaflets obovate; involucre clustered and sessile . . . *M. hirsuta*.

Leaflets narrow-oblong; involucre sessile usually solitary . . . *M. angustifolia*.

2. *Isoetes humilior* F.Muell. (in *Linnaea*, 1852, 722).

Synonyms: *I. Hookeri* and *I. Stuartii* A.Br.—1868.

This species first came under notice in Victoria when Mr. Willis identified as such, plants collected by the writer in granite rock pools of the Genoa River in East Gippsland. Further investigation showed that most of the Victorian material previously passing as *I. Drummondii* was the same as the Tasmanian *I. humilior*. The two Victorian species can be distinguished as follows:

I. Drummondii inhabits shallow water or grows even on damp soil, the rootstock is 3-lobed, a few stomata are present, and the sporangia are naked. The only known Victorian specimens were collected at Hawkesdale and in the Wimmera by the late Mr. H. B. Williamson (1904). The species is recorded also from South and Western Australia.

I. humilior is permanently submerged, the rootstock is 2-lobed, there are no stomata, and each sporangium is completely covered by a membrane. It is recorded for Victoria by specimens from several localities including Mt. Pilot near Chiltern, Dimboola, and the Upper Murray, and is found also in Tasmania.

3. *Cyathea marcescens* N. A. Wakefield.

An interesting sequel to the discovery, as a new species, of the Skirted Treefern in East Gippsland was the location in Melbourne National Herbarium of a small piece, undoubtedly of the same plant, collected in the Otway Ranges by George H. Marriner, in 1880. In a covering letter to Baron von Mueller, the following notes were given:

"From a tree about 8 or 9 ft. high and 8 or 9 in. in diameter, length of frond 14' 6". I have seen them 17' 6" long off a tree 9 ft. high. This is the strong grower and only to be found occasionally; they both grow in company with one another."

The "both" here refers to *C. Cunninghamii* and *C. marcescens*, and the notes on size and association could just as well have been written of the two species at Mount Drummer and Combiobar in Gippsland.

Mueller sent Marriner's specimen of *C. Cunninghamii* to Benthams, who mentions it in the *Flora Australiensis* (Vol. 7, p. 709); but the Baron labelled the other specimen "Henitelia" and put it aside.

I wonder if the Skirted Treefern is still "to be found occasionally" in the Otway Ranges?

[Mr. Owen Singleton found a solitary but healthy example of *Cyathea marcescens* at "Mait's Rest" on a tributary of the Parker River (main road, five miles east of Hordern Vale) early in January, 1944. Good material was lodged at the Melbourne Herbarium and agrees perfectly with the types from Mount Drummer and Combiobar.—J.H.W., Asst. Ed.]

A RARE VICTORIAN FERN

When N. A. Wakefield, in the *Victorian Naturalist* (Jan., 1941), recorded Mr. W. Robinson's discovery for the first time in Victoria of *Lindsaya microphylla* Sw. from East Gippsland, a beautiful addition was made to our native fern flora. Now the species has been found a second time, 170 miles farther west in our State, and has been sent me by Miss Ruth Clark from Granite Bar, five miles from Hedley near Toora, Gippsland.

The party consisted of Mrs. Rossiter (who with her daughter is a well-known orchid enthusiast), her son, Miss Wigan and Miss Clark. Few know the bush around Hedley better than the first-named and it was a joy to her to find something not previously noted. Granite Bar is an old tin-mining area, and the sluicings left a ravine in which the original flora has become re-established. Described as fairly high, but not wet, the country has a good rainfall and is well timbered with stringy bark and box, with patches of dense scrub. In one depression *Lindsaya* was found growing on the damp, shaded, almost vertical sides, in soil containing much pipe-clay and gravel. The number of plants was not counted, but although well established, the species was not abundant; it should now be carefully sought in the few remaining fern-gullies of South Gippsland.

A. J. TADGELL.

PROPOSED COUNCIL OF SCIENTIFIC SOCIETIES

At the Planning of Science Conference in Melbourne in June, 1944, a resolution was carried instructing the organizing committee, before it dispersed, to explore the possibility of forming a National Council of Scientific Societies. The committee communicated with all those societies in Victoria which had shown interest in the conference, and received many replies supporting the idea of a National Council. A meeting of scientific societies was called in April, 1945. Thirty-four organizations sent representatives, and the aims of the proposed council were explained by Dr. P. J. Henderson, President of the Australian Society of Instrument Technology. This meeting resolved that a Victorian investigating committee be appointed:

- (1) to list the societies which would be interested and provide a statement of their membership, objects and facilities for meetings;
- (2) to report on the field for collaboration amongst these societies;
- (3) to report on any existing joint associations, such as the A.N.Z.A.A.S., A.N.R.C., and Federal Engineering Council;
- (4) to consider all the practical factors involved.

The result of this resolution was the formation of a committee of twenty members (including a delegate from the F.N.C.V.) which worked energetically from May to September to supply societies with data on which they could base an informed decision on the proposal. A provisional constitution for a Council of Scientific Societies was even drawn up. Finally, at its meeting on September 11, the investigating committee decided to recommend to interested societies that a Victorian Council of Scientific Societies be formed. To give effect to this recommendation, a meeting has been called for Tuesday, November 27.

At an early stage in the investigations it was decided to aim at a Victorian rather than a National Council because of the numerous difficulties, spatial and legal, involved in the latter proposal. This decision was also influenced by the fact that a Tasmanian Association of Scientific Societies had recently been formed, the seventeen societies which founded the association covering a wide field. Some were learned and strictly scientific, some were technological, and others amateur; quite a number were branches of Australia-wide senior societies, e.g., Institution of Engineers, Australian Chemical Institute, and British Medical Association. Whether the Victorian Council will be formed on this all-inclusive basis or restricted to those organizations engaged in strictly scientific pursuits has not been determined by the investigating committee, partly because the answer will depend on the nature of the societies seeking admission, and also because the official views of societies on this matter were not known to the committee.

The possibility of forming a Victorian Council of Scientific Societies as part of the A.N.Z.A.A.S. interested the committee for a time. It was constitutionally possible but would have been very difficult to bring about without considerable delay.

In regard to the work it is envisaged the Council can do, the following are suggestions:

1. Organization of conferences. (The Planning of Science Conference in Melbourne in June, 1944, was the work of eighteen societies who co-operated on the organizing committee.)
2. Press and radio publicity for science.
3. Improvement of facilities for training of scientists and technicians.
4. Co-ordination of professional activities on such matters as regional planning.
5. Setting up of scientific and professional libraries.

6. Setting up of an appointments bureau,
7. Provision of buildings to house scientific and technical societies.

It is generally accepted that a closer liaison between scientific societies can have no other than a beneficial effect. With this as a guiding principle, there should be no lack of subjects on which societies will find it advantageous to co-operate, and it is hoped the F.N.C.V. will be among the foundation members of the council now in process of formation.

IN DEFENCE OF WEDGE-TAILED EAGLES

By F. G. ELFORD, B.Sc., Teachers' College, Melbourne.

It is more than a year since I reported an incident involving the capture of a Wedge-tailed Eagle in a rabbit trap, and its subsequent treatment in a Victorian country town (*vide Vict. Nat.*, Vol. 61, No. 4, August, 1944, p. 62). In a letter to the newspaper that reported the incident, I suggested that the people concerned with the capture and exhibition of the bird would be better employed making careful observations of its feeding habits and reporting their observations, thus providing reliable evidence of its value. Since then, two letters from district farmers have come to my notice, and some of the information they give is worth recording.

One farmer, in writing to the newspaper, stated, *inter alia*: "We have had them nesting on our property for 70 years and have never known them to kill anything but snakes and rabbits. We have had sheep lambing in the same paddock and have not lost one lamb. I noticed the man who set the traps for that bird knew what bait to use (yes, the rabbit). If I had my way there would be a £50 fine for destroying an eagle in Australia."

The other farmer wrote to me and, apart from the introductory and concluding paragraphs, his letter is as follows:

"I have been on the land all my life and have had at least 32 years of experience with lambing ewes. In all that period I have never known a Wedge-tailed Eagle to attack and carry off a lamb alive, and I very much doubt an eagle's ability to do same, although I have heard odd people say they have seen it happen. I have known them to tear to pieces a dead or half-dead lamb, but never a sound, healthy lamb. On one occasion I caught one in a rabbit trap and he got away with the trap, but could hardly rise more than 6 feet above the ground, and then for 50 to 70 yards at the most. Since then I have very much doubted his ability to take away a whole lamb. They are always poking about amongst the lambs and I never worry over them. My lambing percentages this last seven years have always been 95% to 100%, so I could not have lost many from eagles and crows.

"While on the subject, I never shoot or poison crows, and there are plenty here. This statement is not quite correct, as I have a shot at any crow that troubles the sowlyard, and it's only one in a year or two. The crow, like the eagle, does not attack strong, healthy lambs, but only dead ones or weaklings; will also on occasions attack a sheep that is cast on its back and can't get up. *Keep your stock in good condition and you will have no worries from these birds.* [*Italics mine. F.G.E.*] which are excellent scavengers, and the amount of vermin, blowflies, etc., the old crow cleans up more than balances the small amount of damage they do. There are many graziers in N.S.W. who protect the crow and have not regretted it."

Mr. Frank Robbins, 12 Pleasant Street, Castlemaine, desires to obtain a back number of *Wild Life*, viz., Vol. 3, No. 2, February, 1941, and would be glad to hear from any Club member who may have one to spare.

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PROCEEDINGS

The monthly meeting of the Club was held on November 12, 1945, at the Public Library Lecture Room, the President (Mr. H. C. E. Stewart) and some 150 members and friends attending.

Apologies for non-attendance were received, from Mr. A. H. Chisholm (visiting Tasmania) and Mr. R. G. Painter, who has recently been appointed Curator of Hepburn Springs Park. Mr. J. A. Blackburn, recently returned from service in the North, and Mr. R. C. Harvey, of Bechworth, were welcomed to the meeting.

Mr. Stewart referred to the recent death of three friends of the Club: Mr. C. C. Brittlebank, an ex-member; Mr. M. Galbraith, father of our member, Miss Jean Galbraith; and Mr. A. F. Basset Hull, secretary of the Royal Zoological Society of N.S.W. Mr. P. Crosbie Morrison spoke appreciatively on the life and work of the late Mr. Basset Hull, and members stood in silence as a mark of respect to the memory of our late friends.

The President announced that Mr. Chas. French and Mr. F. Salau were now much improved in health and expressed the good wishes of the Club for rapid progress toward a complete recovery.

Excursion reports were given as follows: Maranoa Gardens, Mr. A. J. Swaby; Frankston, Mr. H. C. E. Stewart, for Mr. T. S. Hart; Beaconsfield, Mr. A. S. Chalk; Bendigo (bird life), Miss Wigan and Miss Ina Watson, who had noted 70 species of birds there; and Werribee Gorge (geology), Mr. A. A. Baker.

In reports of the Bendigo excursion, reference was made to the official opening of the Bendigo Field Naturalists' Club, which now has a membership of 30. The President stated that films shown by Mr. R. T. Littlejohns during our Melbourne Club's recent visit were greatly appreciated, and suggested that members of the parent club should correspond with those having similar interests at Bendigo, but any could well form a basis of valuable correspondence.

Mr. H. P. Dickens reported on the Wild Nature Show held recently at Hawthorn, and stated that a clear profit of some £103 was expected. The President thanked sponsors, members and exhibitors who had helped make the show such a success, and looked forward to future ones, whereby funds could be built up for important projects of the Club which, to the present, had £1,000 invested in Government loans.

Mr. G. N. Hyam reported concerning a "Save the Forests" show in which our Club had participated at the Melbourne Town Hall; the campaign recommended abolition of grazing in National Parks, and research into vegetational types and water flow in catchment areas. The President expressed thanks to all who had assisted the Club at this show.

The following correspondence was read: From Mr. G. Mack, thanking the Club for good wishes in connection with his new appointment to the Queensland Museum; from Capt. H. E. Young, now back in the Forestry Department of Queensland, expressing good wishes to the Club and thanks for past happy associations; from the committee investigating a Victorian Council of Scientific Societies, asking that the Club consider the advisability of forming such a council. This last matter having been printed at length in the November *Naturalist*, a motion was called for. Mr. P. F. Morris moved, and Mr. A. S. Chalk seconded, "That this Club favours the formation of a Council of Scientific Societies in Victoria and desires to be listed as a foundation member of the proposed council." The motion was carried without dissent.

It was announced that our proposed Geological Discussion Group would be formally established at the Royal Society's Hall on Wednesday, November 28, at 8 p.m., when it is hoped to elect officers and draw up a programme for the forthcoming year.

Mr. P. F. Morris announced the formation of a second Junior Branch of the Club, at Toorak. Initial membership should be about 120, the local executive would include juniors who would also preside at each monthly meeting, and it was hoped to publish a small mimeographed journal there.

The following were elected as Ordinary Members of the Club: Mrs. A. W. O'Mara, Miss Margaret Douglas, Miss Joan Williams, Messrs. S. J. Bacon, A. H. Dovey, P. G. Collins, James Raiton; as Country Members: Mr. H. Palethorpe, Mr. G. H. Edwards; and as Associate Member: Master Ivan Collins.

ADVENTURES AMONG BIRDS

Mr. C. E. Bryant gave members an insight into the joys and perils of bird photography. A series of excellent photographs in natural colour showed nesting birds of many kinds and in many places, some being exceedingly hard to photograph. This breezy yet most informative lecture was one of outstanding interest and at its conclusion an enthusiastic vote of thanks was moved by Mr. P. Crosbie Morrison, seconded by Mr. H. P. Dickins, and carried by acclamation.

EXHIBITS

Mrs. Fenton Woodburn: *Passiflora cinnabarina*, "Red Passion Flower."
Mr. R. Whitworth: White-bellied Snake (*Eardonia leucobalia*) from the Northern Territory.

Mr. Tom Griffiths: Assassin Bug (*Ptilocnemus femoratus*) from Beaconsfield (21/10/45).

Mr. F. G. Eford: Cicadas. (a) Yellow variety of the Green Monday, *Cyclochila australasiae*, taken at Fernree Gully; (b) a tropical variety from Balikpapan, Borneo.

Mr. A. A. Baker: Rocks and fossils collected at Bacchus Marsh excursion (6/11/45), specimens including glaciated pebbles, tillite, mica-schist, and chert as a siliceous replacement of mudstone from the Werribee Gorge, also fossil leaves, fruits, stems, fossil wood, and concretions from the Tertiary beds of Korkkoperrindul Creek.

Mr. C. J. Gabriel: "Clam" shells from various localities, e.g. *Tridacna elongata*, *T. squamosa*, *T. crocea*, and *T. compressa*.

Mr. R. Savage: Light garden-grown native plants, including *Prostanthera spinosa*, *P. uspaluthoides*, *Cheiranthra linearis*, etc.

Mr. H. P. Dickins: Illuminated address in the making, showing use of Australian flowers in the design.

Mr. J. H. Wilks: The remarkable and primitive arthropod, *Ooperipatus oviporus* from Mason's Falls (Kinglake National Park), kept alive in damp moss for more than a month without food.

Mr. J. A. Blackburn: Some examples of native handicraft from the Milne Bay area of New Guinea and neighbouring islands of the D'Entrecasteaux Group. Specimens include grass skirt, lime bottle and spum, string bag, fish hooks, waist bands, arm bands, grass bag, etc.

Mr. J. Ros Garnet: Some interesting plant specimens from the Wimmera. (a) Three species of mistletoe (*Lysiana exocarpi*, *Anyema linophylla*, and *A. grandang*, var. *haveroflii*) parasitic on one "Buloke" (*Casuarina Luehmannii*) at Arkona, 1/10/45. (b) Four Spider Orchids—*Caladenia reticulata* (typical form) from the red sandstone of Lawloit Ranges, Diapur, 3/10/45; *C. filamentosum* var. *tentaculata* from the Mallee scrub at Dimbooka (coll. Eric Muir, 10/9/45); *C. cordinchila* (typical form, rarely found in Victoria) from the red sandstone, Lawloit Ranges, Diapur, 3/10/45; *C. reticulata*, an unusual variety or perhaps an undescribed species, also from the Lawloit Ranges at Diapur, 3/10/45. (c) A living specimen of *Pterostylis rufa*, from Dimbooka. (d) Mustard plant (*Brassica hirta*) from Kaniva, 4/10/45, where it is grown commercially.

OBSIDIAN IN NEW GUINEA

I read with interest the article in the October *Naturalist* dealing with obsidian implements found in New Guinea, and would like to place on record some additional information on the subject.

I have found similar obsidian flakes at two localities in the Milne Bay area: one on the coast at the eastern end of the Turnbull Airfield, and the other about six miles away near "Hagita House." The flakes were all small and angular, and very numerous, suggesting extensive use over a long period. The local natives' statement that obsidian was used only for shaving suggests that the flakes belong to an earlier culture.

Obsidian is found *in situ* on the southern tip of Fergusson Island, in the D'Entrecasteaux Group, about sixty miles to the north-east. It exhibits a faint banded structure which is noticed in some of the flakes, indicating that they probably came from that locality.—J. A. BLACKBURN.

AMONG ALPINE FLOWERS ON THE BARRY MOUNTAINS, COBBLER, STIRLING AND BULLER

By J. H. WILLIS, Melbourne.

(Continued from previous issue.)

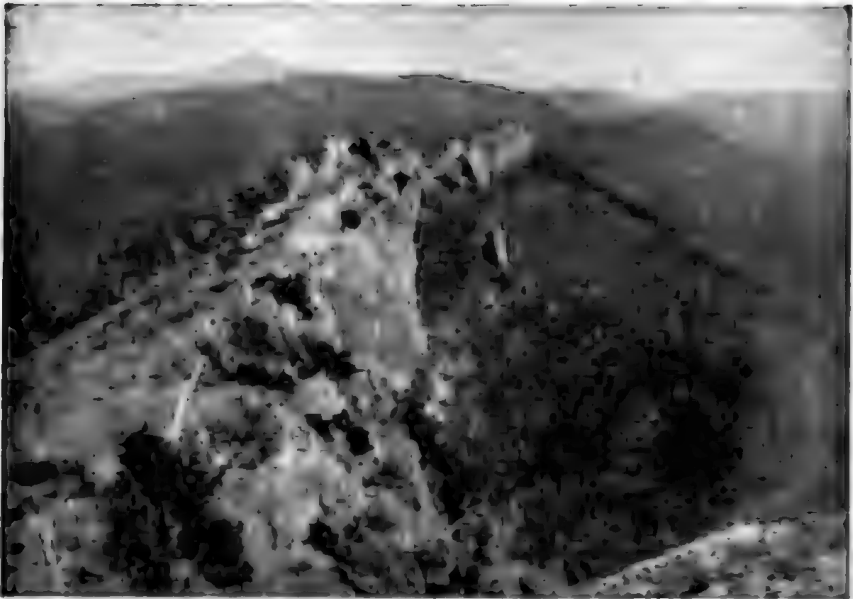
Introducing The Viking and The Razor

At the last low saddle before one commences to ascend The Viking (so-called from its fancied resemblance to a Norseman's war helmet), a sharp geological change occurs—from Ordovician slates and mudstones to Carboniferous conglomerate or "pudding-stone," with large water-worn pebbles cemented in an exceedingly hard matrix. The vegetation, too, undergoes a corresponding and pronounced change, and although we were now three-quarters of the distance to Mt. Speculation, I wrote down 58 new plants between here and that western bastion of the Barries.

The Viking offered us many a thrill and nerve test as we climbed 1,900 feet to the dizzy summit, whence indescribable beauties of mountain-scape are enjoyable in every direction. The Razor was spread out beyond a deep valley in front of us (immediately north-west), its declivities even more rocky, bold, and precipitous than those above which we perched. How pleased we felt, to have scorned the easy route, around the base of the mount, that is pursued by less venturesome spirits! There is but a single safe means of descent on to the low saddle connecting Viking with Razor—down a gorge-like cleft between two rock piles on the west face of the former, but one can easily miss it. These two complementary mountains have an almost identical flora, and their beetling stratified cliffs are rather reminiscent of the Grampians. Soil was scarce on both, and a feature was the variety of shrubs that were firmly rooted in rock crevices and cracks: *Acacia siculiformis*, *Dodonaea cuneata*, *Micranthemum hexandrum*, *Wstringia senifolia*, *Kunzea peduncularis*, *K. Muelleri*, *Callistemon pallidus*, *Phabalium podocarpoides*, *Olearia stricta*, and *Croceae exaltata*, all noted for the first time. *Croceae* was in full rosy bloom (as large as orange blossoms) and no more handsome rock shrub was seen during our trip.

Having "done" The Viking, we climbed in late afternoon to some permanent rock pools high up on The Razor's shoulder and gladly threw down the packs on a small grassy saddle, where massed banks of Tasman Flax-lily (*Dianella tasmanica*), tall flower-smothered Derwent Speedwells, Golden Everlastings (*Helichrysum bracteatum*) and blue Bugle (*Ajuga australis*) made a pretty camp setting. A high wind soon arose and darkening clouds advised us to spend our fourth night under canvas—it was New Year's Eve. But the threatened rain held off and good pace

was made next day along the exciting knife-edge of The Razor; we vain would have scaled its highest point—a detached and very precipitous crag at the eastern extremity of the ridge—but, in order to reach Mansfield and board a train there on January 5, we were obliged to maintain a certain time schedule. A succulent alpine condition of the White Purslane (*Claytonia australasica*) formed sage-green mats on the most exposed sheets of conglomerate rock—hardly recognizable as the same species of low-land swamps, yet samples transferred from the mountain tops to a Melbourne garden soon assumed the normal, bright green,



On The Razor, looking toward Mt. Speculation.

Photo. by W. H. Ferguson.

etiolated form. After The Razor, we gently ascended to Mt. Despair through some magnificent unburnt Snow Gum forest, well grassed beneath—no cattle have as yet desecrated this portion of the Barry Mounts. We lunched in a fine stand of Woolly-butt, beside a ferny stream flowing north to join the Catherine River, Leafy Sunbush (*Bossia foliosa*) and remarkably tall Purple Violets (*Viola betonicifolia*) being conspicuous in the vicinity.

Mount Speculation

From the wide, flattish summit of Despair, one drops to a short, deep saddle, dividing the waters of the Wonnangatta and Catherine Rivers, and is at once confronted by an almost sheer 1,300-ft.

wall of rock, above which lie the hidden peak and cairn of Mt. Speculation—such a formidable barrier is certainly conducive to *speculation*, whichever way you approach it. By worming our way gingerly upwards and testing every foothold (for there is much loose stone), we at length attained the rim of the escarpment and sauntered down through a park-like expanse of old gnarled Snow Gum and soft grass to an ideal flat for camping. Tents were pitched beside the Catherine—here a charming streamlet, splashing merrily from its source just above, in a sheltered gulch where Shining Coprosma, Baw-Baw Heath, Waxberry, Tea-trees, Mountain Heath-myrtle, Mountain Peppers, Wiry Coral Ferns and Sphagnum moss made a verdant tangle. A cold south-westerly drove us early to bed, and during New Year's Night there was a light fall of snow.

Mt. Speculation on the morrow was in calm clear air again and, breakfasting very early, I hastened up to the treesless summit (5,650 feet), half a mile distant, to consummate my Barry crossing and to absorb the scenes of grandeur revealed therefrom in morning sunshine—more extensive than any witnessed hitherto. Floral surprises cropped up everywhere on Speculation and among the first additions to my list were *Aciphylla simplicifolia* and matted *Nertera depressa*, the latter studded with tiny, four-angled star flowers that I would like to have seen replaced, later, by the more handsome berries of orange-red. Mountain Plum Pine (*Podocarpus alpina*) clung to a few almost inaccessible cliffs, and Snow Aciphyll (*Aciphylla glaciatis*) grew luxuriantly on narrow grassy ledges, its honey-scented flower heads like celery run to seed. Snow and Silver Daisies shared with Aciphyll the wet slopes facing southerly, *Celmisia* here being quite broad-leaved; north from the mountain crest, and thus over most of Speculation, *Celmisia* assumed the normal grassy-leaved form—an interesting dimorphy. On wind-swept expanses of conglomerate, Rosy Heath-myrtle (*Baeckea ramosissima*) and Yellow Kunzea (*K. Muelleri*) where so flattened as to appear planed off level with the rock surface, but they afforded a brave display of blossom—charming crevice plants in Nature's crazy pavement. Crustaceous lichens (particularly the yellow-green *Rhizocarpon geographicum*) added another touch of colour and beauty to the russet rock masses. Mountain Shaggy-pea (*Oxylobium alpestre*) was abundant here, as on most formations above 4,500 feet, but its close congener, *O. ellipticum*, seemed comparatively scarce.

Purple Eyebright (*Euphrasia collina*—or perhaps a distinct species?) was represented by unusually robust specimens, with terminal clusters of large mauve flowers deeply veined in purple. Sun-orchids (in bud only, but doubtless *Thelymitra pauciflora*)

and Musky *Caladenia* (*C. angustata*) were rather common above 5,000 feet. Several bright everlastings were in evidence, but one regal kind, with slender, stiff, glandular stems and big pearly-pink heads, commanded special attention and later proved to be an undescribed variety, *Helichrysum adenophorum* var. *Waddellae* (see *Vict. Nat.*, April, 1945, p. 217). Grasses were prominent and varied in this much-grazed region, e.g.: *Poa caespitosa* var. *alpina* (dominant), *Dryocuxia brachyathera*, *D. monticola*, *D. frigida*, *Trisetum spicatum*, *Danthonia semiannularis* var. *alpina*, and a dark purple-headed form of *D. pallida* (the Red-anther Wallaby-grass).

Cobbler Peak and Plateau

It was with reluctance that we tore ourselves from the heights of lovely Mt. Speculation and set off toward Cobbler peak, eight miles to the north along a great isolated spur from the Divide. With the exception of an inconsiderable rise over Mt. Koonika, the grade is downhill from Speculation to the edge of Cobbler plateau, where a halt was made for our midday snack against a delightful, low-banked stream. We were now in cattle country again, free from scrub and abounding in good tracks. In fact, there were too many tracks, for, just after lunch, the party accidentally split, Professor Cherry and I continuing down one pad toward Cobbler "Lake" and thereby losing touch with our mates for 30 hours—in vain we "coo-eed"; they had gone uphill toward the peak and were quite out of ear-shot.

To do justice to the wonders of Mt. Cobbler, its "Lake" (really a circular treeless bog at the head of Dandongadale River), its gently sloping plateau, dissected by north- and east-flowing water-courses—some very deep,—and its precipitous escarpments, would take more words and space than I can command. The plateau (between 4,000 and 5,000 feet and about ten square miles in extent) has a uniform, park-like vegetation; Snow Gum predominates, but is interspersed with fine straight Mountain White Gums (*Euc. Dalrympleana*) and bordered with Blue Peppermints (*Euc. dives*) toward the lower slopes; ground scrub is dwarfed and scanty, *Persoonia chamaepeuce*, *Daviesia ulicina*, and *Leucopogon Fraseri* being conspicuous entities. Apart from the ubiquitous *Caladenia angustata* and *Chiloglottis Gunnii*, I located only two other orchids (viz., *Prasophyllum Archeri* and *Spiculaea Huntiana*) and then but a solitary specimen of each, so the season was evidently a poor one—if Mr. W. H. Nicholls' fine tally be a criterion.

At the immaculately neat, clean "Lake View" hut, Professor Cherry and I camped *de luxe* on the night of January 2. We

foods and by now twelve-days-old bread! We sank to sleep in cosy hessian bunks, and learned later that the rest of the party had spent an indifferent, cold night, but had relished a cooking of the locally abundant native "yams" (*Microseris scapigera*).

The following morning was passed in exploring the "Lake," then coloured with violet sprays of Mountain Milkwort (*Bredemeyera retusa*) and tall white heaths (*Epacris breviflora* and *E. microphylla*), though I missed the Veined Sun-orchid (*Thelymitra venosa*) which Mr. Nicholls found a-plenty there—also the picturesque surroundings of Dandongadale Falls, a series of high



Mt. Cobbler and plateau, from the grassy summit of
Mt. Speculation (5,650 feet).

Photo, by Fritz Hauer.

cascades and large rock pools, extending for hundreds of feet down from the northern escarpment of the plateau. Lovely ferns, wet with spray, hung from dripping ledges under the falls (*Hymenophyllum cupressiforme*, *Sticherus tener*, *Blechnum fluviatile*, *Histiopteris incisa*, etc.). The steep rocky walls were gay with everlastings, tea-trees, bottle-brush and pink *Crowea*, recalling once more our recent happy impressions of The Razor. But my most exciting find at Dandongadale Falls, and indeed for the whole trip, was an insignificant little green lily, *Chlorophytum alpinum*—previously known only from Tasmanian mountains, and a new generic record for our State! (See *Vict. Nat.*, March, 1945, p. 187).

That afternoon we climbed the remaining 1,300 feet to Cobbler's cairn—rough going for two miles; but ah, the reward! I have heard from many sources that no other Victorian alp is more arresting, alluring, or spectacular than Cobbler (5,340 feet), and I can endorse the claim: its ultimate summit is a detached "pimple" at the extreme north-west of the rising plateau, and is a sheer delight. On steeply tilting "pudding-stone" strata, inaccessible to stock and immune from fires, there will ever be a few square yards of primeval loveliness above the tree-line. We found it ablaze with colour—carpets of azure daisies, interrupted by golden sun-rays, purple Trigger spikes, and thickets of alpine mint-bush in palest mauve blossom. Robust aciphylls are also there, and I sighed for a "kodachrome" film recording. From Cobbler cairn, one seems to stand on the brink of the world as he gazes northward (a sudden drop of several thousand feet) over Mt. Typo to Buffalo, now in close relief—head, horn, hump, and hind are all displayed in a panoramic vision, wonderful and beyond the power of description as we beheld it on a still, blue-and-gold summer afternoon.

There was somewhat of an anti-climax in turning back along the plateau to where a track (the only one) led down from an ancient stockyard, south-westward into King River valley; but, just before beginning the descent, I was requisited in the location of a patch of Baw-Baw Berry (*Wittsteinia vacciniacea*). This remarkable endemic genus (there are but two in Victoria) favours boggy ground and exposed roots around the bases of tea-tree, sassafras, or evergreen beech, and I did not know of its occurrence anywhere beyond the Lake Mountain-Baw Baw area. We left directional notes on several prominent landmarks for the benefit of our "lost" companions, should they perchance be searching for us still about the plateau, but were relieved to find them at dusk, awaiting our arrival by the King River hut.

The unburnt open forest of great Mountain White Gums and tall Peppermints on the King valley fall was very beautiful, as viewed in sunset glow, and a noteworthy find was the Summer Spider-orchid (*Catadenia pallida*)—lovely flowering specimens, and fairly numerous at about 3,000 feet. White Mountain Gentians (*Gentiana diemensis*) were also a-bloom nearby, though I had missed them from higher levels where they are usually more abundant, opening later. Down on the King were man-high shrubs of Mountain Beard-heath (*Leucopogon Hookeri*), already carrying red berries. At first, I failed to recognize this tall lowland form as being conspecific with the pigmy specimens (about a foot high), so far observed only at high altitudes, seldom below 5,000 feet:

Up to Mt. Stirling

King River hut being dilapidated and rat-infested, we preferred to sleep out under the stars and made an early morning start. The river is delightfully wild, icy cold, and fordable on stepping stones. Although the valley has a wide, flat floor hereabouts, it assumes gorge-like proportions about eight miles downstream and is well nigh impassable. This was to be our last and biggest day, with Clear Hills, Mt. Stirling, Mt. Buller, and the Delatite mill settlement as objectives.

A steep climb westerly, up a good track, brought us to the edge of a final "pudding-stone" escarpment where I bade farewell to *Crocus exaltata*, *Dodonaea cuneata*, *Leucopogon Fraseri*, and *Olearia stricta*, first seen on similar Carboniferous formation at The Viking; Summer Spider-orchids appeared again here. Then followed a long, more gradual rise of some 2,000 feet through Woolly-butt forest to the Clear Hills (of granitic rock) whence beautiful glimpses were enjoyed of the lofty Speculation-Howitt mass—great hinge of the Divide and mother of waters, now a jagged wall of intense blue on the eastern skyline. Some fine shrubs of Royal Grevillea (*G. Victoriae*) grew here.

The Clear Hills are but a stage toward the much higher granitic bulk of Stirling, where, after passing a strongly built stockyard, we paused awhile to absorb fresh scenes from its crowning alpine meadow, nearly 5,800 feet above sea-level. The chief attraction was mighty Buller, beckoning to us from a distance of five miles across the upper Delatite valley, but the way on foot proved much longer. I was feverishly busy, noting down the many plants that this high moor introduced: *Astelia alpina*, *Microtis oblonga*, *Caltha introloba*, *Hovea longifolia*, *Phlebodium phyllicifolium*, *Oreomyrrhis pulvinica*, *Richea continentis*, *Veronica serpyllifolia*, *Plantago tasmanica* and *Brachycome scapigera* occurred in and around a treeless morass on the northern slope and were all additional to the Barry and Cobbler records. Then I descended to catch up with the rest of the party and partake of a rather hurried lunch on the deep saddle connecting Stirling with Buller's long eastern spur and ski run.

Magnificent Buller (5,935 feet)

By late afternoon the Buller springs were reached and there, in addition to all the new recordings already mentioned for Mt. Stirling, my list was enhanced by *Ranunculus Gunnianus* (alas, with flowers far spent), *Barbarea stricta* (rare Wintercress—perhaps rather an early introduction to our mountains than a cosmopolitan native species), *Pleurandropsis trymolioides*, *Diplazis Hydrocotyle* (rare), and *Lycopodium fastigiatum*. From

the ski hut and morass around the springs the apical hump of Buller rises steeply for some 300 feet above tree-limit and presents a curious mixture of rock types—Ordovician (or Silurian?) strata, granitic intrusions, and basalt are all there. The summit is clothed with a galaxy of bright flowers in season (mostly blue, gold and white composites), a dwarfed alpine condition of Long-leaf Hovea (*H. longifolia*) being the predominant shrub.

I recaptured Baron von Mueller's enthusiasm as he gazed from the self-same pinnacle on March 22, 1853, and later remarked, "I was delighted to observe here for the first time this Continent's alpine vegetation." A century has robbed little of natural beauty from Buller Peak, if we except the Forest Commission's recently installed fire lookout which resembles a temporary soft-drink kiosk, anchored to the highest point by strong iron cables. Dr. C. S. Sutton fittingly expressed his admiration of the Buller flora and scenery in this journal (Vol. 23, February, 1907, p. 175), so we shall dwell no longer on the subject, save to mention that above the 4,5000-ft. contour I noted 120 different vascular plants within the space of two hours.

Mt. Buller is a massive outpost of the Alps, dropping sharply westwards to the open grassland about Mansfield—the first clearings and signs of civilization that we had seen for eight days. Four thousand vertical feet beneath us lay the buildings of Delatite River sawmill, our destination for the night. Mt. Timbertop was prettily silhouetted as a slender cone against the setting sun when we commenced our hurried descent—a race against failing light. "Hurried" is no exaggeration since, for hundreds of feet, we had no choice but to dig our heels into the slaty scree and slither down, hoping for no collision with trees or boulders. Fortunately, the worst hazards of that 4,000-ft. drop from Buller's pinnacle were safely negotiated before darkness closed in, and we were then guided along the easier final gradient by friendly lights from dwellings of the little sawmill community on the Delatite.

Conclusion

A quick plunge into the icy river water removed much grime from our perspiring persons, and then we paid our respects to the local school-mistress, a friend of Professor Cherry's. Shall I extol the virtues, nay luxuries, of a fruit-and-vegetable dinner with *fresh bread*, a proper shave, and a cushioned bed? But they belong to another story: the great hike was over. We rendered thanks to the Almighty for bringing us through, in almost perfect weather and without one minor mishap. The beauty and scientific interest of this trip remain as food for reflection, while its many humorous incidents and true fellowship enjoyed by camp-fire and along the trail will long be cherished memories.

On the morrow (January 5) a truck sped us the score or so of relatively uninteresting miles to pick up our train at Mansfield whence we arrived in Melbourne nine hours later—painfully slow travelling, yet welcome enough as a means of relaxation to five tired "Barry Mountaineers."

My lists indicated 265 native alpine plants (222 on the Barry section) and 58 aliens (9.4 per cent.) for the trip. It is impossible to print them here, where I have mentioned only a few "highlights," but a typewritten check-list (systematically arranged and showing the rarity, or otherwise, of each species in each mountain area traversed) is available for consultation at the National Herbarium, and is as complete a record as circumstances and time permitted.

[Correction: In the first part of this article, *Vict. Nat.*, Nov., 1945, half way down page 114, read "B" instead of "H" in *H. citiaris* and *H. nivalis*.—J.H.W.]

THE PERILS OF CURIOSITY

This is a sad little story! It has its beginning, as far as I personally am concerned, in events of September 1941. At that time Mr. W. H. Nicholls, Mr. R. T. Littlejohns and myself, when returning from an excursion in the Mallee, found near Maryborough a number of beautiful Sun-Orchids which Mr. Nicholls believed to represent a new species. Soon afterwards (*Vict. Nat.*, November, '41) he named the plant *Thelymitra Chisholmii*, the "Babes-in-the-Cradle" Orchid. An accompanying sketch revealed something of the charm of the graceful violet-coloured flower.

A year or two later I came into possession of a number of copies of the *Southern Science Record* (the journal which preceded the *Victorian Naturalist*) and in the issue for April 1883 I chanced upon an article dealing with orchids of the Loddon Valley, by J. N. McKibbin. The writer having stated that he compiled his list of orchids, numbering 33 species, while living at Maryborough (my old town), I made inquiries and learned that he was a school-teacher who had been stationed in the locality for a few years in the 1880's and had collected plants for Mueller. More important, I made inquiries about some of his orchids, a few of which seemed to be wrongly identified, while one carried a name, *Thelymitra McKibbinii*, which I had not previously seen. It was not mentioned at all in Prescott's *Orchids of Victoria* (1928). Mr. Nicholls' comment was that *T. McKibbinii* appeared to be synonymous with *T. rubra*. It had been described by Mueller, in 1881, in a Melbourne publication called the *Chemist and Druggist*. (Why "the Baron" had chosen such a medium, and why he had spelt McKibbin's name in three different ways, were side-issues of the main puzzle.)

However, after further discussion Mr. Nicholls agreed to look more closely into the matter, and to that end he delved among old specimens in the National Herbarium. There, nestling among other species of Sun-Orchids, were three original specimens of *Thelymitra McKibbinii*. Brief examination revealed that, although Mueller's description had been inadequate, no doubt could be felt regarding the validity of the species. It was the one which Nicholls had named *T. Chisholmii*.

That, then, is the story behind a paragraph in Nicholls' "Orchid Notes" in the *Victorian Naturalist* for August last—the paragraph in which he sinks *T. Chisholmii* as a synonym of *T. McKibbinii*. In short, I have lost my charming little orchid through my own inquisitiveness! Let this be a warning to others!

A. H. CHISHOLM.

HYALITE FROM THE OLIVINE-BASALT OF CAVE HILL, LILYDALE

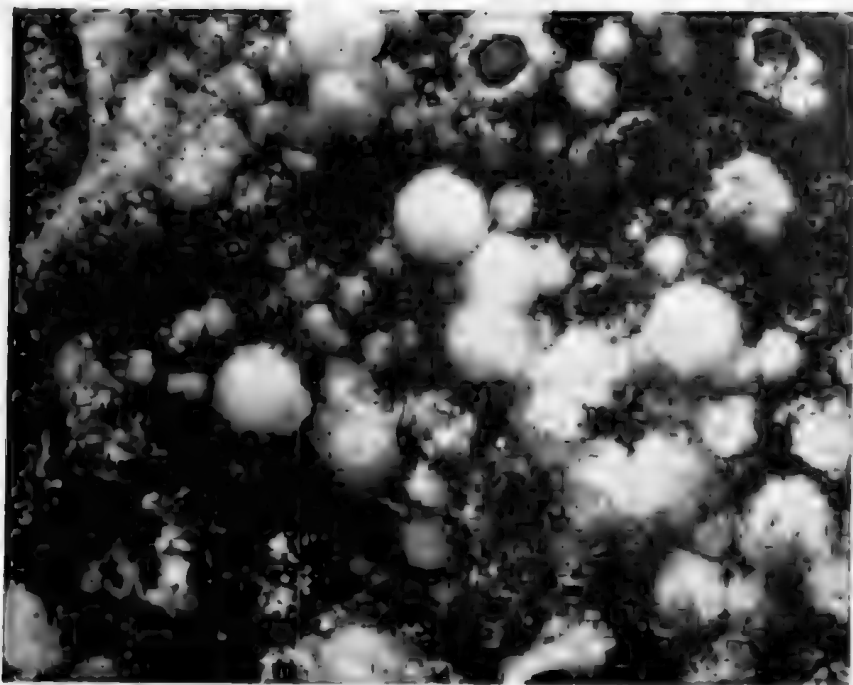
By A. C. FROSTICK, Melbourne.

The limestone quarry of Cave Hill, situated about one mile approximately south-west of Lilydale, has been for many years the favourite haunt of geologists, chiefly on account of its comparatively rich yield of fossils. Some time ago, however, subjugating the interest attached to the fossil fauna of limestones, I examined the basaltic lava flow which occurs at the top of the southern face of the quarry, and was rewarded by several specimens of the mineral known as hyalite, or "Muller's glass." Though quite a common mineral in Victoria, hyalite does not appear to have been previously recorded from Cave Hill, and since specimens may be procured with much less difficulty than is usual it was thought that a few notes on the occurrence might prove of interest to Club members likely to visit the locality. Examples of this mineral could then be used to supplement a collection of the mineral species which also, at times, appear in the limestones.

The lava flow, in which the hyalite occurs, has been determined by Morris Morris¹ to be an olivine-basalt, which he refers, on lithological grounds, to the Older Basalt series. It is much younger than the associated limestones, which it overlies, but from which it is in part separated by the accumulated sands of an ancient pre-basaltic stream. The hyalite occurs as more or less expansive layers on relatively sound basalt in association with clay, earthy magnesite, limonite, and nodular cores of less weathered basalt. It appears to be restricted in distribution to the proximity of the base of the flow, where such is visible, and occupies irregular, approximately horizontal joint planes in the rock. The majority of the numerous records of this mineral, from other Victorian localities, mention it as occurring in vesicles in the containing lavas. Such vesicles are generally best developed at the upper and lower portions of a flow, and in this case denudation has been instrumental in the removal of the former, while the latter was to some extent masked by a talus of rubble, and the whole subject to partial decomposition. Consequently few vesicles were discovered, and none were found to contain hyalite.

From a chemical standpoint there is practically no essential difference between hyalite and opal; due to a difference in physical structure, however, where opal exhibits the familiar play of colours in its precious form, hyalite remains typically clear and glassy. Both of these minerals are amorphous, and both consist of hydrous silica. The amount of water present is variable and, according to Dana,² has a maximum range of from 3 to 25 per cent. in opal, the common range being from 3 to 9 per cent., while hyalite shows an

inferior range of from 3 to 6 per cent. Since opal has been produced in the laboratory by the gradual desiccation of gelatinous silica, it is generally considered to be formed in a similar fashion in nature. It is also thought that the amount and variable distribution of residual water held by such consolidated material can be considered responsible for the presence, or absence, of iridescence. This latter property is generally credited to the interference produced when light passes through differently refracting lamellae



Hyalite encrusting blisters of white, opaline silica, from olivine basalt at Cave Hill, Lilydale. (Approximately twice natural size.)

of the substance, and, as mentioned by Rosenbusch,³ the refractive index is dependent on the degree of hydration of the material. This feature is well illustrated by hydrophane, a translucent opal variety which absorbs water rapidly and, in doing so, may become quite transparent. Iddings⁴ lists a series of refractive index determinations made by Reusch on hydrophane from Czerwenitzza, in Hungary, the dry mineral giving a value of 1.368. But when saturated with water, however, it showed a value of 1.443, and when saturated with alcohol a value of 1.451. It would appear, then, that the amount of water present in some varieties of opaline silica may be of importance in accounting for their variant physical

properties and, in others, its uneven distribution may be equally important. In the more opaque forms the presence of impurities must naturally be considered.

Hyalite, then, may be considered as a colourless form of opal. It consists of hydrous silica, is amorphous in form, and generally occurs as botryoidal encrustations. It is usually clear and colourless, has a vitreous lustre, and a hardness of about 6 in Mohs' scale.

The above brief description typifies the Cave Hill hyalite, much of which is beautifully clear and glassy. There is, however, some variation in appearance from that of the common type. One small specimen, an aggregation of tiny, almost clear droplets, reflected incident light in faint, iridescent flashes, dependent upon the orientation of the reflecting, or refracting, surfaces with respect to the direction of the light source. Another isolated specimen, lying on a grassy bank and wet with dew, consisted of a thin, powdery film of vivianite sealed beneath a perfectly transparent encrustation of hyalite. Assuming the reflected blue green hue of its opaque substratum, this encrustation had the appearance of a gelatinous algal colony, and occasioned some surprise when probed with an exploring finger in the belief that it would prove soft to the touch. A specimen collected by Mr. F. S. Collier at Rowsley, and kindly loaned to the writer, is a similar transparent encrustation on red scoriaceous basalt which, in consequence, appears as if unevenly coated with pink lacquer. Incidentally, the above locality does not appear among the twenty-four published Victorian records of this mineral which are known to the writer.

A further form from Cave Hill occurring as small, sporadically distributed globules, was translucent, whitish in colour, and had a dull, pearly lustre. It was not unlike chalcedony in appearance, though this likeness was not substantiated by a microscopical examination with the aid of polarized light. For, while the substance was slightly anisotropic, i.e., double refracting, it showed nothing of the aggregate polarization of cryptocrystalline silica, and nothing of the black interference cross to be expected in spherical growths of chalcedony, or in amorphous, opaline, silica under strain induced by centripetal condensation of a former gel. That the sample showed even feeble anisotropism was anomalous, for hyalite, being amorphous, should also be singly refracting, or isotropic. It would seem, from consultation of various works on optical mineralogy, that, in virtue of internal strain produced in assuming its characteristic botryoidal, or repeated sub-spherical form, hyalite rarely is completely isotropic. A further anomaly is mentioned by Iddings⁴ (p. 492), in that mammillary forms of hyalite often show uniaxial interference figures of a negative character in polarized light. He likewise attributes this strange

behaviour of an amorphous, and hence supposedly structureless, mineral to strain produced by shrinkage and radial compression.

In yet another Cave Hill specimen, pellucid hyalite was found to encrust hollow bubbles of a white, feebly translucent mineral of slightly inferior hardness; the floor of an occasional bubble, freshly broken open, sometimes showing a small, botryoidal growth of clear hyalite, concentric to, but generally separate from, its inner wall. Independent samples of this white mineral were not available for a more specific determination, but on the few tests applied to a small amount of material broken from the hyalite-encrusted specimen it would appear to be a milk-white, common opal. For, under the heat of the blowpipe it does not show the characteristic intumescence of the zeolites, is practically infusible, does not appear to be affected by acids and, like hyalite, is sparingly soluble in dilute caustic potash. A freshly exposed sample was immersed in water in the hope that it might prove to be hydrophane, but failed to show opalescence or to become markedly more transparent.

Examples showing the variant appearance of the forms listed may occur in conjunction, i.e., encrusting one another. The difference in their appearance is probably due to variation in hydration and, to some extent perhaps, to the presence of impurities. It was very probably brought about by development of the hyalite in several closely related cycles. The specimen just described illustrates this feature in that it shows the bubbles of common opal encrusted with transparent, botryoidal hyalite, and the latter in turn encrusted with translucent mammillary hyalite, distributed as minute pearly individuals, with similar material also occurring as tiny moniliform chains, generally traversing the depressions formed by the junction of contiguous convex surfaces of the supporting encrustation.

Little can be said concerning the origin of the hyalite at this juncture, except that its mode of occurrence plainly indicates that it is *not* a primary constituent of the basalt in which it occurs, and, although obviously formed after the latter was outpoured, it is also clear that little time elapsed between the two events—despite its often close contact with earthly weathering products of the lava, the hyalite has not been found to include any of this material. Further, its probable thermal origin is also indicated by its common, and almost universal, association with igneous rocks. In every one of the Victorian records of this mineral known to the writer, it occurs in an igneous rock, and these, with one exception, are basalts chiefly of the Newer Basaltic series. Thus it would appear probable that the hyalite was developed within the lava by thermal agencies belonging to the same volcanic cycle of which it, in turn, is an earlier manifestation.

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LENGTH OF THE COMMON BROWN SNAKE

Different reference books on Australian animals give the length of the Common Brown Snake as "usually 4 to 5 feet," "about 5 feet" and "reaching a length of 6 feet." In the *Naturalist* of December, 1937, (Vol. LIV, No. 8), is the summary of a "Snake Symposium" at the Club, wherein Mr. Robert Eadie spoke on "the value of snakes in preserving the balance of Nature," and expressed the opinion that they deserved protection. In answer to a question about the largest snakes recorded in Australia, Mr. Eadie mentioned in his reply that the record for the brown snake was 7 ft. 2 in.

Recently I received a letter from Mr. W. L. Murphy (head teacher, S.S. No. 2990, Laibert) in the Swan Hill inspectorate. He states, *inter alia*: "This morning the father of one of my pupils brought an outside in brown snakes to the school. It measured exactly 8 feet. . . . There is no doubt about the species. . . . Personally, I think he was quite a valuable member of society as many a mouse and young rabbit must have gone to develop such a bulk."

F. G. ELFORD.

LORD ALANBROOKE'S VISIT

The Chief of the Imperial General Staff, Field-Marshal Lord Alanbrooke, who spent two nights and one day in Melbourne recently, gave himself a free afternoon (following important military conferences) in order to see something of Australia's birds and mammals in the Healesville Sanctuary. The Field-Marshal, who is a keen student of birds and has a valuable ornithological library, was closely interested in all that he saw during the outing, and particularly in magpies of the wayside and the lyre-birds, bower-birds, mound-builders, and parrots in the Sanctuary. He declared afterwards that the excursion was a highlight of his world journey.

KOOKABURRAS IN TASMANIA

An animated discussion has been proceeding recently in the *Lausceston Examiner* regarding the merits and demerits of kookaburras, which are not native to Tasmania but were introduced from the mainland some years ago and are beginning to flourish. As in other States, much is being said in the kookaburra's favour as a destroyer of noxious insects and small snakes, and, on the other hand, the bird is being impeached as a destroyer of the young of small birds. The balance of opinion appears to regret that the introduction was effected.

A SUPERB WESTERN SUN-ORCHID

By W. H. NICHOLLS, Melbourne.

THELYMITRA VARIEGATA, Lindley, in Herb. Benth.

This brilliantly-coloured *Thelymitra* species was originally described by John Lindley as *Macdonaldia variegata* in his *Swan River Appendix* (Vol. XXII, of the *Botanical Register*, 1839, p. 50).

Bentham's description in *Flora Australiensis*, Vol. VI, 1873, p. 323, embraces also Lindley's *Thelymitra spiralis*—allied, but specifically distinct. Bentham based his determination of these plants on the examination of dried material from Lindley's Herbarium.

In 1865, Baron von Muellèr described a new species, viz., *Thelymitra porphyrosticta*. This plant is undoubtedly Lindley's *Th. variegata* (see *Fragmenta Phytographia Australiae*, Vol. V, p. 97).

Lindley's original descriptions of both forms (in latin) are quoted here for convenience:

"*Th. variegata*: floribus purpureis, sepalis petalisque linearibus acuminatis, cuculli laciniis lateralibus lanceolatis subcarinatis intermedia obsolete, anthera carnosa obtusa elongata loculis brevibus semicircularibus membranaceis."

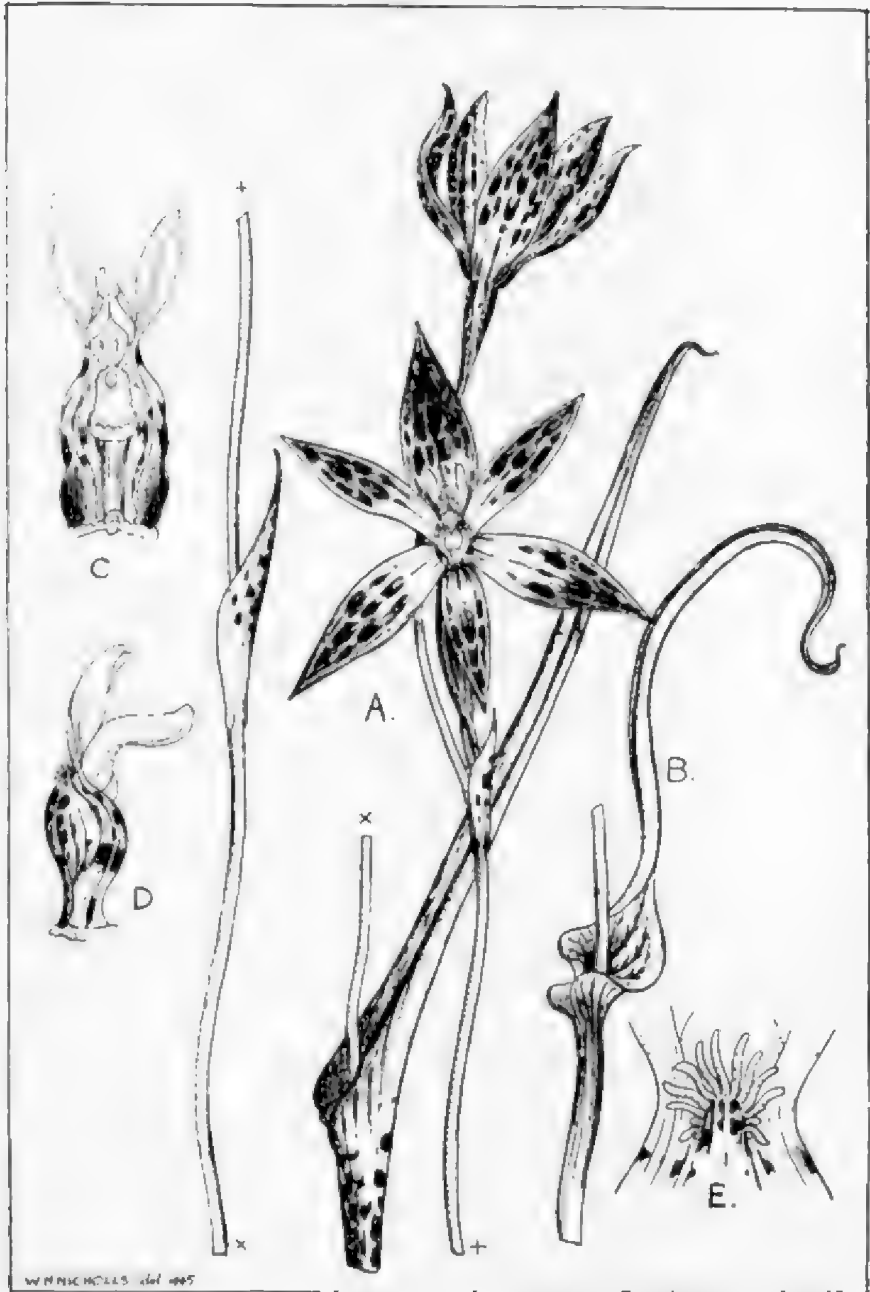
"*Th. spiralis*: folio radicali spirali caulino solitario ovato, caule uniflora, floribus purpureis, cuculli laciniis lateralibus carnosiss dolabuliformibus intermedia obsolete, anthera obtusa apice papillosa."

Dr. R. S. Rogers refers to these descriptions in discussing his new *Th. D'Altonii* (= *Th. Matthewsii*, Cheesem.)

He writes (*Trans. Roy. Soc. S. Austr.*, Vol. LIV, 1930, p. 43): "It will be noted in these descriptions that the leaf is undescribed in *Th. variegata* but stated to be spiral in the other; the flowers are purple in both; the intermediate lobe of the hood is absent or rudimentary in both, and there is no reference to the presence of a crest in either; the lateral lobes in *Th. variegata* are lanceolate and subcarinate, in *Th. spiralis* they are fleshy and hatchet-shaped. The name implies a character (presumably in the flowers) which receives no reference in either description."

R. D. FitzGerald's interpretation of *Th. variegata*, Lindl., in his monumental work *Australian Orchids*, Vol. 2, Pt. 4, 1889, is incorrect. His plate of figures represent a form (among others) which is included for the time being under *Th. spiralis*, pending further and more detailed examination of the several forms involved. Mr. Alex Purdie (in a lecture, "Our Native Orchids," published as Vol. 1, No. 8, of the *Mueller Botanic Society*, Dec., 1900) seems to have been the only one correctly to interpret this Lindleyan plant.

The present writer's material came from Boyup Brook (Col.



B. T. Goadby) and Yarloop (Mrs. E. Scouler). Lindley's specimens were collected (both species) on the Swan River (Drummond 1st coll.), also on the Kalgan River (Maxwell). Authentic specimens in the National Herbarium, Melbourne, are from the last locality, also from King George's Sound (Miss Franklyn, 1884).

Th. variegata surely occupies just such a position among our Sun-orchids as the Blue Tinsel Lily (*Calcectasia cyanea*) does among our lilies. The rich iridescent sheen of both orchid and lily must be seen to be appreciated.

Bentham's description should now be amended and enlarged as follows:

A slender plant about 30-40 cm. high. *Leaf* linear, channelled, much dilated at the base, often with a villous sheath, erect, and often undulate. *Flowers* 2-3 (in my specimens), large, about 4 cm. in diameter. *Sepals* and *petals* lanceolate, shortly acuminate, dark-coloured and variegated in shades of violet, purple, red and pure gold; the whole constituting a delightfully-brilliant kaleidoscope pattern. *Column* about 7 mm. long to the anthers, the wings broad and brilliantly coloured, not produced behind the anthers, but with erect lateral lobes about 5-6 mm. long, oblong, obtuse, but not spatulate, connected by a semi-circular crest behind the anther. Anther-cells short, the connective produced into a broad obtuse appendage as long as the lateral lobes of the column. *Stigma* small, pedicellate, situated just below the anther. *Flowering time* September, October. *Distribution* West Australia (South-Western Division, between Perth and Albany).

KEY TO FIGURES

Thelymitra variegata, Lindl.

Fig. A—Typical plant in bloom. B—Lower portion of a plant with undulate leaf. C—Column from front. D—Column from side. E—Head of column from above, showing crest. (For natural size of figures see description.)

FLIES AS FERTILISING AGENTS

Perhaps like myself various observers have seen innumerable flies of the house-fly type and a near relation with shining blue body, as well as the blow-fly, settling on the flowers of the garden Crataegus, or hawthorn. What are these flies doing? The answer is simply that they are not only extracting honey, but incidentally pollinating the flowers as they carry the pollen from flower to flower. Diptera are well-known flower fertilisers, and though moths, butterflies, and bees are better known to most people, not all recognize the common flies as in some instances the more fruitful agents of many species of flowers. The warm days have shown us in our gardens what previously we had not noticed, and that is how innumerable are the flies doing their work in the sunshine among the hawthorns, which, perhaps because of the mild winter, are now flowering so freely. In my own garden my bushes are just holding as many flowers in a wealth of creamy-white as the shrubs can well carry. Does this predict a colder ensuing winter, as people are wont to say, when berries will be more abundant for the birds' food?

A. J. TADDELL

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PROCEEDINGS

The monthly meeting of the Club was held on December 10, 1945, at the Public Library Lecture Room, the President (Mr. H. C. E. Stewart) and some 160 members and friends attending.

Extracts were read from a letter received by the Secretary from Mr. R. G. Painter, now Curator of the Hephurn Springs Park. These consisted of notes on the natural history of the area, progress reports and an appeal for seeds of *Hardenbergia monophylla* (Purple Coral-pea). These should be sent direct to Mr. Painter at Hephurn, Victoria.

Mr. H. C. E. Stewart reported on the excursion to the Botanic Gardens, and stated that 60 to 70 members attended to inspect Robert Brown's plants.

Mr. F. S. Colliver reported on the recent meeting held to form a Geological Discussion Group. This group will consist of Club members only, and only geological matters will be discussed at the meetings. The first meeting will be held on the first Tuesday in February at the Royal Society's Hall (old Club Rooms) at 8 p.m., and subsequent meetings will be held monthly also on the first Tuesday. About 25 names of members interested in this group have been noted so far. It is proposed to begin with a series of lectures covering a preliminary course in geology, and Mr. F. G. Elford has agreed to open this series. Interested members are invited to the February meeting.

Mr. Stewart reported on the successful formation of a Junior Branch at Toorak. This was sponsored by Mr. P. F. Morris and Mr. Wilson, headmaster of the school. Approximately 160 children attended. After the business had been completed, Mr. P. Crosbie Morrison showed three motion pictures of natural history subjects.

The following were elected as Ordinary Members of the Club: Miss May McAuley, Miss A. S. Ball; as Country Members: Messrs. B. Brennan, L. D. Pryor, and Stanley Kelly; and as Associate Member, Mr. Gordon K. Scrambler.

Mr. A. H. Chisholm reported that Mr. David Fleay was at present in Victoria and possibly would be in attendance at Healesville for our excursion, but he expected to return to Tasmania shortly to continue the hunt for the Tasmanian "Tiger," fresh tracks of which had been seen just before his return to Melbourne.

Mr. Stewart asked, "Why has the vernacular name of *Merops ornatus* been changed from Bee-eater to Rainbow Bird?" Mr.

Tarlton Rayment had informed him that the birds do eat bees. Mr. E. S. Hanks stated that the name "Rainbow Bird" was the original name used in Queensland. Mr. V. H. Miller suggested that far more bees drown themselves than are eaten by *Morops*, and instanced a case at Wyperfeld Park, where there were so many drowned bees in tanks and troughs that they had to be cleaned out. Mr. A. H. Chisholm stated the name was changed because the birds do not entirely live on bees.

Mr. Ros Garnet stated he had recently inspected the Mallee area near Dimboola that Mr. Eric Muir hoped to have preserved as a flora and fauna reserve. He had been very impressed with the area and commended the project to the committee for discussion and all assistance possible.

LIFE IN THE DEEP SEA

Associate Professor O. W. Tiegs gave an interesting and instructive lecture on this subject. He traced the history of knowledge of the matter from 1830, when soft animals were brought up on cables from one mile down, to 1850 when expeditions were sent to the Atlantic and Mediterranean; again to the British *Challenger* Expedition, and further through to the more recent "Bathysphere" descents of William Beebe.

The depths of the ocean from the shore-line across the Continental Shelf to the great depths were discussed, and the various sea-bottoms or "oozes" illustrated. It was stated that from about three-quarters of a mile down the temperature was about 2-3 degrees above freezing point, and that generally the water was fairly still, with only slow currents flowing from the Arctic towards the Equator. Illumination was discussed and it was stated that light only penetrates for about 1,000 feet, and the change in the light intensity was illustrated by a spectograph chart actually taken below the sea. Pressure in the depths was stated to be approximately 1 ton per square inch for a mile of water depth, and thus many animals were under a pressure of upwards of 5 tons on each square inch of body surface.

In discussing the life so far discovered, Dr. Tiegs stated that no really ancient forms have been collected, although it was not beyond the bounds of possibility that such animals as trilobites would be still living in the depths. The animals known were either adapted or modified forms of present-day surface groups. Some groups had developed extra long legs and feelers to keep them out of the ooze; luminosity was common; some animals were blind, others had very large eyes. Many of the fish were of the "Angler" type and had a kind of fishing rod with a luminous bait and a pair of very large jaws which soon took charge of animals attracted to the light.

Besides the Deep Zones, there is an Intermediate Zone of very different life; some of the queer forms were illustrated and special mention was made of the parasitic male of the Angler Fish of this zone. In this case the male fish attaches itself to the female and subsequently degenerates, being fed by the female's blood stream. The male may be attached to any part of the female's body, and instances are known of a female having three parasitic males attached.

For food, in the main these animals depend on the constant rain of dead creatures from the surface waters, and it should be remembered that, owing to the temperature, decomposition by bacteria does not take place, the material falling being almost in cold storage.

Mr. Colliver asked from what zone came the recently discovered Coelacanthid Fish (*Latimeria chalumnae*, J.L.B. Smith) taken in a trawl off the west coast of Africa. Answer: Probably the middle depth.

Mr. C. J. Gabriel asked if deep-water mollusca were coloured. Answer: Colour depends on the depth, as some forms known to be red at the surface are black in deep water. For mollusca it was possible there were various colours but these had no meaning owing to absence of light.

Mr. Elford asked how fertilization took place in the parasitic fish. Answer: The ova received the sperm in the water and it was possible the eggs just floated in the middle zone.

Mr. A. H. E. Mattingley asked if light rays did penetrate to the bottom of the ocean. Answer: Photographic plates exposed showed no trace of sunlight.

Mr. A. H. Chisholm proposed a cordial vote of thanks to Dr. Tiegs. This was seconded by Mr. Mattingley and carried by acclamation.

EXHIBITS

Mrs. Benton Woodburn: Fish from the Solomon Islands.

Mrs. M. E. Freame: Marine specimens, including Caprellid, Squilla, Fairy Shrimp, Limulus or King Crab, Stingray tail with two barbs.

Miss M. L. Wigan: Sponge and *Loranthus exocarpis*.

Miss J. W. Raff: Marguerite freaks, garden-grown at Hawthorn, Dec., 1945.

Mr. V. H. Miller: Orchid (*Dendrobium chrysotoxum*) in bloom.

Mr. R. Savage: *Grevillea leucopetris* and *Kunzea sericea*, garden-grown.

Mr. Tom Griffiths: Eggs of Pond Snail (*Hydrobia*).

Mr. J. A. Blackburn: Shark's teeth and Whalebone (tossil) from Hamilton.

Mr. C. J. Gabriel: Scallop Shells (*Pecten novaezelandiac*, Reeve) from Western Port Bay.

Mr. J. R. Garnet: Harvestmen, together with drawings showing the structure of the spider.

Mr. H. P. Dickens: Two coloured drawings of native flowers (*Loranthus exocarpis*, parasitic on *Casuarina stricta*, and *Nicotiana suaveolens*). The latter was collected at the You Yangs.

CYLINDRO-CONICAL STONES

By S. R. MITCHELL, Melbourne.

The stone materials used in the fabrication of cylindro-conical stones by the aborigines of the Darling River basin, New South Wales, were chiefly sandstones and slate, but a few examples are recorded as being made from basalt and quartzite. One "cyclon" in the possession of Mr. H. Murray, of Bellsgrave, appears to be of fine-grained pegmatite. None made from clay or "kopi" has so far been identified by the writer.

The sandstones vary considerably in hardness and texture, from a soft fine-grained rock to one of extreme hardness. The slates are dark grey to greenish-black and dense in texture. They are not very hard, and are fairly free from cleavage planes. As this rock usually splits into tabular masses, much work was involved in fashioning the long slender forms which are characteristic of slate "cyclons." No doubt at times naturally weathered pieces of suitable shape were used.

Between the Darling River and the Queensland border the surface of the country is modified by numerous residuals of older rocks which stand out as rises and small ranges, of no great elevation above the general level, with the intervening country covered with more or less recent deposits of alluvial and wind-borne sands, clays, red and black soils, and rock-waste. It was from the outcropping rocks on the hills that much of the material for the making of the sandstone "cyclons" and also the "nardoo" mills and mullers was procured. Suitably shaped water-worn pebbles of sandstone also were used, particularly for the smaller examples.

Many elongated water-worn pebbles are found that have had one end flattened, or cupped, and others that show more or less hammer dressing, which appear to be cyclons in the making. Some of these were probably used as ceremonial stones in this partly finished state. This applies also to others that are intermediate between a roughly shaped blank and the finished object, and also to irregularly shaped pieces that approach in form some types of cyclons. In the study of numbers of these interesting objects, it is often difficult to decide which should be included in the group and which should be rejected. Every stage between a rough blank and the finished product is represented.

These older rocks belong to at least six geological periods, the oldest being the Archeozoic series of the Barrier Ranges, followed by the Palaeozoic, represented by the Mootwingee series, which occupy a total area of about 1,000 square miles in the Darling Basin, and are almost exclusively of sedimentary origin, comprising beds of sandstone, coarse conglomerates and clay shales. Kenny, referring to these sandstones, states: "These are usually

white when freshly broken but exhibit tints ranging from pink through reddish-brown to dark brown on weathered surfaces according to the degree of oxidation and contents of iron oxide. Normally the grain size ranges from fine to medium, but coarse gritty varieties are exposed over limited areas."

Rocks of Mesozoic age are the Jurassic formation, confined mostly to the north-west parts, and Cretaceous rocks which are fairly widespread, the most important and extensive development being the White Cliffs belt.

"In the neighbourhood of White Cliffs and for a considerable distance north and south thereof, a broad zone is occupied by a group of peculiar beds. This formation may be described as white or cream-coloured porous sandstones, usually very fine in grain size with a matrix essentially clayey. The material is shaley or thinly bedded and is light in weight, due perhaps to the removal of portion of the silica contents under capillarity." (Kenny.)

Portion of a cyclon of soft white sandstone, on analysis, proved to be composed almost wholly of free silica and alumina. The alumina is uncombined and is bauxite and not kaolin (clay). The silica grains show no evidence of being water-worn and are rough, angular, and non-vitreous. The sediments forming this sandstone may be of volcanic origin (tuffs), which through subsequent chemical changes have had the feldspars converted to bauxite, by the complete removal of the alkalis, and some of the combined silica.

The white sandstone from this formation probably provided much of the material used for the softer cyclons, a material that was easily worked and incised.

In this series, silicification has taken place to a marked extent in the formation of precious and common opal, the opalization of wood, and the production of quartzite and a porcelain-like white or buff fine-textured rock.

Through the denudation of the cretaceous rocks, rounded boulders and pieces of these rocks and other varieties in places cover the surface. They have been extensively used by the natives for the making of flaked knives, adze stones and scrapers. Much of the surface of the country in the White Cliffs area is covered with these stones, which range from 2.5 cm. to 20 cm. in diameter, forming "gibber" plains. On Youldoo Station, which is 20 miles north-west of White Cliffs, is a large ceremonial ground where the stones have been arranged in heaps, circles, parallel lines and intricate designs.

The slates used for the more slender and longer cyclons probably were derived from the older and more metamorphosed formations. These occur in the vicinity of Cobar, Bourke, and the Barrier Ranges. The locating of these outcrops is important and should

indicate to what extent these interesting aboriginal relics have been distributed.

The technique used in the making of cylindro-conical stones is a matter of considerable interest. Those made from hard rock have entailed much work in their fashioning, so that it is obvious that suitably shaped blocks of stone were selected whenever possible.

The form or shape of cyclons falls into four main types, i.e., cylindrical, conical, cornute and placoid, and their dimensions vary from 15 cm. to 55 cm. in length and from 5 cm. to 12.5 cm. in diameter in the case of those made from sandstone; those of slate, usually the more cylindrical types, are always more slender, with a length up to 170 cm. (33 inches).

As many sandstones show well defined bedding and jointing planes, particularly on the outcrops, where they have been subjected to weathering, the rock tends to split into elongated blocks and rectangular slabs. Those having a square cross-section would naturally require the least amount of work spent on them.

The techniques employed in the making of cyclons of hard sandstone appear to have been:

1. The rough shaping by knapping off flakes from the edges and corners of suitably shaped blocks by means of a hammer stone.

2. Reduction by hammer dressing, effected by bruising with a harder stone, thereby wearing away the surface until the final shape is attained. In this manner the taper towards the distal end and the cup on the base were formed.

3. Smoothing by means of a piece of sandstone, or rubbing in a groove on sandstone, probably with the aid of sand and water.

In the shaping of cyclons from softer sandstones, three methods were used, namely:

1. Scraping with hard stone scrapers,

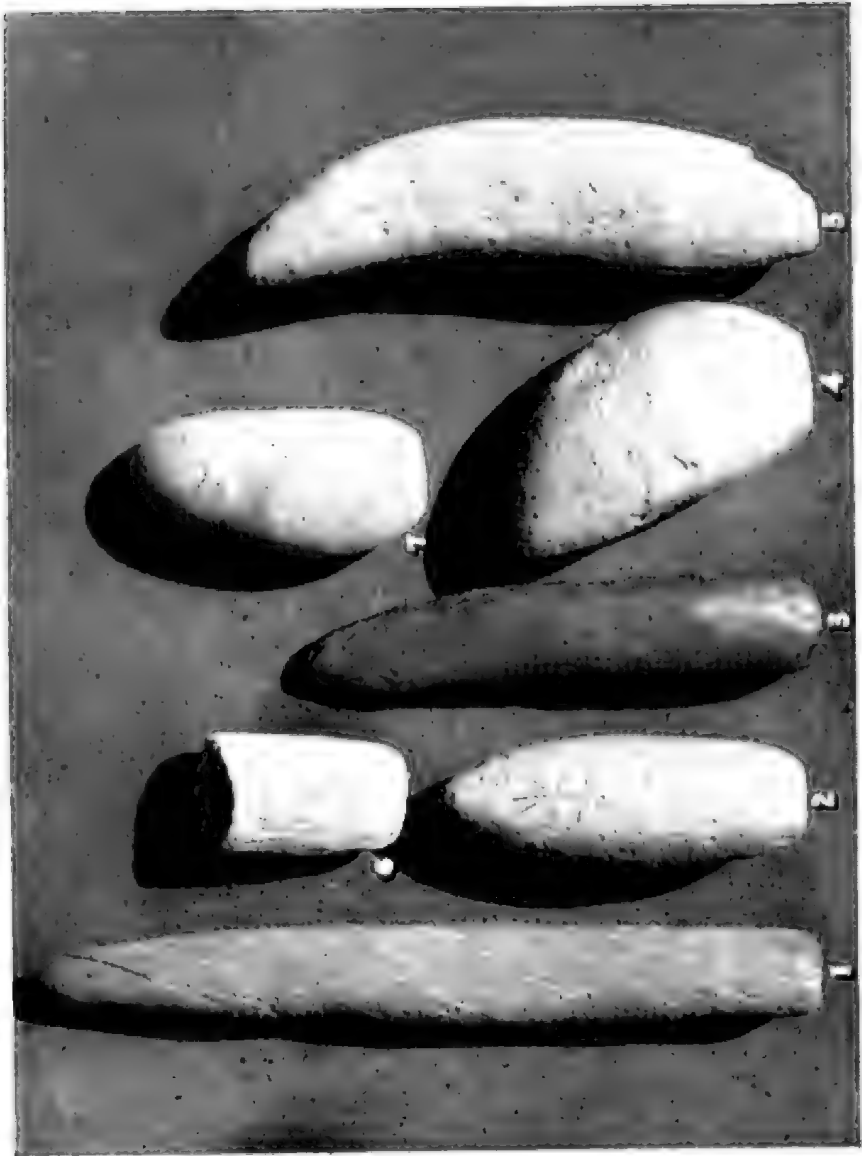
2. Hammer dressing or pecking with a hard stone, having projecting points (which leaves a series of small pits on the surface).

3. Adzing with the native chisel, followed by smoothing with a rubbing stone.

Examination of finished and partly finished cyclons show that all these methods were in use, but the adzing method so far has not been noted. Similar methods, except adzing and scraping, were probably used in making the slate cyclons.

A portion of a white cyclon that was given the writer by Mr. H. Murray, of Bellsgrave, shows distinctly the marks of the adze stone (Fig. 6). It is part of the basal end of a cyclon of soft white sandstone with a well defined cup, together with the characteristic flaking on the periphery, and is 10.6 cm. long and

PLATE VI



Cylindro-conical Stones (For details see page 155.)

6 cm. in diameter. It shows a series of short flutings similar in appearance to the stone adze marks to be seen in many of the wooden implements of the aborigines. It was evidently used in this unfinished state.

REFERENCES

- Etheridge, R., Jr. (1916), Ethnological Series No. 2, *Mem. Geol. Survey, N.S.W.*
 Kenny, E. J. (1934), West Darling district, No. 36, *Geol. Surv. of N.S.W.*
 Black, Lindsay (1942), *Cyclons*.

EXPLANATION OF PLATE

- (1) Cylindrical, hard sandstone; length 41.5 cm.; diameter 5.5 cm.; weight 4.75 lbs.; section circular; base convex; tapers regularly to distal end; has been hammer dressed to shape and rubbed fairly smooth, not incised. Darling River. *S.R.M. coll.*
- (2) Conical, moderately soft sandstone; length 19 cm.; section slightly oval, 7 cm. x 6 cm.; weight 2.5 lbs.; base cupped; shaped by pecking and hammer dressing, smoothed by grinding, incised. Wilcannia. *S.R.M. coll.*
- (3) Cylindrical, black slate; length 27.8 cm.; section oval, 5.5 cm. x 4.5 cm.; weight 2.75 lbs.; flattened towards distal end; base cupped with two slight depressions; flaked around basal periphery; made from a somewhat irregularly shaped piece of slate; shows pecking and grinding, incised. Teryawynia Station, Darling River, N.S.W. *F. Smith coll.*
- (4) Placoid, hard sandstone; length 19 cm.; section oval, 9.7 cm. x 7 cm.; weight 3.8 lbs.; base cupped and flaked; hammer dressed waterworn pebble. Lake Petyuna. *S.R.M. coll.*
- (5) Cornute, white sandstone; length 30 cm.; section circular, 7.5 cm. diameter; weight 5 lbs.; base cupped and heavily flaked; shaped by scraping with stone tools, incised. Albemarle Station. *S.R.M. coll.* Darling River, N.S.W. 502. *S.R.M. coll.*
- (6) Portion of cyclon, soft white sandstone, 10.6 cm. long; section circular, diameter 6 cm.; base cupped and flaked; shaped by adzing, adze marks well defined. Dunlop Station. *S.R.M. coll.*
- (7) Conical, hard sandstone; length 17 cm.; section oval, 7.3 cm. x 5.5 cm.; weight 2.5 lbs.; base flat; made from a waterworn pebble; shows hammer dressing, partly finished. Darling River, N.S.W. *S.R.M. coll.*

THE BARRY MOUNTAINS

I must apologize for an error and an omission in the second part of my paper, dealing with this region (*Pict.Nat.*, December, 1945). On page 133, the caption to the text illustration should read "Viking," not "Razor"—thanks for this correction are due to Mr. W. H. Ferguson, who took the photo. At the head of page 136 two lines have been left out; these referred to the welcome change, from dried foods, of a bag of potatoes found in Cobber Lake hut.

Mr. Ferguson made a triangulation survey of the Barry Range in the 1890's, and advises me that he named Mt. Murray, after his chief, Mr. R. A. F. Murray (then Government Geologist), and also The Viking—on account of its wild, rugged appearance. This is valuable information.

J. H. WILKS.

HERBS AND BIRDS AGAIN : WORMWOOD AND MULLEIN

By EDITH COLEMAN, Blackburn.

Birds have again shown fondness for the rare *Pyrethrum* which started our herb and bird trail; but, so far, this plant has not suffered so severely as a silvery-leaved Mullein and a highly aromatic Wormwood.

Last season I found many branches of two large plants of an *Artemisia* almost denuded of leaves, but no birds were seen attacking them. This year five plants have suffered, and sparrows were seen carrying "bunches" of the leaves into a nest in a nearby gumtree.

One sparrow dropped a bill-full on the lettuce bed while he refreshed himself with lettuce seedlings. The leaves were examined and found to have pieces of stem-bark attached, showing that they were forcibly torn off. Here and there in the garden, even on a garden table, one finds leaves and tufts, as if the birds had attempted to carry away more than their bills could securely hold.

The use of this Wormwood is interesting, for it is very closely related to *A. absinthium* which is grown so largely for absinthe and to flavour other liqueurs. It has the same powerful fragrance and is used by Australian distillers as freely as *A. absinthium*. The late Mr. P. R. H. St. John determined it as *A. abrotanum* and as such it was labelled in our Botanic Gardens herb-beds. It has, however, quite a different scent from the Southernwood we know so well. Its leaves are less finely divided and much more silvery. Moreover, it flowers freely and sets fertile seed, whereas the true Southernwood has apparently not flowered in Australia, and flowers only shyly elsewhere. Mr. J. H. Willis has kindly compared specimens with material in the National Herbarium and now assures me that my silver plant is *A. arborescens* (Shrubby Wormwood).

The choice of this one Wormwood out of 13 species of *Artemisia* in the garden is curious. All of them are more or less hoary and all, with the exception of Tarragon, are more or less bitter, some intensely so, yet the others are not touched.

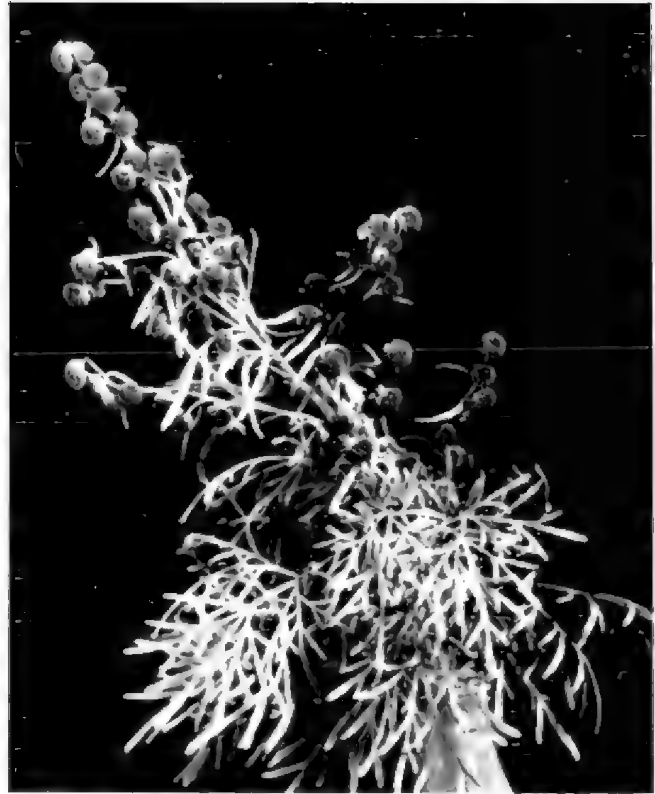
It is significant that *A. cina* and other species of *Artemisia* have been valued for many centuries for their anthelmintic properties—as the "wormseed," used in pharmacy, denotes.

The tiny dried flower-heads of *A. cina* (sold by chemists and herbalists) are so small and seed-like that one is easily deceived into the belief that they are seeds, until they are soaked and dissected. As a domestic remedy for both children and pet animals, these flower-heads, powdered and mixed with honey or treacle, are



Artemisia arborescens branches from which sparrows have stripped the leaves.

Photos. by Edith Coleman.



Artemisia arborescens, showing silvery-white leaves (flower heads are yellow).

said to be a powerful vermifuge. They contain several active principles, to one of which, santonin, the anthelmintic property is due.

Despite their bitterness, sparrows probably eat the leaves, as we have seen them eat those of the *Pyrethrum* discussed in previous issues of the *Vict. Not.* (Jan. 1944, Jan. 1945). In at least four Scriptural references to Wormwood it is associated with gall; yet birds are believed to dislike bitter fruits. It has long been a custom to spray berrying shrubs with the bitter decoction of *Quassia* chips to deter birds from eating the fruit. In some parts of North America large tracts of country almost destitute of other vegetation are covered with species of *Artemisia*. Few animals will touch them. The flesh of those that do eat them is said to be rendered bitter.

Bible-leaf

Southernwood, variously known as Lad's love, Apple-ringie, Bible-leaf and, in France, Maiden's-ruin, is one of the oldest and best loved of garden herbs.

The name Bible-leaf was applied by our great-grandmothers to certain herbs (Tansy, Rosemary, Peppermint, Bergamot, etc.), which they carried between leaves of the Bible, or in posies, "to smell at" during long sermons in crowded, badly ventilated churches. (Home-made peppermint bulls'-eyes, large enough to last through a lengthy sermon, were sucked even under the eye of the consenting clergyman!)

In days when the dreaded gaol fever (typhus) took heavy toll such herbs were believed to ward off infection. Although the cause of typhus is now better known, it is probable that those aromatic herbs did to some extent mitigate the evil by acting as antiseptics. Mrs. Ewings, in the charming story "Daddy Darwin's Dovecot," refers to this old custom.

Little Phoebe, even though she did not suffer from "fainty feels" like her mother and her aunt, carried a posy of herbs to Sunday school to prevent them. Her mother said no herb equalled red Bergamot for church posies. Other times, other herbs.

Most popular of all was Rosemary: "Nay sir, he was so taken up with the excellencies of Rosemary that he would needs have the Bible cleared of all other herbs and only Rosemary inserted." (Brand's *Antiquities*.) As far as I know, birds do not touch Rosemary.

The Plot Thickens

Even more significance must, I think, be attached to the use by goldfinches of *Verbascum*, particularly a tall (up to 10 feet)

woolly-white species that Mr. Willis has provisionally named *V. Visianianum*, "Dalmation Mullein." Until this season I thought the leaves torn from the plants in this garden and one at Bayswater were used as soft, warm nest-lining. Several of the species have densely woolly foliage and stems and goldfinches have been seen to strip the "wool" from the stems. Then I noticed that the very young, densely-woolly, leaves were neglected while large pieces are torn from older leaves which are thicker, less "blankety" and far less pliant. They have, too, lost most of the pubescence from their upper surfaces.

Mulleins have long been used in medicine and as antiseptics. According to Dr. Fernie (1897), fresh Mullein flowers steeped in oil are an admirable bactericide. Figs, Pliny tells us, do not putrify if wrapped in Mullein leaves. An old name, Blatter-herb, for *V. Blattaria*, the Moth-Mullein, recalls its use to rid the house of cockroaches (*Blatta orientalis*). An old Russian remedy for dropsy is *Blatta orientalis* in powder form. It was included in the *Extra Pharmacopœia* (Martindale and Westcott) in 1895, probably later.

So, after all, there may have been good reason for the custom of ancient Greeks and Romans of sleeping on fragrant leaves. When Cheiron, who taught Jason the virtues of herbs, sang of the birth of Time, he lay on aromatic leaves of Marjoram and Thyme, as well as fragrant boughs of Myrtle and Bay. Can it be doubted that the ancients were aware of their antiseptic and bactericidal properties? And birds! Is it surprising, after all, that their nests are so hygienic?

SUMMER BIRD-VISITORS

Once upon a time—say, up to twenty years or so ago—the pretty White-browed and Masked Wood-Swallows were regular springtime visitors to certain parts of Victoria. Their piping calls could always be heard drifting down from high above on blue days early in October. More recently they have been very erratic in their appearances: sometimes numerous, sometimes rare, and sometimes entirely absent. In October of '45 it seemed probable that the birds were again to be "posted missing." In November, however, the White-browed Wood-Swallows became quite numerous about Melbourne, and since then they have been reported to be nesting freely in many districts.

Their Royal Highnesses the Governor-General and the Duchess of Gloucester, Prince William, Captain Alex. Ramsay, A.D.C., and Miss Eileen Phipps, Lady-in-Waiting, paid a visit to the Healesville Sanctuary on December 13. They were accompanied by Mr. A. H. Crisholm and were received at the Sanctuary by the Chairman (Mr. Lindsay Field) and the Director (Mr. David Fleay). The visitors showed keen interest in the platypuses and various other exhibits.

PTEROSTYLIS BOORMANII RUPP

An Interesting Orchid of the Central Western Slopes of
New South Wales.

(With additional remarks on the "Rufa Group" of the Genus
Pterostylis.)

By the Rev. H. M. R. RUPP, Northbridge, N.S.W.

In *The Orchids of New South Wales* (1943, p. 98), I published the description of a *Pterostylis* from Peak Hill, under the name *P. Boormanii*. This description was worked out from the only specimens then known, collected by the late J. L. Boorman in October, 1906, and deposited by him in the National Herbarium at Sydney. Recently Messrs. G. W. and P. Althofer, of Dripstone, nearly 50 miles east of Peak Hill, have sent me living specimens which I am now satisfied are specifically identical with those of Mr. Boorman. Exhaustive examination of both the living and the dried plants was necessary before this conclusion could be reached; and in the course of it I found that my original description of *P. Boormanii* was somewhat defective and in one or two respects erroneous. For instance, in the individual flower softened out and dissected for the purposes of description, the long marginal setae of the labellum seemed to be directed backwards towards the interior of the flower. This, however, is not the case in other flowers which have now been examined, and was probably accidental in the first.

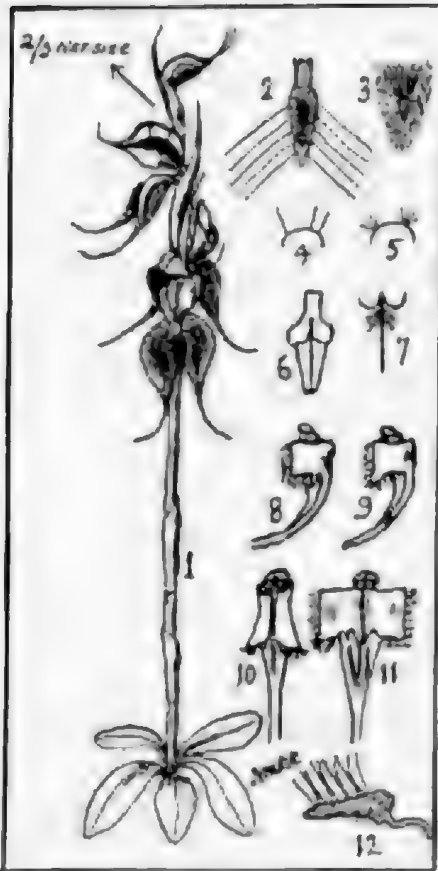
Now that living plants have been made available, I feel that a fuller and more explicit description should be given of this very distinctive species than was possible when working from dried material nearly 40 years old.

A sturdy plant 5-15 cm. high, with 4-7 radical leaves, ovate to oblong, shortly petiolate or almost sessile, about 2 cm. long. Cauline bracts 2, closely appressed. Floral bracts rather large with acuminate or almost filiform points, at least 2 cm. long. Flowers 2-7, relatively large, deep red-brown with translucent spaces, on slender pedicels. Galea deeply cucullate, with a filiform upturned point 10-14 mm. long. Dorsal sepal nearly 2½ cm. long round the curves, with a translucent space on either side between the dark median ridge and the dark inflated marginal portions. Lower sepals very large, connate for their basal thirds, about 3 cm. long and 1½ cm. wide across the united part, abruptly deflexed near the base, divergent from the termination of their union, suddenly narrowing anteriorly into filiform points about 1½ cm. long, the points curving variably; both sepals conspicuously ciliate along their outer margins from the base for about a third of their length. Petals transparent, the acute apex situated at the base of the filiform point of the galea. Labellum very small, thick and fleshy, very irritable, on a claw half its own length, linear- to ovate-oblong, narrowing anteriorly, about 5 mm. long, concave above, channelled below, densely glandular-pubescent at the obtuse, or nearly acute, or minutely emarginate apex; beset along the lateral margins with 4 to 8 long equal white setae; base slightly

gibbous, quite glabrous or with 2 or 3 rather short setae, or with 2 clusters of still shorter ones; a few setae sometimes at the base of the channel on the under surface. Column about 16 mm. long, much curved; the wings devoid of upper lobes and often quite lobeless and square, or with short lower lobes; densely ciliate along the margins. Rostellum almost obsolete. Stigma very conspicuous, broadly winged, the wings sometimes angular.

Guntawang, Oct., 1945, G. W. and P. Althofer; Dripstone, Oct., 1945, same collectors.

This is certainly one of the most attractive members of the so-called "Rufa Group" in *Pterostylis*, with its rich red-brown colouring set off by translucent or even transparent spaces. It



will be seen from the above description that the details of both labellum and column show considerable variation; but I think it will also be obvious that none of the variations can serve to unite it specifically with its nearest allies—*P. squamata* R.Br. and *P. Mitchellii* Lindl. The scaly character of the stem in *P. squamata* is, as the name implies, so eminently characteristic of the species that, in my opinion, it would be most undesirable to unite with it a form with a consistently non-squamate stem, unless there were complete agreement in the morphology of the flowers, and this is very far from being the case. And the labellum of *P. Mitchellii* is too distinctive to allow a specific identity there.

But it seems to me that the time is ripe for some discussion of the taxonomy of the group to which these plants belong. Undoubtedly it is the

most difficult group in the genus. On morphological grounds, *P. Woollsii* is correctly included in this association; but it is the exception which proves the rule, in that it is readily identified by its unique lower sepals. The remaining members of the group—*P. rufa*, *P. squamata*, *P. Mitchellii*, *P. pusilla*, and *P. Boormanii*—have so much in common, and are obviously so nearly related,

that the question constantly arises whether it would not be wiser to follow Bentham's precedent in the cases of *P. squamata* and *P. Mitchellii*, and to regard all five as varying forms of one species, Robert Brown's *P. rufa*. On the other hand, it can be argued with much weight of evidence that the differences between them, though insignificant to the non-botanist, and often obscure to the naked eye, are very real morphologically, and must not be glossed over. The difficulties of the problem are increased by the fact that all five exhibit considerable and obvious variability within their own limits. In some instances the variations appear to be sufficiently constant to warrant varietal rank and name; in others they are too ephemeral and uncertain—which does not make them less puzzling.

In the above description of *P. Boornmanii*, I have endeavoured to cover all the variations observed in about 25 individual flowers. Unless this species proves to have a wider distribution than is at present known, involving further variations, I think the description is comprehensive enough to make identification fairly easy. Mr. W. H. Nicholls (*Pict. Nat.*, LIII, (1936), 135, and *ibid.* LVII (1941), 115) has dealt exhaustively with *P. squamata*, and if his interpretations of the type form and var. *valida* be accepted, little difficulty should be encountered in future over that species. The remaining three, however—*P. rufa*, *P. Mitchellii*, and *P. pusilla*—call for fuller treatment than has yet been accorded to them.

The type form of *P. rufa* was a Port Jackson plant. This form is rather widely distributed over northern N.S.W. east of the Dividing Range, and also occurs in southern Queensland. It exhibits little variation, but in a dried state is not easy to distinguish from the rufous form of *P. Mitchellii*. I have seen no specimens of *P. rufa* from southern N.S.W.; but in Victoria and South Australia there are forms accepted as this species which differ widely from the type, with much larger flowers, wholly green: I think they might well be given varietal rank and described accordingly.

P. Mitchellii also has forms with large and small flowers, the former always rufous, the latter often quite green. But for the different structure of the labellum, the rufous form might pass for the typical *P. rufa*. The colour, however, is a true red, and in my opinion this is the most beautiful little orchid in the whole group. Here again I think varietal rank would be warranted.

P. pusilla, as described by the late Dr. Rogers in *Trans. Roy. Soc. S. Austr.* XLII (1918), 26, is designated "a slender . . . plant, 2½ to 3½ inches high . . . Flowers 1 to 4." How far we have departed from this description is illustrated in my own herbarium by plants up to 29 cm. high with 8-12 flowers. This robust form, it is true, has been given varietal rank as var. *prominens*. My own

view is that it should be raised to specific rank. This opinion was shared by Dr. Rogers himself. Other forms included in the species are very close to the typical *P. rufa* and the rufous *P. Mitchellii*. A review of all these forms would be very opportune. If Victorian orchidologists would comment upon the remarks here offered, we might see the way open for clearer definitions of the members of this very interesting group.

KEY TO FIGURES OF *PTEROSTYLIS BOORMANII* RUIP

1, Complete plant. 2, Labellum from above. 3, Anterior portion of labellum, showing pubescence. 4, 5, Base of labellum, showing variations from the commoner glabrous form. 6, Outline of labellum from below. 7, Setae near base of the channel on underside of labellum. 8, 9, Column from the side, showing lobeless and lobed wings, respectively. 10, Column from the front. 11, Column from the front, with wings opened out. 12, Labellum from the side.

EXCURSION TO POUND BEND, WARRANDYTE

Over 70 members and friends braved the very hot afternoon of November 24 and travelled by bus from Box Hill. As leader, I tried to explain, with the aid of a map, how the flow of the river had been diverted through a 200-yards-long tunnel in the '80's to enable gold-seekers to win alluvial gold from the 2½ miles of dry river-bed thus exposed. There were not many species of flowering shrubs and trees in the area examined, but a few made up in showiness and profusion: the delicate sprays of Christmas-bush (*Prostanthera lasiantha*) along the river provided a beautiful sight. *Kunzea peduncularis* was also very showy and the Yellow Box (*Euc. melliodora*) in full bloom filled the air with sweet scent. Other trees and shrubs representing the Myrtle family were Manna Gum (*Euc. viminalis*), *Leptospermum lanigerum*, *Melaleuca cricifolia* and *Callistemon badius*.

Some charming bird studies were made, Mrs. Hanks identifying several nests and occupants. A second brood of Blue Wren babies were seen, being lavishly attended to by parents and grown-up progeny of the first brood! On a willow tree-stump, only inches away from the footpath, a Yellow Robin's nest with three fledglings was observed by many of our party. Quite unconcerned, one of the parent birds kept watch alongside, while its mate brought along food, passed it to the guardian, who in turn fed the young. Dusky Wood-swallow's, Scissors Grinder's, Magpie Lark's, Firetail Finch's and Black-faced Cuckoo-shrike's nests were located and watched, while the White-winged Triller was active, seemingly on the look-out for a nesting position high up in a Manna Gum.

A family of Tawny Frogmouths attracted much interest: the two parent birds sat in characteristic fashion, "stick-like," while only a few feet higher up we saw their two offspring. The young did not seem to have yet acquired Frogmouths' age-old ability to camouflage, as they were moving around and looked just like ordinary owls. About ½-mile farther down the Yarra another Frogmouth family of four was located, with their nest built on a dead Paper-bark tree. It was interesting to note that, within such a short distance along the river, Frogmouths are breeding freely on account of the abundance of food, whereas at Doncaster (away from the running water) I have never known a Frogmouth pair to produce more than one young per year during the last ten years of observation.

PAUL FISCH.

EXCURSION TO BACCHUS MARSH

Favoured with excellent weather on November 6 (Melbourne Cup Day), some sixty members and friends, with a sprinkling of the younger generation, took part in an interesting excursion beyond Bacchus Marsh.

Geology:

The first halt was made at Korkuperrimul Creek, where it crosses the Ballarat Road, about one and a half miles west of Bacchus Marsh. Within a few yards of the road here are to be seen blocks of ironstone containing impressions of leaves, fruits (as seed cases) and twigs of trees, as well as an occasional piece of wood replaced by the brown oxide of iron, limonite.

These blocks, which are washed down the creek from a deposit farther upstream, are composed of fine to coarse sand, cemented together with white and coloured clay, forming a hard mass.

Other blocks are more of a clay mixture, with various queerly shaped markings on and through them, such as might easily be taken for fossils, especially plant forms. These are concretions, however, and are caused when the cementing material (in this case oxide of iron) is formed in larger quantities, or the amount of evaporation is greater, than these lumps are found distributed throughout the rock mass. If the rock is a non-porous type, then these solid lumps may not extend far, but be deposited in a knot around an organism, such as a fossil plant or shell or grain of sand.

The ironstone beds were doubtless formed when earth movements, such as faults and folds, caused the lifting and subsidence of the land and lava poured out from volcanoes at Mt. Blackwood and Mt. Ingliston, filling the river valleys, and so forming large lakes. Leaves from the trees, and other vegetation, which grew round these lakes were deposited in the sediments that washed into them from adjacent streams, and were slowly buried.

The present Korkuperrimul Creek has cut its valley through these deposits, which are now exposed to our view. The leaves are plentiful, and very clearly preserved; the midrib and larger veins are very distinct, while on many impressions even the finer leaf vessels can be seen by the unaided eye. Common types described from these deposits have been attributed to the Cinnamon, Laurel, and Beech groups.

The fossil fruits are found as external casts, the original woody structure and kernels having perished. Sometimes the kernel is found as a limonite "pea." The petrified wood, replaced by limonite, is very poorly preserved and its origin could not be determined. The age of these beds is considered to be Miocene, in the Cainozoic or Tertiary Period—many millions of years later than the great Glacial Period.

After lunch, the party proceeded to Werrisbee Gorge, by the Ballarat Road entrance, and from this vantage point clear views were obtained: to the north, Mt. Blackwood (2,432 ft.), from which lava flowed to a depth of over 1,000 ft. along the Korkuperrimul Creek, while to the south the You Yangs and Anakies (1,350 ft.) were outstanding on the vast basalt plain.

Another interesting feature was the Rowsley Scarp, a huge fault, about 30 miles long, necessitating a long detour in the construction of the railway line from Bacchus Marsh to Ballarat, and a rise in elevation from 343 ft. at the former place to 1,666 ft. at Ballan.

The party then proceeded towards the Gorge, the route taken following the course of Myrning Creek to its junction with the Werrisbee River. "The Island," an almost isolated, flat-topped hill, around which the Myrning Creek flowed, was conspicuous by reason of the deep valleys on three sides, while on the fourth side is a low wind gap.

The late Mr. C. C. Brittlebank described this island as being "thrice a valley and now a hill." Its base is mainly glacial: above this, Tertiary leaf

beds occur, and basal forms the cap, giving three distinct periods of deposition, each of which was possibly a valley phase.

The party next moved on towards the junction of the two river valleys, and appreciated the grandeur of rugged scenery. On account of the rough track, most excursionists rested at this point, but several continued on to get a closer view of this interesting section of the Gorge, where cliffs in the vicinity rise up to 600 ft. in height.

The rock specimens observed and collected were as varied as usual in the case of glacial deposits. Several good striated and faceted pebbles were found, and attention also directed to blocks of tillite (the material deposited by glaciers, after they have melted, and composed of pebbles of all sizes and of many different kinds of rocks, cemented together with clay, from the grinding action of glaciers).

Several large erratics were examined, one of mica-schist being noteworthy, while another was a fine-grained sandstone, showing only one pebble imbedded on its surface; this was in striking contrast with the tillite, often termed "pudding-stone."

Members of the party retraced their way to the starting point, and were sorry that such a glorious day had come to an end.

An excellent description of the Werribee Gorge appears in *Walkabout*, Dec., 1936, entitled "A Glacial Age in Australia," by Professor Skeats, and readers are referred to papers by Brillebank and Sweet (*Aust. Ass. Adv. Science*, Vol. V, 1933) and to "The Physiography of the Werribee Area," by Fenner, *Proc. Roy. Soc. Vic.*, Vol. 31, new series.

Alfred A. Baker.

Birds:

At the precincts of the upper section of the Gorge, the richness of bird life in the area soon became apparent to a trio of members who lagged behind the main party intent on geology. A variation in the normal pattern of nesting sites and species association was noticed in a place where once a habitation stood. The scene comprised several exotic trees, of mature age. One, a Black Locust or "False Acacia" (*Robinia pseudo-acacia*) in full flower with wistaria-like white racemes, was almost a hedlam of sound and movement from many native birds: Dusky Wood-Swallows, Yellow-winged Honeyeaters, White-winged Trillers, Rufous Whistlers and Thornbills of several species. The department of a Dusky Wood-Swallow betrayed its nest—typical flimsy structure with three eggs, on a branch a few feet above ground level. The continued observation of this nest brought to notice the behaviour of a pair of thornbills around the bole of the same tree. Presently these birds, later identified as Buff-tailed Thornbills, fitted in and out a tiny hole in the bark. Closer examination revealed the nest, tightly squeezed into a narrow fissure behind the bark, and sparingly constructed of grass, but liberally upholstered with feathers. The nursery contained callow young. Both nests were on exactly the same level, and within eight feet of each other.

The adjacent, almost touching, tree was a large Pepper (*Schinus molle*), which also contained two nests. Low down, a double-decker home of a Yellow-tailed Thornbill pair hung pendant. Again on the same level, and about four feet away, another nest, cup-like, neatly built, with three young, came to view, at first pronounced to be that of Yellow-winged Honeyeaters by reason of their proximity. But the antics of White-winged Trillers, after an interval of watching and discussion, proved the nest as theirs, later confirmed by the birds nurturing the young as we viewed developments from a further distance.

A common, five or six yards distant in a dwarf boxthorn, next attracted attention. Out flew Goldfinches and a White-fronted Chat, the latter

performing the broken-wing trick. Its diminutive nest, situated very low down, with two pink spotted eggs, was seen.

The question arises as to why these Australian birds should choose exotic trees, one deciduous, in preference to the many and varied native trees crowding the vicinity? Also, is it usual for such avian species to nest in close association and at a low, vulnerable level? The White-winged Trillers' nest, moreover, was built a few feet above a camp fireplace with evidence of recent use.

A dramatic interlude was provided in the long-range spectacle of several magpies assailing a Brown Hawk. The hawk appeared exhausted as soon it dropped into the side of the "island." Two of the magpies dropped too, and what appeared like a furious combat ensued. The hawk presumably was "settled," for the magpies flew off chortling jubilantly.

H. C. E. Stewart.

Arachnidae:

Insect-minded excursionists found the Gorge of much entomological interest. Numbers of spiders were collected, and included *Dipluridae* (Trapdoor Spiders), *Lyrosidae* (Wolf Spiders), and *Salticidae* (Jumping Spiders). Under stones, the Red-and-Black Spider (*Nicodanus bicolor*) was especially plentiful.

—A. P. and R. A. Dunn.

INTRODUCTION OF *LATRODECTUS* TO THE PACIFIC ISLANDS

The poisonous red-back spider, *Latrodectus Hasselli*, common throughout Australia, has now been introduced to at least two Pacific islands, where it is increasing rapidly. First observations were made on Morotai, an island in the Halmahera group 4 degrees north of the equator. An area record which I made there in July, 1945, showed that in an area of approximately 400 sq. ft. 37 adult females were found. Of these, 28 had egg-sacs. The area examined was 30 yards from the nearest camp, which had then been in operation for seven months. Vegetation consisted of secondary growth, and a large percentage of the spiders had utilized natural objects (burnt-out stumps, etc.) on which to build their webs. The remainder were in rusty tins and drums. Many empty egg-sacs were noted, and the abundance of insect life will undoubtedly bring about a rapid increase of the species.

From a further examination of the area it became obvious that *Latrodectus* had been introduced from Australia in boxes and crates containing stores, vehicles and folded canvas tents and canopies. These items were, in many cases, retained in mainland ordnance depots for long periods before being sent overseas. An interesting sidelight is that the area described had been subjected to aerial spraying by D.D.T.

A second introduction of *Latrodectus* was noted in the Koepaung (Dutch Timor) area.

An examination of stores and disposal areas in Manila (Philippines) revealed numerous examples of *Latrodectus mactans*, the "black widow." Latest figures from America show that from the earliest recorded case in 1726 to this year (1945) there have been 1,291 cases of spider bite or arachnidism attributed to the black widow. There were 55 deaths in that period. These figures are taken from *America's Most Poisonous Spider*, a recent book on the black widow written by Raymond W. Thorpe and Weldon D. Wilson. This valuable addition to the unfortunately short list of works on the Arachnids is published by the University of North Carolina Press, and the Oxford University Press.

BRYAN M. SLOGGETT, SGT.,
Army Education Service, Timor.

EXCURSION TO FRANKSTON

About twenty-five, including three visiting members from the New South Wales Naturalists' Club, attended the outing on October 20. The weather was fine, and a route was chosen in open country south of the Hastings Road.

Much of the area visited was occupied by Scented Paper-bark; (*Melaleuca squarrosa*), indicating the existence ordinarily of ample moisture, though at present the surface was dry for such country. Other wet-place plants, however, were present, such as Pink Swamp Heath (*Sprangelia incarnata*) and the Blunt-leaf Heath (*Epacris obtusifolia*). The latter was of rather shorter growth than usual in some examples gathered. Much of the Scented Paper-bark had young tips withered, either by unusual lack of moisture or from some recent late frosts. Flowers of *Melaleuca* were not abundant but enough were found to show their general arrangement, in groups of three in four rows, agreeing with the leaf arrangement.

An unusual form of the Tangled Dodder-taurel (*Cassytha glabella*) had fruits approaching a spherical shape. It does not appear to be mentioned in text books, and, so far as I know, has only been noticed in a limited area near Frankston. As the inner part of the fruit was already hardening and the young plantlet in the seed with its large cotyledons well advanced, it does not seem likely that it would contract to the usual narrow and elongated fruit of this species.

A pink flowering tea-tree has, I think, been previously mentioned for this district. Though there are in cultivation several pink and red New Zealand forms of *Manuka* (*Leptospermum scoparium*), this species in the wild here rarely, if ever, shows more than a faint rosy tinge. A decidedly pink wild form is, however, not rare in Silky Tea-tree (*Leptospermum myrsinoides*), usually a plant of drier ground. Both species were seen on this excursion.

T. S. HART.

THE LATE A. B. BRAINE: A TRIBUTE

The death of Mr. A. B. Braine removes one of the most successful collectors of orchids that we have had. The story of "my" orchid (*Chilodactylis Pascottiana*) is worth recording. When Fred, a Cravensville school-boy, arrived one morning with an unusual orchid, Mr. Braine at once packed it up and sent it to me. That week Charles French and I found a new *Prasophyllum* at Ringwood. I recognized Mr. Braine's orchid as a new species and wrote telling him this. In the same box went the two new species and the *Prasophyllum* after Mr. Braine. That was in 1917.

Mr. Braine has left a fine record of his collecting at Cravensville in a series of 23 articles which were published in the *Federal Standard*, a Clutern newspaper, in 1917-18. These articles form the best record of "local" collection that I have ever seen. I suppose that my set is unique; and in memory of Mr. Braine it will shortly be presented to our National Herbarium.

Mr. Braine's father, the late C. J. Braine, at one time held an important Government position in Hong Kong. While there (1856) he discovered a new tree-fern, which was dedicated to him. It is unique in that both the genus and the species are monotypic. The fern is *Brainea insignis*. It is described as having a trunk from 3 to 4 inches thick, with fronds 2 to 3 feet long and 8 to 12 inches broad, and as being a "very handsome and interesting" fern—related to *Blechnum*.

The late A. B. Braine was one of the happiest of cultured men I have ever met.

E. E. PASCOTT.

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A HARDY ALIEN ORCHID

By A. J. TADGELL

The orchid *Epidendrum radicans* var. *O'Brienianum*, though a native of Brazil, has "gone bush" in Queensland, so Mr. W. H. Nicholls told me when identifying this orchid recently. Moreover, I think it must have attracted attention in Australia because of its long flowering period and the ease with which it may be grown and propagated "in captivity."

But for those who, like myself, did not know what to do for many years, there is probably disappointment in the refusal of *Epidendrum* to flower. My Queensland orchid grew well enough, but I could not flower it. Later, I discovered the secret for myself. Someone told me that it should be hung on a fence out in the sun, that it would be useless to hope for blossom either in a bush house or a glass house. All three suggestions proved false, for I have seen it flowering in both glass and bush houses. But I nearly lost my "Queenslander" by taking wrong advice!

In my green house, open on the east side, it thrives suspended from the lattice roof in a large hanging basket and attains a height of 30 inches. It has flowered continuously from April 22 to November 22 (seven months), with still another dozen buds to develop; every week new ones open as each one or two flowers fade and fall. It does not seed, perhaps because the natural insect pollinator is absent. The flower-head now has nine perfect flowers, each $1\frac{1}{2}$ inches in diameter on pedicels of the same length. The five broad segments are brown, and the labellum is shaped like an erect fimbriated Maltese cross of canary-yellow, large in proportion to the flower.

My plant has the morning sun, but is protected on the north side by a wood-shed. Though there are many succulent branches, so far only one has developed a flower spike, which is 13 inches long. This is essentially a "poor man's orchid," though a not-too-recent London orchid catalogue prices *radicans* at 31/6 each!

Later.—Since my notes on the above (as at 22nd November) one of the present 10 flowers has become fertilized so that the former apparent pedicel has developed into an elongated, horizontally-lined ovary for two-thirds of its length. Like the labellum, it was originally canary-yellow, but has assumed the dark brown of the floral lobes. At the base of the last, outside, several glass-like globules are seen resting also on the ovary, which on being tasted are found not to be sweet, but of uncertain flavour which remains on the lips for a considerable time. This secretion is, to me, an unusual orchid accompaniment.

F.N.C.V. JUNIOR BRANCH NO. 2

Nature study has never been more popular than it is to-day. Thousands of people, young and old, have heeded the call of the wild to become lovers of the bush or the coast and their manifold charms. Our Club, having done much to foster the cause of natural history, has recently formed two Junior Branches. In these the State has a splendid asset, which we should tend with care and intelligence.

The inaugural meeting of the Toorak Branch was held in the Presbyterian Memorial Hall on Tuesday, December 4th, at 3 p.m. The President, Mr. H. C. E. Stewart, welcomed the 180 foundation members, and in declaring the new Branch open hoped for a long and prosperous existence. Mr. P. Crosbie Morrison gave an educative opening lecture, supported by films in colour. The Headmaster Mr. W. J. Wilson, thanked the President and members of the parent club in attendance, while the Mayor of Prahran, Councillor W. Cole, expressed appreciation of this worthy project. Items of harmony by the mixed choir of 100 voices added much to the pleasure of this propitious occasion.

P. F. MORRIS, Organizer.

PTEROSTYLIS SQUAMATA R.Br. IN THE WIMMERA

By ERIC MUIR, Dinholala.

Whilst at Rainbow on November 17, I visited a small patch of scrub (9 or 10 acres) about 4 miles south of the town. The purpose of the visit was to collect Bitter Quandong fruits (*Santalum Murrayanum*), not to seek orchids, rare or otherwise.

But I was delighted to find, when walking near a water channel passing through the scrub, a colony of five greenhoods. First thoughts were that they were late specimens of *Pterostylis pusilla*. Examination, however, showed that each plant had six stem bracts, the lower ones imbricate and spreading further apart as they progressed up the stem. *P. pusilla* has 2 bracts only.

The labellum had no appendage, but was thickened at the base, with two bristles; the edges were ciliate, longer towards the base and short at the tip. The column wings were blunt and ciliate, the margins incurved with a fringe of hairs. This suggested *P. squamata* to me. The plants were all 17 to 20 inches high. As Black (in *Flora of S.A.*) and Rupp (in *Orchids of N.S.W.*) both give the height as about 20 cm., the tallness may be due to the fact that they were growing in tall grass and near water. The flowers, four in number, agree with descriptions by both authorities. Key. Rupp says "flowers on short peduncles," while Black specifies long ones—perhaps this is also a matter of environment.

J. Ros Garnet has verified my identification and remarks, "It is a curious thing that the plants Fitzgerald identified as *P. squamata* came from around Urangeline in the Riverina, since settled and sown with wheat and grazed. Both Rainbow and Urangeline are wheat-growing areas, with little of the original flora left, so to come across a rarity, surviving the march of progress, is indeed a miracle of good hunting." It was actually good luck!

BIRD COMMENTS FROM LARDNER

With reference to a suggestion in the *Vict. Nat.* for October that Crimson Roselias were trimming their beaks on young fern fronds, we have a small *Eucalyptus coeisia* at this moment in flower with a pink carpet of flowers and buds beneath the tree—the result of parrots' sheer mischief. Fuchsias and *Habrothamnus* plants are also attacked. Our tiny plant of *Rod. Correa* at the house door has to wear a shield of newspaper to keep the flowers on it from the birds. They annoy us with their depredations, especially on the buds of apple trees, to prove disastrous later to the apple crop.

A White-browed Scrub-wren built its nest in a pocket above the clothes-peg on the peg "apron" that hangs just inside our wash-house door. I grasped the bag one day and went outside before the nest was discovered. It was replaced at once, and the birds are now in complete possession.

(Miss) C. C. CURRIE.

SPECIMENS WANTED

(To the Editor)

Sir,—I am interested in the anatomy of the head and neck of aberrant reptiles, and I want to study the musculature and skulls of the legless lizards, *Pygopus*, *Delma* and *Cryptodelma*, as well as the almost limbless forms of *Lygosoma*. I am also desirous of studying the degenerate ophidian genus *Typhlops*. I would be indebted to any of your members who could send me specimens of any of these reptiles. Preservation in either formalin or spirits would be all that could be desired.

Yours sincerely,

H. LEIGHTON KESTERN.

91 Balaclava Road,
Caulfield, S.E.7

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PROCEEDINGS

The monthly meeting of the Club was held on January 14, 1946, at the old Children's Museum Room; Melbourne Public Library, the President (Mr. H. C. E. Stewart) and some 150 members and friends attending.

The President referred to the death of Dr. Georgina Sweet, a Club member of many years' standing, and the Secretary referred to the death of Mr. F. H. Baker, who was interested in shells and microscopical work, and who had been active in the Club in earlier days. Members stood in silence as a mark of respect to the memory of our late friends.

A letter from the headmaster of the Central School, Toorak, thanked the Club for establishing a branch at the school.

Excursion reports were given as follows:—Healesville, Miss Ina Watson; Shoreham, Mr. H. C. E. Stewart; Beaumaris, Mr. F. S. Colliver.

The following were duly elected as ordinary members of the Club:—Mrs. D. O. Pcowrie, Misses C. S. Stewart, Freda R. Neilson, M. H. Orford, Mr. J. Seaton, Mr. Albert C. Nilson; as country member, Mr. Richard Cuddihy; and as associate member, Master L. R. Adler.

NATURE NOTES

Miss Ina Watson mentioned that Mr. A. G. Campbell had recorded, for the first time, the red-backed kingfisher at Kilsyth.

Mr. Stewart mentioned that the Rutherglen bug had been recorded as stinging human beings. Mr. C. C. Ralph stated that recently at Portsea bathers were forced to leave the beach. Mr. Colliver said it appeared that the bugs were able to exist on any vegetable or animal juice. Mr. G. N. Hyam stated that the Agricultural Department would be pleased to receive eggs of the Rutherglen bug. These are not commonly found. They generally occur in bunches of seven, and possibly would be found on members of the Compositae.

NATURE STUDY IN THE NORTH

A summary of natural history work done in North Queensland was given by Dr. H. Flecker, a one-time member of the Club, now resident in Cairns. A motion picture, taken by Mr.

Bruce Cummings, was shown. It dealt in the main with the bird life of Michelmas Cay, some 26 miles from Cairns. The picture showed the vast numbers of birds on the Cay, the nesting groups of the three terns which are the commonest birds there, and some wonderful slow-motion photography which illustrated the command over the air possessed by these birds. Dr. Flecker stated that the Naturalists' Club was formed soon after his arrival in Cairns, and was based on the F.N.C.V. Monthly meetings were held until the war years, and a journal, the *North Queensland Naturalist*, was published. A nature column is a regular feature of the *Cairns Post*. The Club had been working for the establishment of a Museum, and the Council had made a grant of a piece of land and a store-room had been built and a start made collecting material. A herbarium of over 10,000 sheets has been built up, and a library started. Protection of fauna and flora and bush fire control were two items always under consideration by the Naturalists' Club.

Miss R. S. Chisholm asked if Service men and women were interested in natural history. Answer: Yes, many were very interested, and the Club had received a great deal of help from visiting naturalists in the Services.

Mr. Stewart asked for information on the Taipan. Dr. Flecker said this large brown snake was upwards of 10 ft long, and had very large scales. It was recorded as one of the most dangerous snakes in the world. Clinical records had been kept of recent cases of bites. Dr. Flecker added that the evidence seems to indicate that this snake occurs in large numbers in certain areas from time to time. Certainly it was not as rare as was previously believed.

Miss Wigan asked if anything had come of experiments for the extraction of rubber from weeds. Answer: The rubber vine, an African weed, had been subject to experiment, but it was not economical. This was just as well, Dr. Flecker believed, as the vine was possibly as bad as the prickly pear at covering the ground, and indeed was a curse in certain parts now.

Mr. A. H. E. Mattingley asked why were there no flies or mosquitoes at Lake Barrine. Dr. Flecker suggested that the ant population was the main factor in controlling the flies, and as for the mosquitoes, apparently the height of the lake above sea-level (2,000 ft.) prevented them from breeding in any numbers.

Mr. Colliver asked how close to Cairns did the crocodile occur. Answer: Crocodiles were common in the Russell River. A Chinese girl had been killed by a crocodile about 27 miles from Cairns.

Miss Chisholm asked if the Dodd collection of insects was still in existence. Dr. Flecker replied that the collection had

been kept on show for some time by Miss Dodd, but it had since been sold and he did not know who had purchased it.

A vote of thanks to Dr. Flecker was cordially carried.

EXHIBITS

Mrs. Paul Fisch: *Eucalyptus Stricklandii*, garden-grown, with this and last year's buds and flowers, which incidentally took three years to develop.

Mr. A. N. Carter: Marine shells: *Livonia mamilla*, Victoria; *Amario undulata*, Victoria; *Ericusa sowerbyi*, N.S.W.

Mr. C. J. Gabriel: Marine shells: *Chlamys frigidus*, Norwegian Sea, 957 fathoms; *Chlamys imbrifer*, East Greenland, 90 fathoms.

Mr. E. E. Lord: *Humea elegans*, garden-grown at Ringwood. (Plant 10 ft. high and now in third year.)

Mr. A. H. Mattingley: Little Whip Snake (*Demisonia flagellum*).

Mr. Tom Griffiths: Collection of mosses in book.

Mr. T. S. Hart: *Helichrysum* and *Cassinea* to show distinctions. Spring flowering and summer flowering forms of *Leptospermum scoparium*

Mr. J. R. Garnet: Germinating green peas.

Mr. C. C. Ralph: Fossils of Carbo-permian age, Eaglehawk Neck, Tas

PLAGUE OF LOOPER CATERPILLARS

The foliage of young wattle-trees in the "Forest of Arden," a few miles from Marysville, has been killed by a plague of looper caterpillars, which hang by a spider-like thread. Visitors are smothered with them along the Keppells Falls track, continuing on from the end of the Talbot Drive. We are wondering if the trees will recover; every one in the area has withered. The caterpillars crossing the Talbot Drive are being attacked by small black ants, so much cursed by city folk. The devastated area, which looks as if it has been fire-scorched or frost-bitten, can be clearly seen from Woods Lookout on Mount Gordon. Nearer Marysville the caterpillars are not so numerous, but a few can be seen along the Steavensons Falls track, and on Mount Kitchener and Wilks Creek. Bird life is not very abundant in the district, so it looks as if the ants will be the main destroyer of the plague.

LESLIE M. CARBITT

THE LATE FRANK HENRY TAYLOR

The death occurred suddenly in Sydney on December 20 of Frank Henry Taylor, F.R.E.S., F.Z.S., of the staff of the Sydney University School of Public Health and Tropical Medicine. Mr. Taylor was an entomologist specialising in insect-carriers of disease, and it is mainly through his efforts that the school possesses the finest collection of tropical insects in the Southern Hemisphere. He was the author of several works on insect-carriers of malaria, dengue fever, and other tropical diseases in Australia and the lands immediately to the north, and at the time of his death was collaborating in the production of a book on venomous and disease-carrying insects, spiders, scorpions, centipedes, etc., of Australia. It is to be hoped that the production was sufficiently advanced to permit of the completion of such a valuable work.

P.C.M.

OBSERVATIONS ON THE EGG-CASE AND YOUNG OF
THE BALER SHELL, *MELO UMBILICATA* Brod.By JOYCE ALLAN and T. CLIFTON MIDDLETON
(Published by permission of the Australian Museum)*Introduction*

The following observations on the laying of its egg-case by the Queensland Baler Shell (*Melo umbilicata*), and the subsequent hatching and growth of the young Balers up to the age of eight months, were made by one of the authors (T.C.M.).

No similar observations appear to have been recorded in Australia. Therefore, the notes accumulated during the investigations are presented here, and, although these are not as complete as the authors would wish, it is hoped the information will assist future work in this direction. If possible, T.C.M. had intended to proceed with the experiment until the young reached at least three years' growth, but he was forced to discontinue the work when the young reached eight months of age. This was indeed unfortunate, since at that age the young Balers were thriving well, and there seemed no reason to believe that their growth would not continue successfully.

Experimental work of this nature, especially when dealing with tropical marine species, needs to be carried out as much as possible under natural environmental conditions, as T.C.M. was fortunately able to do. Although the egg-case of a Baler shell is a conspicuous object on a coral reef, and of a size suitable for experimental work, no serious study of this nature has been attempted before on the species. Few individual persons have the opportunity or the time for the necessary research that such a study entails. It is work which could be carried out ideally by a Biological Station situated on the spot.

Two experimental tanks for this work were kept in the sea, but the young were hatched out in a small glass aquarium. Each tank was divided into sections, to hold various growth stages. Five sets of growth-stages of the young Balers, from birth to eight months, were watched, and the individual stages in the sets showed a uniformity of growth with one another, throughout.

The Baler Shell and Egg-Case

Baler Shells (*Melo*) are exclusively tropical and semi-tropical in distribution, ranging from the Indian Ocean to Australia. They are noted for their large size (often reaching over a foot in length), their pinkish-orange colouring, and the very wide body whorl, with spines round its upper margin, which permits the larger specimens to be used most effectively as balers or water carriers.

PLATE VIII



Baler Shell (*M. tubificata* Brod.) with egg-case protruding from the mollusc (reduced)

PLATE IX



Back view of Baler Shell shown in Plate VIII

The species of Baler shell used in the following investigations is *Melo unilicata* Brod., formerly regarded as confined rather to the mainland waters than to the coral reefs of north-eastern Australia, its type locality being Moreton Bay, Queensland. The adult specimen measured 11 inches long, and $6\frac{1}{2}$ inches wide, but much larger specimens have been seen on the reefs.

The egg-case, when fully developed, consists of a creamy-horn mass of leathery capsules cemented together, row upon row, until the whole forms a more or less rectangular case, reaching in some instances over 16 inches long and several inches broad. On its emergence the case has a gleaming frothy appearance, but soon becomes firm. Though a number of embryos probably develop in each fertile compartment originally, as hatching-time approaches, only one young Baler is present in each. No particular place seems to be chosen by a female Baler for depositing her eggs; they are found in both very deep and shallow water, in sheltered and in exposed environments. The egg-case in this instance was attached to a small piece of dead coral, which helped to keep it submerged. Others are quite unattached to any object.

Laying and Development of the Egg-Case

The parent Baler was found on October 10, 1942, laying its egg-case at low tide, in water about one foot deep, on the north side of Heron Island, Great Barrier Reef (normally at high tide the water in this situation is about 8-9 feet deep). Observations have shown that October seems the most favoured month for the Baler to deposit its egg-case.

When the parent with its egg-case was first observed, the case already then measured 9 inches in length. Therefore, the time it had taken the mollusc to produce such an amount can only be conjectured from subsequent observations on the remainder of the case. A week later (17/10/42), its length had increased by $1\frac{1}{2}$ inches ($10\frac{1}{2}$ inches). By October 23, thirteen days later, it measured 12 inches, and on October 31 it had reached a length of $13\frac{1}{2}$ inches. The case had therefore increased its length approximately $1\frac{1}{2}$ inches per week. Growth continued practically at this rate until, by November 24, it had reached its maximum length of $16\frac{1}{2}$ inches, having taken approximately six weeks to increase its length by $7\frac{1}{2}$ inches. A compartment opened on that date disclosed no developing Baler, but may have been infertile.

On December 3, almost eight weeks after laying was noticed, an egg-compartment was removed from the first-lain portion of the sac. It contained a single, well-formed, living Baler. At this stage each compartment had a small hole punctured at one

end, through which protruded the mollusc's siphon, and through which the young eventually emerged. Only a small number of compartments (about six) proved infertile. The parent, in the meantime, did not appear to feed and refused any food placed before her.

Hatching of the Young Balers

Hatching commenced on December 22, almost 11 weeks after the egg-case, then measuring 9 inches, had been discovered. Assuming that it took the same degree of time, at $1\frac{1}{2}$ inches per week, to increase its size from emergence to the 9 inches, about 17 weeks would have elapsed from the commencement of laying to the date of hatching.

Two young Balers emerged on the above date, each measuring 26 mm. long and 15 mm. broad. On the following day eleven individuals, of approximately the same measurement, emerged. Hatching continued daily until completion. Unfortunately the notes showing the number hatched daily after December 27, and therefore the total number which emerged during the hatching period, were mislaid, but the latter number would have been somewhere near one hundred. The following figures give an indication of the hatchings to December 27:—

Date of hatching	Number	Measurement of shell
December 22 .. .	2	26 mm. long, 15 mm. broad
" 23	11	26 " " " " "
" 24	3	27 " " " " "
" 25	2	26 " " " " "
" 26	3	25 " " " " "
" 27	2	26 " " " " "

It will be seen from the above table that little or no variation existed in the young shell at the time of hatching. Their progress growth from birth to eight months covered the gradual strengthening of the shell, intensity of its colouring and pattern, increase in the size of the body-whorl mainly, and the development of spines—all useful evidence.

Being flesh-eaters, the young Balers from the first were fed chiefly on the mollusc *Melarapha scabra*. These seemed easy for the young to manipulate at that early stage in their growth. Later, cowries were fed to them, and were eagerly devoured. Incidentally, this proved an effective and clean method of removing the animals from the cowries, in order that the shells might later be placed in a collection! The young Balers, even at that early age, were able to make a "clean sweep" of the cowry mollusc, despite the narrowness in the mouth-opening of its shell.

The young Balers displayed a strong cannibalistic tendency

by devouring the weaker of their number, when a lid, covering the aquarium in which they were kept, was unfortunately moved and the living food placed there for their benefit allowed to escape. This materially reduced the number of young Balers.

Development of Young Balers

No observations were made on the developing mollusc, as T.C.M. was more concerned with its progress as a whole; the shells, however, provided an interesting study. An unborn specimen, removed on December 3, had a white delicate shell with few teeth on the inner lip, and a suggestion of brown marking along the back upper part of the body whorl, near the outer lip. At one day old the shell differs only in being slightly larger, and at a week old it remains practically the same size, but the brown blotching is heavier; with slight increase in growth, a pinker tinge appears over the shell, especially on the spire, and brown blotching with wavy brown lines between, extending over half the back of the body whorl, is apparent at two weeks old. A brown blotch appears for the first time on the front upper part of the body whorl at four weeks; also, two spines on the suture of this whorl have developed. At six weeks these spines become stronger, and the ridge bearing them, as well as the future spines, commences to develop.

Three well-formed spines and the commencement of two others, were characteristic of the shell at eight and ten weeks. When twelve weeks of age, the shells showed stronger spines, and their markings had extended over the whole of the back of the body whorl, confined approximately to an upper and lower row of separated blotches, united longitudinally by fine, wavy brown lines.

The next stage considered by T.C.M. was at six months. By this time the young Baler had a strong, well-formed shell, with a marked increase in length, confined principally to the body whorl. The polish within the mouth and on the columella, which had gradually developed over the previous stages, was now quite high. At eight months of age the shell was a fraction larger and the body whorl had increased in width. By this time it was quite a handsome, well-developed, little shell.

A surprising factor noticed in the development of the shell was the comparatively small increase in the size of the spire throughout these stages, the main alteration being associated with strengthening, and change of colour from white to pinky-yellow. In fact at eight months of age the spire approaches practically the same size as that of the parent, in which, of course, it is sunk well below the level of the spines. The extensive growth-increase is exhibited throughout in the body-

whorl, as will be seen in the following table of measurement. Whereas the spire alters only by one to four millimeters, the body whorl shows an increase up to 15 mm.:

Age	Measurements of shell	
	Total	Spire
Unborn	26 mm. long	3 mm. high
	10 " broad	9 " broad
1 day	26 mm. x 16 mm.	3 mm. x 9 mm.
1 week	27 " x 17 "	3 " x 10 "
2 weeks	29 " x 17 "	4 " x 10 "
4 weeks	32 " x 20 "	4 " x 10 "
6 weeks	33 " x 21 "	5 " x 11 "
8 weeks	33 " x 21 "	5 " x 11 "
10 weeks	34 " x 21 "	5 " x 11 "
12 weeks	34 " x 22 "	5 " x 11 "
6 months	37 " x 22 "	5 " x 12 "
8 months	39 " x 24 "	5 " x 13 "

As observations similar to the above have not been recorded previously, it is impossible to say whether the rate of growth was absolutely normal, or was retarded somewhat through being subjected to aquarium conditions. Five sets of growth stages conformed to approximately the same rate of growth, and the specimens throughout did not give the impression of being weaklings. If this rate can be accepted as normal, then to reach the size of an average adult shell (like the parent of these young Balers) would, it is imagined, take at least five to seven years, or even longer, and normal growth, other than the increased thickness which develops with age in all shells, might continue for some time after maturity. This might account for the very large adult specimens of Balers sometimes found, which far exceed the measurements of an average adult. The parent shell in this investigation had the appearance of a specimen which could not be far past maturity. When he was forced to abandon the observations, T.C.M. killed both the parent and young.

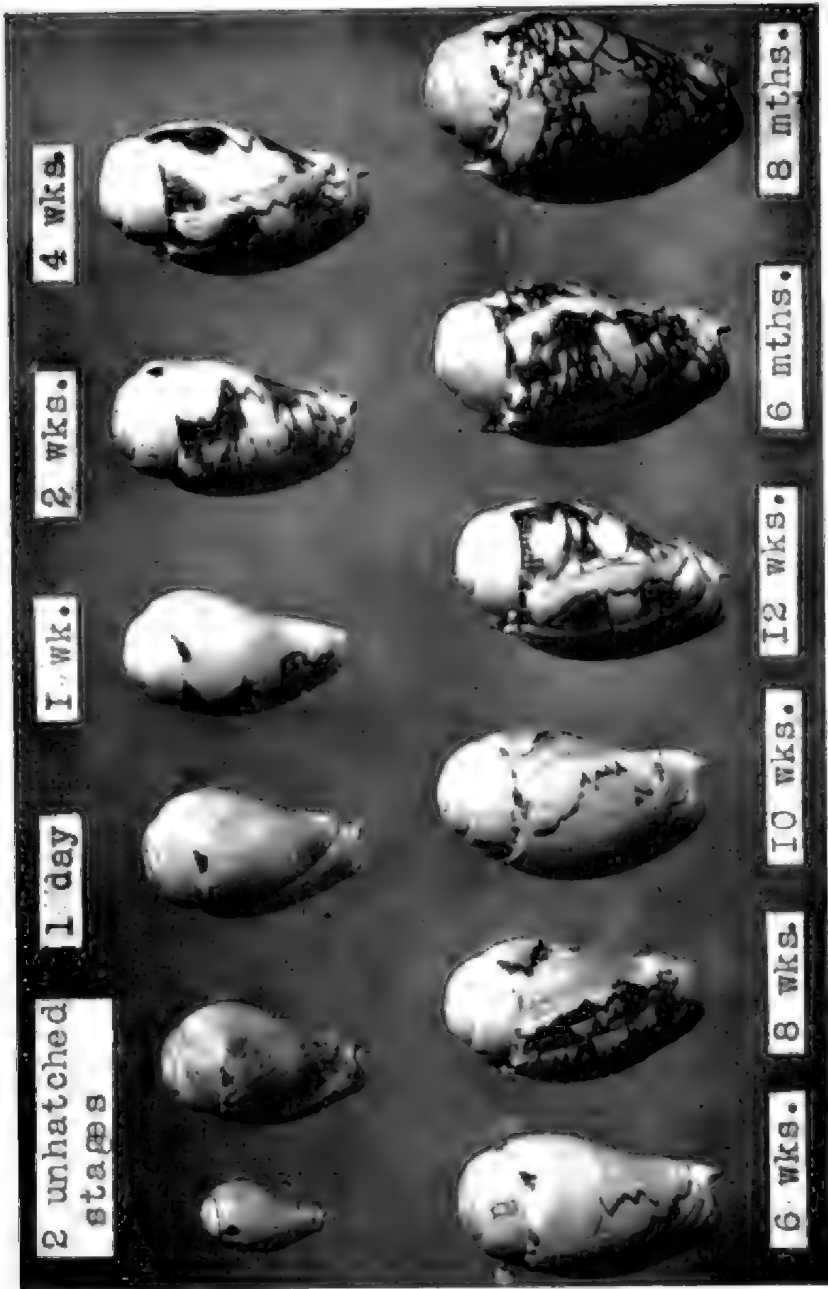
At the first opportunity, another attempt is to be made to rear young Balers, commencing from the time the parent first begins to breed, to a much more advanced growth than eight months. In this prospective project, it may be possible to elucidate several points, such as:—

1. The age at which the parent reaches maturity.
2. Breeding habits.
3. Stage, if any, when growth of young may be rapid.
4. The number of times a parent may breed in a year.
5. The possibility of a parent not surviving a breeding season, as is known to happen with some particular molluscs.
6. The corresponding development of the mollusc itself.



Growth stages of young Baler Shells, from unhatched to eight months. (M. G. S. 11)

PLATE XI



Back view of Plate X. Note development of spines round upper portion of body whorl, and expansion of colour markings.

SUMMARY

Observations on the laying of its egg-case by the Baler Shell, *Mela amblicata*, and the development of the young Balers Shells were made at Heron Island, Great Barrier Reef, Queensland.

Observations were carried on until the young Balers reached the age of eight months, when the work unfortunately had to be abandoned. The young Balers at that age were thriving well and there were indications that the work could have been carried on successfully.

Five sets of growth stages of the shells were kept, ranging from birth to eight months old. These show a marked similarity to one another, and a corresponding rate of growth in the various stages in each set.

The observations, though unfortunately abandoned, provide most interesting and useful information on the development of the shell characters to eight months, and provide a sound basis for future research.

It is proposed, at the first opportunity, to attempt the rearing of young Balers to several years of growth. Should this meet with success, it is hoped to clarify several doubtful points associated with breeding habits.

ACKNOWLEDGMENT

The authors are indebted to Mr. G. C. Clutton, Australian Museum, Sydney, for the preparation of the photographs illustrating this article. The photograph of the Baler mollusc laying its egg-case is from a negative belonging to T. C. Middleton.

A PLANT ODDITY

I have been interested in green peas which, after storage for several days in a closed jar at about 10°C., have germinated. Growth has continued at this relatively low temperature during several weeks, even though the jar has been almost continuously in the dark. The rate of growth, though at first quite rapid, slows down after about one month. Although the occurrence appears to be unusual, it is actually common enough in Nature, since many plants germinate very well during a cold spell or following a series of frosts, the cold apparently providing the requisite stimulus.

J. R. GARNET.

THE "RAAF-BIRD"

"Can you tell me," a reader asks, "what is a 'Raaf-bird'? I'm not trying to be funny, and don't really mean a member of the R.A.A.F. The fact is, a largish bird in New Guinea is always known as the 'Raaf,' and none of us knows what it really is and how it got its name." This question having been submitted to the office naturalist, he produced the odd scrap of information that "Raaf" is the Dutch name for the raven. He added that he had never known the name to be applied to any bird in this part of the world, and he had no idea how a New Guinea bird acquired it. So there you are—the Dutch, with the aid of the raven, have beaten the Royal Australian Air Force to the use of the picturesque word, "Raaf."—"Rouseabout," in the *Melbourne Herald*.

DEATH OF DR. GEORGINA SWEET

Dr Georgina Sweet, a distinguished scientist and member of the Victorian Field Naturalists' Club for many years, died in Melbourne on January 2, in her 71st year. A sketch of her career will be published later.

NEW BEES AND WASPS -- Part I

Notes on the Biology of *Exoneura*, with a Specific Description

By CHARLTON RAYMENT, Melbourne.

Introduction

In this paper the author presents the first accounts of the remarkable habits of two bees and two wasps in very divergent genera. These records are due to the unstinted collaboration of enthusiastic collectors, whose carefully recorded observations are a real contribution to our knowledge of the native species, and indicate a field that may be cultivated with profit and pleasure by amateurs who seek the True and the Beautiful in Nature. The author studied the *Cerceris* wasp while engaged on a "Critical Revision" of an entirely different family (1941), which work was assisted by a small grant from the Commonwealth Endowment Fund for Scientific and Industrial Research.

Bees with a Communal Cradle

Doctor Hans Brauns (1926), in South Africa, was the first to investigate scientifically the biology of the *Allodape* of that country, and his observations revealed the extraordinary life-history of these small bees. He found that one group has a "communal cradle," that is, a number of eggs are laid together, not in separate cells, as is the rule for almost all bees; the older larvae moved nearer to the front, with the pupae nearest to the entrance. He found, too, that the larvae of this group possessed a pair of fleshy appendages on the incipient thoracic segments, and with these they held the pollen-pudding to the mandibles as they ate the food.

Australia has three genera related to *Allodape*, but Professor Cockerell (1934) separated the Australian *Allodapes*, placing them in the genus *Allodapula*. The larvae of typical *Allodape* are said to lack the fleshy appendages of *Allodapula*, and, generally, the latter have simple trochanters on the hind legs, while those of the former are dentate. All are dwellers in plant-tubes. The other genera are *Exoneura* and *Neoceratina*. The author has nests of all three, but hitherto had been unsuccessful in obtaining either eggs, larvae or pupae of any species; consequently, the early stages of the life-history were quite unknown.

For several years I have been receiving fine collections of insects from Alex. Holmes, of Wollahra, N.S.W., who has been very successful indeed in the Como and Heathcote districts, both of which are adjacent to the Georges River, thirty or so miles south of Sydney. Among the many *Exoneura* received from him is a new species, close to *E. perpensa* Cldl., for which

I propose the name *holmesi*, and append a description of the type and the allotype.

Perhaps the most satisfactory feature is his discovery of both sexes, with eggs and a larva, in a gallery in a branch of a *Banksia* shrub. This observer captured the bees, and at once placed the eggs and larva in a formalin solution before posting them, and his careful work has supplied me with the essential material for this short biological survey.

The material arrived in excellent condition, and I was able to study the eggs and larvae as well as the sexes. Professor Cockerell had only the male of *E. perpensa*, but recently the author received a nest-series from John Hardcastle, Macpherson Range, and the specific description of the allotype is included. I was very fortunate to have nest-series of these two species, otherwise it would have been difficult to associate the sexes correctly, so alike are the two females.

The eggs are white and slightly hewed, the cephalic pole being little if any larger than the caudal pole—most other eggs of the *Apidae* are largest at the former end. They measured 2.1 mm. in length, with a diameter of .5 mm.; a very large egg for such a small bee, but it is known that the eggs of certain species do increase in size after being deposited. The time taken to hatch has not been determined, but there was no food whatever about either the eggs or the larva, and it is permissible to assume that the female was feeding the young since it appeared to be about fifty hours old. The eggs have an exceedingly delicate hexagonal sculpture.

Three eggs were laid "criss-cross" in the base of the common gallery, and two females were giving the young "some attention." Of three vigorous bees captured as they were departing from the nest one proved to be a male; the sex of the two that escaped was not known. The presence of the eggs and the larva preclude one from assuming that the series of imagines had only just emerged from their natal chambers. Moreover, other nests in the collection of the author reveal the remnants of empty silvery larval skins from which the adults had emerged.

We may say, then, that a truly communal cradle is used by these bees, but we do not know for certain whether or not one female—or several—deposits the eggs, though it is clearly demonstrated that two females were attending to the young in a common chamber. It would seem that several females had contributed the eggs.

The utter absence of food in the cells appears to indicate that the very young are fed by the mothers with a predigested pap analogous to the "royal jelly" of the bee-hive, and which is fed after the larva hatches from the egg. This is in sharp contrast

to the habit of almost all other genera of wild bees where the complete pollen-pudding is supplied *before* the egg is deposited. I believe that this evidence almost completely establishes "progressive feeding" of the larvae, at least during the early stages.

Field Observations

In a letter to the author, Mr. Holmes detailed the circumstances in which he found the nidus:—

"On December 15, 1940, while walking along Uoola Creek, in the National Park, Heathcote, Waterfall District, I noticed a small, red-bodied bee enter a hole in a dead limb of a *Banksia serrata*, and counted five bees coming out of the same entrance; I captured three of them. The stick was about seven inches in diameter, and the wood was quite firm, though *Banksia* has a rather soft structure, as you know. I think the gallery had been bored by some other insect, probably a beetle. I followed the gallery in with my pocket-knife, and about the middle, found a bee giving a young larva some sort of attention. I took this bee, and then transferred the white larva to the preservative in a test-tube.

"The bee attending to the larva was facing the interior when I opened the gallery, but when disturbed, compressed her body into a sphere, and turned completely over, even though the diameter of the gallery was less than the length of the bee's body; she then flew out of the entrance.

"I continued to follow the bore, and near the extreme end found a second bee attending to three small white eggs, laid just criss-cross. I lifted these also into the formalin. There were no chambers, and certainly no cell-divisions of any kind, although my cutting was not altogether good owing to the circumstances, but I would have found any obstructions in the gallery.

"The entrance was on the under side of the dry limb, and the gallery went in almost vertically for about an inch, and then turned, and sloped sharply down into the heart of the wood for about three inches; the entire bore being nearly five inches in length, with a diameter of a trifle less than one-eighth of an inch. I have packed all the material in cotton-wool, and trust you will receive it in good order."

Brauns found that the larvae of his species of *Allodape* possessed distinctive fleshy appendages on the anterior segments; these were used to grasp the pollen-pudding while the creature fed itself, and he gives a sketch of the processes. Microscopical studies of the larva of *Exoneura holmesi* reveal similar structures, and the majority of the segments exhibit small lateral processes that certainly could retain a hold on a wall, or keep a spherical ball in a convenient position on the curved ventral surface. Since the author has taken many hundreds of *Exoneura* in the field carrying a load of honey and pollen, it will be demonstrated later that the pudding is supplied to larvae of all ages until the mesenteron is full.

Brauns said all the females of his African species take part in the feeding until they are impregnated, after which they construct their own "nests." He also observed that the males

returned at night for shelter, and thus crowded the plant-tubes. The fact that a male emerged from the Heathcote nest would appear to indicate habits parallel with those of the South African *Allodape*. He concludes that the bees of this family exhibit a transitional stage from purely individual effort to active social co-operation, and my studies certainly confirm Brauns' conclusions.

Conclusion

These observations definitely link the habits of African *Allodape* with those of Australian *Exoneura* in the family CERATINIDAE, which includes the Australian genus, *Neoceratina*; but, unfortunately, the early stages of the larvae of the latter are unknown. They are small bees, rarely exceeding 6 mm. in length, and few people have observed such trifling honey-gatherers.

The first "nest" of *Allodapula* was received from John Hardcastle (1935), and he also sent *Exoneura* "nests," while the first nidus of another *Exoneura* came from R. Willey (1935), Woy Woy, N.S.W. *Neoceratina* was discovered by Phillip Whiteley (1935), now of Orange, but sometime of Marrickville, near Sydney. No wood-pulp cell-divisions, pollen-puddings, eggs, or larvae were found in any of these, but the imagines were all in contiguous positions, neatly arranged along the gallery.

The communal cradle approaches the habit of the bumble-bee, which feeds several larvae on the one pollen-pudding during the earliest stages, but *Exoneura* is evidently much more advanced, since it apparently practises "progressive feeding" after the manner of the highly developed hive-bee.

It is to be regretted that such a remarkable phenomenon has received so little attention. Surely any evidence bearing on the evolution of this social state is full of interest for all mankind.

SPECIFIC DESCRIPTION

Supertfamily: APOIDEA; Family: CERATINIDAE.

EXONEURA HOLMESI, sp. nov.

This is very close indeed to *E. perpensa* Ckll., which has been known hitherto only in the male, but now both sexes in a nest are to hand from the New South Wales-Queensland border. Because of the likeness, it is considered advisable to describe the new species by comparison. The new species is dedicated to the collector.

E. holmesi

E. perpensa Ckll.

TYPE: Male—Length 5 mm.
approx

Male—Length 6 mm. approx.

Clypeal Mark

An ivory I; with hooked extensions above. Ivory, widest at base.

Hair of clypeus long and pale. Hair of clypeus long and black

Scape

Quite naked. Much long black hair.

Anterior Orbital Margins

Diverge below; Converge below.

Mesothoracic Disc

Long pale-yellow hair. Long pale-yellow hair.

Tergites Red

1 and 2 black, with much long pale-yellow hair. 1 and 2 black, and almost naked.

Legs

Red, more or less black on femora, coxae black. Red, more or less black on femora, coxae black.

Wings

Dark; nervures and pterostigma blackish. Pale-yellowish; nervures and pterostigma clear ferruginous.

ALLOTYPE: Female—Length
6 mm. approx.

ALLOTYPE: Female—Length
6 mm. approx.

Clypeal Mark

An ivory T, extensions hooked above. A stripe, reddish, subobsolete.

Labrum

Black. Reddish.

Scape

Ferruginous stripe on front. Dark.

Anterior Orbital Margins

Parallel. Converge below.

Genae

Narrower than eye. Wider than eye.

Tergites

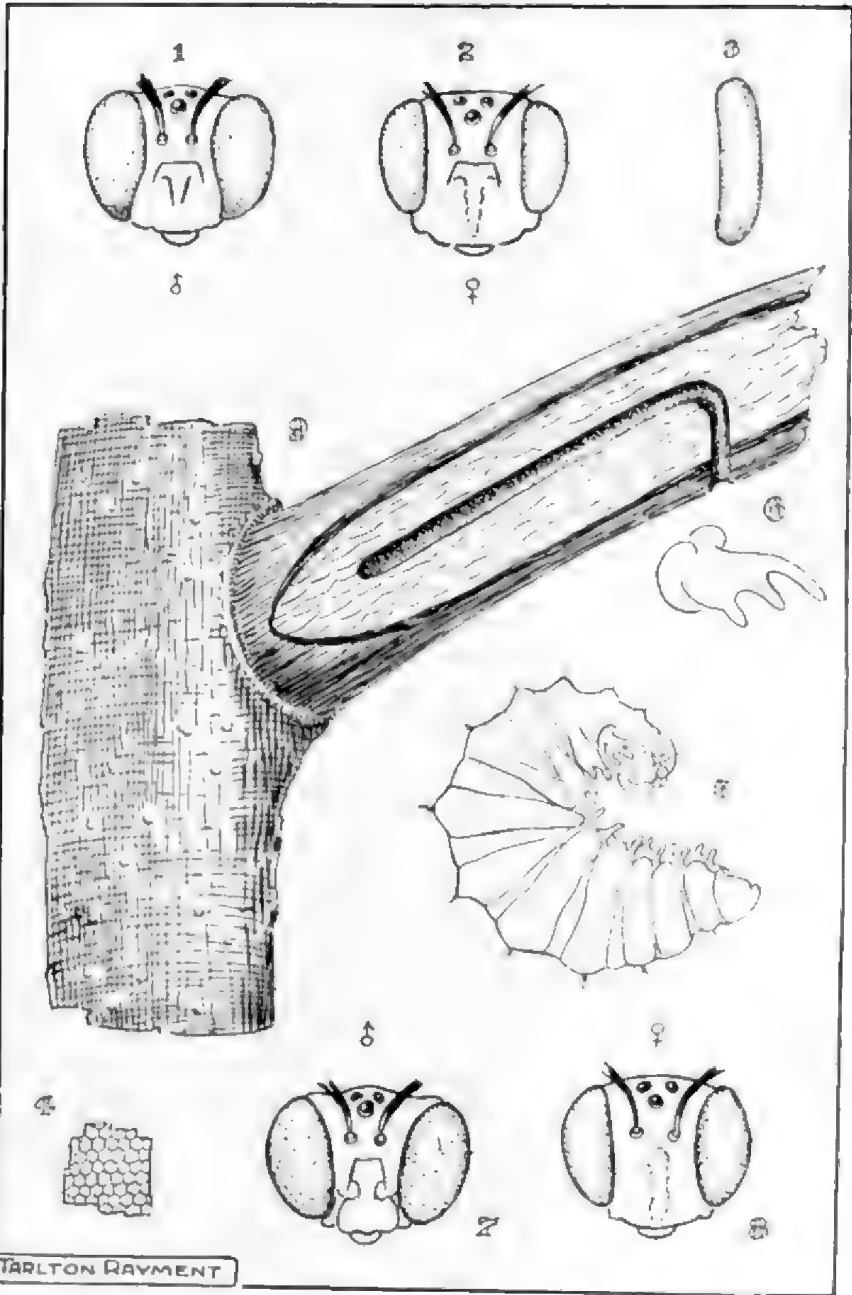
Red, dusky only apically. Small black patches on 1 and 2, 4 and 5.

Wings

Basal nervure far short of nervulus. Basal near to nervulus.
Nervures and pterostigma blackish. Light ferruginous.

Locality

Heathcote, N.S.W., Dec. 12, 1940. Alex. Holmes.
On flowers of *Leptospermum arachnoideum*.
White Swamp, N.S.W., Feb. 10, 1940. John Hardcastle, Junr.
On flowers of *Lomatia* sp.



Exoneura holmesi (new species)

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 1934—*Ann. Mag. Nat. Hist.*, p. 220, Aug.
 1935—Rayment; *A Cluster of Bees*, pp 472-486.
 1941—*A Critical Revision of the Zonata Group in the Genus Anthophora.*
 (Captured in Java, and now in the hands of the Japanese.)

KEY TO FIGURES

1. Front of head-capsule of male *Exoneura holmesi*, sp. nov. (Type).
2. Front of head-capsule of female (Allotype); hair and flagellum omitted.
3. Egg of the species.
4. The chorion of the egg bears the delicate impress of the cells lining the ovarian tubules.
5. The larva showing the extraordinary appendages of the incipient thoracic segments.
6. Anterior appendage enlarged.
7. Front of head-capsule of male *Exoneura perpensa* Ckll.
8. Front of head-capsule of female (Allotype).
9. The communal gallery of *E. holmesi* in a *Banksia*.

A METHOD OF PREPARING SPIDERS FOR EXHIBITION

By A. P. and R. A. DUNN, Melbourne

Although the majority of writers merely state that spiders should be preserved in alcohol, the following method of preparing them for exhibition purposes has been used by us with fairly good results, and, judging by the interest aroused at a recent exhibition, may prove to be of some interest to students.

After being killed with chloroform fumes, the spider is fixed, for which a formula recommended by Petrankevitch (1933, *Trans. Conn. Acad.*, xxxi, p. 307) has proved quite successful. After fixing and washing in three or four changes of 70 per cent. alcohol, the spider is laid out and lashed to a thin sheet of tin in the required position, which should be as close as possible to the natural attitude assumed by the spider. In this respect, it may be necessary to study the spider for some time when alive. The tin on which the spider is tied is then placed in full-strength methylated spirit, the clear industrial spirit being preferable to the violet commercial type.

In about two days it will be found that the spider has hardened sufficiently, and it is removed, washed in 70 per cent. alcohol, and tied to celluloid, or glass, with hair passing through two holes in the celluloid and across the cephalothorax between the second and third pairs of legs. The specimen may then be placed in 70 per cent. alcohol and sealed in a specimen-tube or other container. If a cork is used it is advisable to first dip the cork in molten paraffin wax, as alcohol reacts on the tannic acid of cork and will deposit a black sludge over the specimen and at the bottom of the tube.

Sometimes the freshly-killed specimen may be tied to the tin and placed directly in methylated spirit, but often the spirit causes the abdomen to shrink, and so ruins the specimen for purposes of comparative study. Moreover, it is necessary to point out that the shrinking action of the methylated spirit makes its use inadvisable in any case where the specimen may ultimately be required for a study of the internal anatomy, and so the method described above should be used, as stated, only for exhibition purposes.

ON KEEPING NEWTS AND SALAMANDERS

By H. W. DAVEY, Melbourne

A few years ago it was my privilege to possess as fine a collection of living amphibians as any to be seen in Australia, and in this connection I have largely to thank Mr. Norman McCance (now of the Melbourne *Herald* staff). Together we imported from Europe, America and other regions (often at considerable expense and many disappointments) various species of amphibia.

Most people have kept pets of some kind, but in many cases the interest has waned from lack of knowledge, the pets having failed to receive those proper living conditions necessary to keep them in good health. In this paper I purpose to show how amphibians can be maintained in health, and thus afford pleasure to those keeping them.

If any kind of animal is forced to endure uncongenial living conditions, it becomes a different being from one that is well fed and contented. A newt, for instance, when living under adverse conditions, soon becomes quite an uninteresting creature; yet the same newt, given a congenial environment, becomes a creature of great beauty and interest to the observer. Few naturalists are quite sure what newts are, and where they belong in the animal kingdom, so perhaps I may be forgiven for stating that, along with frogs, toads and *Cacilia*, they comprise the class *Amphibia*.

Among vertebrate animals, *Amphibia* is an early class in the evolutionary time-scale, like fishes and reptiles; its important distinguishing feature is the kind of metamorphosis that takes place after birth. The great majority of amphibians commence life as gill-breathing larvæ, the gills being later replaced by lungs; but there are exceptions, some forms retaining their gills throughout life, such as, for example, the *Proteus* of Europe and the *Sirenidae* of America. The young newt develops legs in a manner somewhat similar to that of a frog tadpole, but differs from the latter in that its *front* legs are always the first to appear.

When I first began to keep newts in Australia, I was surprised to notice how much better they thrived here than those I had kept in England, the reason being simply a matter of water. The water supplied in London for domestic purposes is much harder than that in Melbourne and, owing to the extreme sensitiveness of a newt's skin, hard water is very distasteful to it—even with the almost neutral water of Melbourne, newts cast their skins nearly every time the water is changed in their tank or bowl. This excessive skin-shedding has a pronounced weakening effect, therefore the water should be changed as little

as possible. It may be mentioned here that no amphibian drinks by its mouth, its water requirements being absorbed through the skin, showing that, in nature, these creatures live where water is readily available. Toads as a rule favor dry situations, but, as they also must have moisture, a saucer of water should always be provided for captive specimens, so that they can sit therein and absorb water like a sponge.

It has been claimed that newts in captivity should be supplied with an island of wood or cork on which they can crawl and bask in the sun, but if newts ever avail themselves of such islands it merely goes to show that they are not happy with their surroundings: newts do not enjoy basking in the sun as do many frogs. Of course, during very cold weather some species naturally leave the water to hide away for winter hibernation.

All amphibians, so far as I know, will live for many years in captivity, provided the living conditions are good. On one occasion I gave my friend, Mr. McCance, a female Japanese newt that had been in one of my tanks for 25 years, and he kept this same newt for another ten years. At the beginning of her 35 years' captivity the little amphibian was fully matured and of uncertain age.

Newts very seldom leave the water during warm weather, except in the case of rain falling, when at once they have an irresistible urge to roam. This, of course, aids the distribution of species, as newts dare not travel during dry weather—they would probably dry up and perish before reaching water or a moist retreat.

The most beautiful newt I have seen is the Marbled, *Molge marmorata*, which inhabits Southern France, Spain and Portugal, and grows to a length of 6 inches. Its general color is of a lovely oak green, covered with small jet-black markings. The crest of the male is ornamented with black and white vertical bands, while the female, in lieu of a dorsal crest, has a lovely carmine streak running down the centre of her back. The sides of the tail are, in both sexes, ornamented with a silver stripe, this becoming especially pronounced in the male during the breeding season. The toes of both sexes are green, banded with black. It was a pleasure indeed to succeed in breeding this handsome species in Melbourne.

When the young were about 4 inches long I had the misfortune to learn, on returning from a holiday trip to Papua, that most of them had escaped. It happened this way: Before going north, I had put these newts into a small enclosure around two cement ponds. The enclosure was of galvanised iron sunk into the ground for six inches and turned well over and inwards at the top, so that it was absolutely impossible for any newt

to climb out. Tadpoles of the bull frog, *Lymnodynastes dar-
salis*, having grown too large to be eaten by newts during the
previous season, had metamorphosed into frogs and then bur-
rowed deeply into the ground (as these frogs invariably do
during the summer months). Having burrowed down below
the iron, they had come to the ground surface outside the
enclosure, so allowing the young Marbled newts to escape by
means of these burrows. I feel certain they escaped in this
way, and were not stolen, because I found one of the newts
inside the cover of a water meter. It was the only one I found,
the others in all probability having dried up and perished.

Another splendid newt, especially in the breeding season, is
the Alpine, *Molge alpestris*, hailing from Belgium, Germany,
Switzerland, and Austria. A small species, growing to about
4 inches long, the color of its upper parts varies from brown
to purple; the sides exhibit a series of small black spots on a
whitish ground, beneath which, in the male, runs a sky-blue
band. The crest on the back and tail is low and nearly white,
with small round black spots; the throat is dotted black, while
the belly is tinted a uniform red or orange. I was also successful
in breeding this newt in an aquarium.

Following is a list of newts the writer has kept in Melbourne,
those species that he has bred being marked with an asterisk:—

* *Molge cristata*, Gray (England and Northern Europe), *M.
blasii*, Gray (probable hybrid between *cristata* and *marmorata*),
* *M. marmorata*, Gray (Southern Europe), * *M. alpestris*, Gray
(Northern Europe), *M. vittata*, Gray (Asia Minor, Syria),
* *M. vulgaris*, Gray (England), *M. vulgaris*, variety *meridionalis*
(close to *palmata*), * *M. palmata*, Gray (England and Northern
Europe), * *M. pyrhogastro*, Gray (Japan and China), *M. torosa*,
Gray (United States of America), * *M. waltii* (Spain and Por-
tugal), * *M. sinensis* (China).

In addition to the above species, the axolotls, native of Mexico,
bred very freely in aquaria, always providing they were well
fed and had plenty of aquatic plants for shelter. Axolotls are
very interesting from the fact that they usually spend *all* their
lives in the larvae condition and breed freely without really
growing to the adult stage. Occasionally some will metamorphose
and lose their gills, but this very seldom takes place when living
under best conditions, and never did with any of mine.

A remarkable little salamander, *Salamandra maculosa*, is beau-
tifully marked in black and yellow, and is a land species. It
only enters the shallow edges of water in which to deposit its
young, for it is viviparous. The larvae are comparatively large
in size, being well grown tadpoles with 4 legs. I well remember
the pleasant surprise I once had in England upon finding 17

larvae, deposited during the night in an earthenware saucer by the mother salamander. Mr. McCance had this species which he kindly lent to me for exhibition at one of the Club's Nature Shows. It has a cylindrical tail and is thus quite unfitted for an aquatic life.

The writer dealt more fully with breeding habits, reproduction of limbs, etc., in *Victorian Naturalist*, Vol. 29, p. 190, 1913 ("Breeding of English Newts in Victoria"), also Vol. 31, p. 135, 1915 ("Notes on English and Japanese Newts").

AN ENTERPRISING ORCHID

I was very interested in Mr. Tadgell's notes on the orchid *Epidendrum* \times *O'Brienanum* in the January *Naturalist*. In the *Australian Orchid Review* for March, 1943, p. 14, I called attention to the origin of the plant. It is a hybrid raised by the late Mr. Soden in Veitch's famous English nurseries, in the 1820's. The parents were *E. radicans* of Guatemala and *E. evectum* of New Granada. The hybrid was described and figured by R. A. Rolfe in the *Gardener's Chronicle*, III, s. 3 (1888), p. 770.

If ever a hybrid can be exalted to the status of a species, the honour should be granted to this fascinating orchid. It produces seed most abundantly, and reproduces itself in kind. In my Sydney suburban garden it is almost a weed, albeit a much-appreciated one. It produces young aerial plants literally by the hundred; it flowers the whole year round without a break; two out of three racemes develop from two to seven plump capsules of seed. From the tangled "forest" of plants outside the north side of my hush-house, seedling plants have appeared in several of the pots of plants inside. The *Epidendrum* itself I never grow inside. In this climate all it asks for is plenty of sun and plenty of water—the soil does not matter. It can, however, have too much sun. The fierce heat-wave which afflicted Sydney a few weeks ago (January) scorched the leaves badly on some of my plants close to exposed rock-surfaces. Nevertheless, the plants appear to be quickly recovering, and they have not stopped flowering. The flowers last well in water.

Notwithstanding the abundance of seed-capsules, I have failed to discover the pollinating agent for *E. O'Brienanum*. I am wondering whether nocturnal insects are responsible. Ants often visit the racemes, but I have not detected them doing anything which might effect pollination, and though I suspect they are up to no good, I cannot prove it—the plants are perfectly free of scale and smut.

If any of your readers want plants, I shall be glad to hear from them. I dislike the idea of throwing orchids away, but we have plants of *E. O'Brienanum* in every corner of our extensive hillside garden where we can find room for them, and every plant is producing youngsters at a rate that will soon put us in a quandary.

Northbridge, N.S.W.

H. M. R. RUEB.

"CYLCONS," NOT "CYCLONS"

In Mr. S. R. Mitchell's ethnological article in the last issue of the *Vic. Nat.*, "cyclon" was inadvertently used instead of "cylon." The word is, of course, an abbreviation of the term "cylindro-conical."

THE LATE CHARLES C. BRITTLEBANK

By E. E. PESCOTT, Melbourne

Charles Clifton Brittlebank, who passed away on 2nd November last at the age of 83 years, was little known to the present generation; but to his confrères, and earlier members of the Field Naturalists' Club, he was considered one of the most versatile and knowledgeable men of science thirty years ago.

The young Mr. Brittlebank came from Winster in Derbyshire in 1875 with his parents and brother, who settled in the New Hebrides as planters. After a period of two years there, the family moved first to Queensland and then to Tasmania. Later they settled at Spring Vale, and finally in the Pentland Hills near Bacchus Marsh (1893), carrying on chiefly the work of a dairy farm.

From early boyhood Brittlebank was drawn to natural history, his chief interests being geology and ornithology.

In the Pentland Hills district, his farm overlooked the famous Werribee Gorge, and there was much in the home district to keep him busy with his two hobbies. He was by no means conservative in his tastes and all nature was fish for his net, so that interest extended to botany and entomology as well.

It was inevitable that he should find congenial companionship among members of this Club, C. French senior and junior, D. McAlpine, A. J. Campbell, George Sweet, Professors Gregory and Skeats being among his chief friends. These and others were always made welcome at the "Dunbar" farm, which home became the centre for Werribee Gorge explorations. In the 90's Brittlebank had become a Club member.

He was not only gifted with a facile pen, but his water-colour drawings of natural history subjects were remarkable: for beauty of delineation and

accuracy of detail his work became world-famous. He first commanded notice as an illustrator through a water-colour drawing of an ichneumon. This painting was exhibited at the Club, and Charles French, senior, at once engaged him to do the drawings for his coming work.

In 1891 his first coloured illustrations were reproduced in volume 1 of French's *Destructive Insects of Victoria*. The work was continued until volume v was issued in 1911. Plates for vol. vi were prepared, but the volume was not issued, for reasons of economy. These drawings (more than 100) were remarkably accurate; they remain as good reference illustrations for to-day. Also included in the volumes were a number of plates of insectivorous birds.

As a token of appreciation for his friend, the senior French, first Government Entomologist, and founder of this Club, Brittlebank prepared a large series of water-colour drawings, featuring every beetle that had been scientifically named after French. These framed drawings, which cover seven large sheets of drawing paper, came into the possession of C. French, junior, who had succeeded his father as Entomologist, and who later succeeded his friend Brittlebank as Biologist. Mr. French recently presented these beautiful delineations to the National Museum, where they will be exhibited as a permanent memorial to both men.

While at his farm Brittlebank began the study of ornithology, a pursuit



C. C. Brittlebank

that resulted in coloured drawings of the eggs of over 300 different Australian birds. These went to illustrate Campbell's *Nests and Eggs of Australian Birds*, 1900, and a coloured plate of the Rose-breasted Robin also appeared in the same volume.

It was in the late years of last century that Brittlebank made a discovery which immediately made him world-famous. Carrying out his geological studies at the Werridbee Gorge, about 1894, he was amazed to discover pebbles which were so striated as to afford evidence and proof of a former ice age in that district. Upon referring his discovery to Mr. George Sweet, the two made many and long visits to the ice-age areas, and the results of their work were presented to the Australian and New Zealand Association for the Advancement of Science, in a 14-page report to the meeting held at Adelaide, September, 1898. Professor David, Mr. E. J. Dunn, and others visited the Gorge, and letters poured in from scientists on the other side of the world.

In his "spare" time, the farmer-naturalist, while studying the work of the Mistletoe-bird, began to work out the life history of the mistletoe, *Loranthus esocarpi* Bchr. This research was published in *Proceedings of the Linnean Society of New South Wales* for 1908, with 6 plates of clever drawings, both natural-size and microscopic delineations.

About this time (in 1908), Mr. Daniel McAlpine, Plant Pathologist of the Department of Agriculture, induced Brittlebank to join him as an assistant. Thus began his studies in mycology, which also achieved world fame. His official collection of fungi became most extensive, and he began illustrating in colour McAlpine's works on mycology, as well as commencing work in micro-photography. There are dozens of coloured plates in the publications of McAlpine, and literally hundreds of wonderful micro-photographs. When McAlpine retired to take up his "Bittee Pit" investigation, Brittlebank took his place as Plant Pathologist (1913). At this time he was about 46 years of age. Since 45 years was the limit at which one could be made a permanent officer of the Public Service, the Commissioner reported that Mr. Brittlebank was too old for permanent appointment. Now, in his early days our scientist had been an amateur pugilist, and there is an uncensored story that he strongly suggested that the Commissioner should come down and "try out a few rounds" with him. He was made permanent!

Brittlebank's illustrations in the realm of mycology are found in nearly a dozen of McAlpine's works. A study of these, as well as his earlier ones, shows him to have been a most exacting artist. Much of the delicate work was done by the aid of a large hand-lens. In 1924 he became Biologist in charge of the Science Branch of the Department of Agriculture, a position of which he was very proud, and held office until 1928, when he retired full of honours.

A few years before his retirement he was invited to attend an International Congress of Plant pathologists at Washington, U.S.A., and also to work there on the flag smut of wheat. Although the invitation was likely to be honoured, some jealous official action prevented his going. In addition to other duties, Brittlebank was lecturer on the fungus diseases of fruit to students at the School of Horticulture, Burnley, and also on plant pathology to students at the School of Agriculture, Melbourne University, from 1923-28.

After his retirement he settled down to prepare, in a large folio book, a complete list of all records of Australian fungi and fungus diseases of plants, with a list of host plants and a record of the works in which these were recorded. At the same time he was retained by the Council for Scientific and Industrial Research to prepare an indexed record of this work, so that it should be permanently available to future students. This compilation occupied about 24 years, and the results are now held by the C.S. and I.R. Brittlebank then completed his large folio book of records and presented it to the Botany School of the Melbourne University.

He lived some years to enjoy a complete relaxation in his garden, and with his books and many hobbies. He always gave freely of his knowledge and never turned any away. His experience as a "man on the land" was of great value to growers of fruit and grain crops alike, and his opinion was eagerly sought by all.

The remains of this great yet modest man were interred in the Bacchus Marsh cemetery, not far from Werribee Gorge, where his discovery of the ice-age was made.

SOME BIRDS OF BENDIGO

Consequent upon adverse conditions over a number of years, coupled with the fact that the weather was now broken, members of the F.N.C. were resigned to a scanty bird-list during their visit to Bendigo on October 27-28, 1945. However, as the rain ceased on our arrival, and as excellent arrangements had been made by the local president (Mr. M. Cohn), the hon. secretary (Mr. Ipsen), and the Committee and members of the F.N.C. at Bendigo, we had after all a very pleasant time.

The first nest seen, at Diamond Hill, was a very pretty picture in Mr Eddy's garden of a Blue Wren in a pink-flowering ivy-geranium on a tree-stump. Just outside the garden fence in a tall eucalypt was the first highlight of the afternoon—a pair of Painted Honeyeaters were seen to change over on their delicate, cup-shaped nest, which was gracefully swinging at the tip of a high branch. Later in the afternoon we saw another nest of this Honeyeater, and again watched with interest the male and female change places on the nest. Mistletoe-birds were numerous; four nests at least were seen in situations less than 12 feet up. These nests were all constructed of sheepswool and decorated with the brown larvae of beetles. It seems due to the lack or paucity of vegetable material usually used in their nest construction that the birds have found a substitute in wool, the qualities of strength, lightness and warmth of this superb animal hair being excellent for their purpose and evidently in good supply.

The view of a pair of Tawny Frogmouths in a good position for observation, with two young emerging from the downy stage was much enjoyed. In much of this worked-out mining area, pitted with shafts and a great proportion of bare subsoil, it is surprising how many species of birds find a home. A small colony of Fairy Martins had 12 bottle-shaped nests on the ceiling of a small shaft. Several Red-tipped Pardalotes and a Sacred Kingfisher had built their tunnels near the top and on the sides of shafts. A Grey Shrike Thrush had a nest with young on a ledge 15 feet or more down a shaft, safe from cats and foxes.

In addition, two nests of the Yellow-tail Thornbill and a nest of the Black-faced Cuckoo-Shrike were seen. Of the two dozen species of birds recorded, half of them were nesting.

Before breakfast next morning, the hard-working president took Mr. Ray Littlejohns to Diamond Hill to photograph the Mistletoe-birds, and also showed his party the Black Honeyeaters. Other members visited the Look-out Tower in the gardens of the city, and were delighted, for here the scene resembled a huge aviary, the birds being so numerous and fearless. Most of the birds were feeding on the pink-and-white blossoms of the eucalypts, and included three of our smaller parrots—the Musk, Purple-crowned, and Little Lorikeets. Wattle-birds and White-plumed Honeyeaters were at the feast, but the Regent Honeyeaters outnumbered all other Honeyeaters. The Regent is a common bird in the city streets, and nests in the eucalypts.

The party to the Whipstick scrub was in charge of Mr. Cohn, and small groups were led by members of the Committee of the Bendigo Club. Here, the most sought-after bird was the rare Black Honeyeater, which is a bird of the inland of Australia, and only migratory to the south in certain seasons. The feeble, high-pitched call of this bird could be heard, but it was not numerous, and not many of us saw it.

Tawny-crowned Honeyeaters with nests and young in low situations, and the habit of the birds in perching on the tops of low bushes in the open was of great interest. The Purple-backed Wren with nest and eggs gave much pleasure to members who had not seen it before. Three Whistlers — the Golden, Rufous, and Gilbert — were seen, the two first-named having nests and eggs. It was very satisfying to see the Gilbert Whistler in this year of the 100th anniversary of the death of John Gilbert, the great bird-collector for John Gould.

The eggs and nest of a shy Ground-Wren, built of bark in a very exposed position, were given much attention. An Owllet Nightjar was flushed from its nest containing three white eggs. Two or three small parties of Budgerygahs made some lovely colour. Red-tailed Thornbills held pride of place amongst the small fry, and a Blue-faced Honeyeater was reported. On the return to Bendigo, Mr. Cohn and party saw some Rainhow-birds, and shortly afterwards eight Galahs flew over the cars.

It would be hard to choose the most interesting of all birds seen at Bendigo. I must leave that to the particular fancies of the participants. The total number-listed was 70.

M. L. WIGAN.

NUTRITION OF *DIPODIUM*

A note on this subject by Mr. R. H. Croll, in *Wild Life* for January indicates that the facts are not so widely known as their interest warrants.

The Hyacinth Orchid (*Dipodium*) is not, to my knowledge, found away from eucalypts. Invariably, in cases I have examined, the rhizome, or whatever it may be, is closely associated with eucalypt roots. But it will also be noticed that a mass of fine white threads enfolds both root and orchid. This is a very interesting case of symbiosis of three plants. The gum-tree has finished with the fibrous outer portion of the root. It is dead. The fungus mycelium breaks down the food material for its own use, and is able to pass some on for the orchid.

The last has not been heard of these symbiotic fungi. In some cases they are said to be necessary to certain orchids for germination or for survival immediately after germination. *Epacris* will not grow from seed without fungal assistance. Fungus mycelium has frequently been observed in association with germinating grass-seeds; but the question of assistance or even tolerance does not seem to have been worked out.

A. J. SWABY.

TAME-WILD BIRDS

"You would be amused if you were here," says Miss Florence Irby, of Casino (N.S.W.), in a letter to the Editor. "Black-faced butcher-birds, blue-faced honeyeaters, grey butcher-birds, and soldier-birds (noisy miners), all come to eat out of our hands. They sit on the window-sills and fly into the pantry. This morning my mother returned from the verandah to the house for crumbs because a bird had flown on to her knee while she was reading. And a day or two ago a niece from Sydney, who had been lying on a couch outside, called for bread because the birds were so hungry that they were sitting all over her, and 'their little tummies were going in and out.'"

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PROCEEDINGS

The monthly meeting of the Club was held on February 11, 1946, at the Lecture Hall of the Public Library, the President (Mr. H. C. E. Stewart) and about 150 members and friends attending. The President extended a welcome to the many visitors.

Excursion reports were given as follow: Footscray Gardens, Mr. H. P. Dickins (for Mr. W. H. Nicholls); Aquarium, Mr. P. F. Morris.

The following were elected as Ordinary Members of the Club: Misses Corill R. Fletcher, Lola V. Gent, June Elliott, Denise Frielser, Mr. John Sinclair; and as Country Member, Mr. J. W. Glover.

The first meeting of the Geological Discussion Group was reported on by the Hon. Secretary, Mr. A. A. Baker, who stated that 27 members were present. The programme for the evening was a lecture (the first of a series) on "Introductory Geology," by Mr. Elford, a lecturette on "Geological collections and how they should be looked after," by Mr. F. S. Colliver, and exhibition of specimens.

The Hon. Secretary reported that so far returns of the questionnaire to members had been disappointing; only 90 had been returned whilst over 600 had been sent out. It was proposed to hold a special committee meeting to deal with the suggestions given, and it seemed possible that some change in the procedure of meetings would take place.

Mr. A. D. Hardy gave a brief report from the Save the Forests Campaign regarding cattle leases on Mount Buffalo. It was hoped that these would not be renewed this year.

GENERAL

Mr. J. Ros Garnet stated that a bush of *Olearia*, grown from a cutting and now two years old, was in flower. This plant is usually a spring-flowering type.

Miss R. S. Chisholm asked if it were true that a spring existed near the Shrine of Remembrance. Mr. Colliver replied that he thought Mr. C. French had once mentioned having used water from this particular spring for making billy tea, but it was only a very small spring and would be of no use as an additional source of water for lawns in the area.

EVENING WITH SPIDERS

A Spider Symposium was given by Messrs. R. A. and A. P. Dunn. It was stated that some 1,500 species of spiders were to be found in Australia from a total of approximately 20,000 in the world, and in Victoria the only poisonous species was the well-known Red-back Spider. Information regarding the habits of various spiders was given and it was emphasized that life-histories of quite familiar forms were not yet known. Illustrations shown by the epidiascope were before members at relevant parts of the lecture, and sundry live specimens were exhibited.

Mr. A. J. Swaby asked for information about the Mouse Spider. Answer: The male has a red head, and the form known as the Mallee Mouse Spider is found all over Australia. It is chocolate-brown and hairy, with very long palpaes.

Question: How long do spiders live? Answer: Some have been kept three years in captivity and have gone 18 months without food. Possibly seven to ten years is the natural life-span. Mr. Colliver stated that a spider in Mrs. C. L. Barrett's bush-house has been there 15 years.

Mr. A. D. Hardy asked if Trapdoor Spiders sometimes make new lids for their holes. Answer: Yes, definitely. They sometimes enlarge the hole and the lid also and add a new hinge. If the spiders referred to were noted about Bendigo they were probably Wolf Spiders.

Mr. P. F. Morris asked if the Messrs. Dunn had ever noticed the Red-back Spider illuminate itself, as he had noted in his own garden recently. Answer: No.

Mr. H. C. E. Stewart asked how do spiders burrow. Answer: Wolf Spiders dig with their sharp fangs and carry the soil in the form of rolled balls upwards of 12 inches from the burrow. The methods used by some of the others spiders are not known.

Miss G. Neighbor: How many young do spiders have? (She had noted some pale small types in a burrow.) Answer: It depends on the spider, but the lecturers had noted a Trapdoor Spider with 59 young, all pale at the time, this paleness being due to recent moulting.

Mr. H. C. E. Stewart asked for information regarding the Fish-catching Spider. Answer: This is a large tropical form which sits on the top of a pool and dives on to any small fish which happens to come close. The fish is then brought to the bank and absorbed.

Mr. Garnet asked for information regarding the toxic effects of a bite from a large Huntsman Spider. Mr. Dunn said there would be a slight local reaction from the bite. Mr. P. C. Morrison stated that the effects of the bite from a large specimen of the Huntsman Spider, which had produced drops of blood from a thumb, were

no more than would be experienced from the prick of a needle. Mr. Dunn emphasized that the health of the person bitten would make a difference to the effects, and stated also that the bite differed from that of a snake in that it was not automatic. Spiders bite first, and by another set of muscles inject the poison later.

Mr. Colliver showed illustrations of two fossil spiders from the Tertiary limestone of Ulm in Germany. One of these was a perfect hollow cast, and the other a spider preserved as a mummy in a running position. The rock is the product of a thermal spring in an open cleft and as the water stood some 40-50 feet below the ground level the carbon dioxide gas from the spring filled the cleft and formed a natural gas trap for its victims. These two spiders are portion of a large fauna, including insects of many kinds, caterpillars, a swarm of honey bees, birds, bats and small mouse-like rodents that have been described from this deposit.

The appreciation of the Club was conveyed to the Messrs Dunn by acclamation.

EXHIBITS

Mrs. J. J. Freame: Medusoid jellyfish. Planula stage. (These attach themselves to a rock or weed and form a Strobila, like a pile of saucers, from the top of which individual saucers break off as young Medusae.)

Miss M. Wigan: Leafcurling Spider (*Phomognatha wagneri*) and Spiny Spider (*Gasteracantha minax*).

Mrs. Fenton Woodburn: Incised cylindro-conical stone from the Darling basin, N.S.W.; specimen 12 inches long by 3 inches thick.

Mrs. Paul Fisch: *Nicotiana suaveolens*, garden-grown from a small, rather withered plant collected at Werribee Gorge, Nov., 1945. Bush now over 3 feet in diameter, and has been blooming for weeks.

Mr. Chas Daley: Walking stick of Hazel (*Pomadouris apetala*) naturally groved by the constriction of the "Supple-jack." (Stick was cut at Ferntree Gully in 1879.)

Mr. A. N. Carter: *Lingula anatina*, a brachiopod from Bowen, Queensland, preserved in spirit and showing the pedicle and "anchor" by which it attaches itself deep down in the mud in which it lives.

Mr. H. C. E. Stewart: Wedge-leaf *Oschatzia* (*O. cuneifolia*), Thyme Mitrewort (*Mitrasacme scryphifolia*); Twin-flower Knawel (*Sceleranthus biflorus*); Alpine Everlasting (*Helichrysum Hookeri*); Mountain Plum-pine (*Podocarpus alpina*); also variegated foliaged form of Leafy Rossea (*Bossiaa foliosa*). All from Mount Buffalo. Also nest and egg of the Large-billed Scrub-wren (*Sericornis magnirostris*) from Mount Buffalo.

Mr. J. S. Seaton: *Beaufortia sparsa*, a West Australian species, garden-grown at Caulfield.

Mr. T. Griffiths: Golden-eyes of Green Lacewings (Fam. *Chrysopidae*, species *Chrysopa ramburi*) with eggs and young larva

Mr. H. P. Dickins: Etchings by the late C. C. Brittlebank

Mr. E. Swarbrick: Insects collected at Mount Buffalo.

Mr. F. S. Colliver: "Burrow" of Trapdoor Spider, collected at Broken Hill over 50 years ago.

CENTENARY OF THE MELBOURNE BOTANIC
GARDENS

By CHAS. DALEY, B.A., F.L.S., Melbourne.

Not long after the appointment of Charles Joseph La Trobe as Superintendent of the Port Phillip settlement on the Yarra River, following the example set some years before at Sydney of reserving an area as a site for a Botanic Garden, Mr La Trobe instructed Robert Hoddle, surveyor, to mark off a block of 50 to 60 acres at Batman's Hill for a Botanical Garden.

The block selected, including Batman's Hill, extended from the western side of Little Collins Street to the Yarra River and the verge of the Western Swamp. Beyond the survey, no further action was taken for a few years, when with rapid increase in Melbourne's population tending westward, and the growing need of increasing wharfage along the river front, it became evident that the retention of the reservation would be detrimental to the growth of the town. In consequence alternative sites for the garden were recommended, e.g., Richmond Paddock, Fitzroy Gardens and Flagstaff Hill.

A committee from the Town Council was appointed to make the selection: they recommended an area adjoining the Government Domain, with a verdant slope stretching down to the river, a position which Superintendent La Trobe had favourably regarded from his residence at Jolimont across the river. He cordially approved of the choice, and on March 1st, 1846, appointed John Arthur, a trained landscape gardener from Scotland, to be superintendent of the garden. Enclosing five acres near Anderson Street, sloping to the lagoon, Arthur planted flowers, shrubs, and trees. At his death in 1849 John Dallachy, also a Scotsman, who had been head gardener at the Earl of Aberdeen's famous garden, and also in the employ of Sir William Hooker at the Kew Gardens, was appointed in preference to the botanist Daniel Bunce, who was also an applicant.

Dallachy, with a letter of introduction to Mr. La Trobe, had come from a coffee plantation at Ceylon to Australia, and for a short time was gardener to Mr. J. B. Were at Brighton.

Under competent care and skill the plantations thrived well. As required, they were enlarged. The flower garden was allowed to be used in conjunction with horticultural shows. In a report for 1851 Dallachy stated that 5,000 exotic plants and 1,000 indigenous plants were under cultivation.

In the year 1852 Governor La Trobe, always keenly interested in the garden, decided to appoint a Government Botanist. Dr. Ferdinand Mueller, well known for botanical research in South Australia, being then in Melbourne, and well accredited by Sir

William Hooker, was appointed to the position, undertaking the scientific duties. In 1857 the posts of Director and Government Botanist were combined, Mueller officiating in the dual capacity and Dallachy occupying a subordinate position. The latter did excellent work as botanical collector in remote parts of Victoria, also in Queensland, in which State he finally remained at Rockingham Bay, where he died in 1871. Numerous plants are associated with his name.

Dr. Mueller, as Director and Botanist, had full charge up to 1873. From 1853 to 1855 he explored Victoria botanically from the Murray to the sea, and especially the alpine system. He thereafter developed the resources and usefulness of the gardens, extending the plantations widely. He got closely in touch with kindred scientific institutions at home and abroad, arranging for mutual exchange of specimens. In a special section the chief families, orders, and species of plants were shown. Indigenous plants from every part of Australasia were obtained from explorers, botanists, collectors, and private citizens, many plants being also cultivated in an Australian section. The Economic Museum was founded, also the National Herbarium. Incidental to these, practical experiments in regard to plant culture, adaptability, fitness, utility, productiveness, etc., as affecting agriculture, floriculture, sericulture, vineyards, and orchards and forestry were undertaken. A classification pavilion on the Kew system was in use. In addition, at this time the newly formed zoological collection in the 33 acres of Richmond Park, which had been founded in 1856 by Dr. Black, was attached to the Botanic Gardens, remaining until 1861, when the menagerie, except some monkeys and an aviary, was shifted to Royal Park.

The old Herbarium was about half-way between the present well-equipped building and the Shrine of Remembrance. Here became assembled the largest collection of dried specimens of Australian plants, identified and classified, and a valuable botanical library containing many rare and highly prized volumes, as well as useful works for reference, research and information for botanical students.

Early in the 'seventies the Director sought to enliven matters with musical recitals on the lawn by the band of the 40th Regiment, then stationed in Melbourne, at which popular functions, under vice-regal patronage, he appeared with various insignia on his breast. At this time discussion arose as to the use and management of the garden, public opinion being more favourable to the aesthetic than to the scientific view, to the attractive and pleasing than to the technical and utilitarian aspect.

On June 30, 1873, the dual office was formally abolished, much to Baron von Mueller's humiliation, and the Botanic Gardens

placed under the control of the Department of Lands and Titles. Henceforth, Mueller was to confine himself, as Government Botanist alone, to the demands of the Herbarium.

Meanwhile, Mr. W. E. Guilfoyle, a capable, skilful and artistic landscape gardener, was appointed as sole Director, under whom the garden, in time, was transformed from its formal aspect into an attractive and pleasing resort, whilst still retaining its botanical features intact, if not so obvious.

Mr. Guilfoyle made effective use of the favourable natural features of contour to produce a pleasing prospect, satisfying in its varied contrasts. At the straightening of a bend of the Yarra River part of the bend in the river was added to the garden, making the lake 10 acres in extent. Mr. Guilfoyle was Director until 1909, since when Messrs. Cronin, Laidlaw, Pescott (acting), Rae and Jessep have sought to maintain the tradition of the Botanic Garden in its charm and beauty, with its variety of flora, its fair vistas, pleasing undulations, broad lawns, choice trees, native vegetation, fern gully and lake.

Adding greatly to its popularity as a cool leafy retreat, an acceptable haven in all seasons, is the fact that it is a safe and much frequented sanctuary for bird life in great variety—songsters and whistlers, disporting water birds, graceful gulls—all in its peaceful environment losing their instinctive distrust of mankind.

Many historic memories cluster around the garden. It was a favourite retirement for vice-royalty. The Baron used to walk frequently with the Earl of Hopetoun in its verdant paths. Many trees, now vigorous, were planted by very eminent visitors. The Separation Tree recalls the time when the revenues from Port Phillip were being mostly used for Sydney's advantage. The Temple of the Winds recalls the amiable personality of Governor La Trobe, whose foresight gave us our public gardens now so much depleted—partly from sales by needy Treasurers, partly by use for Government purposes. In the Centenary year (1935) a new and commodious Herbarium was erected at the Garden gates and once again both Herbarium and Garden staffs came under the same departmental head, viz., the Lands Department, with one director acting as Government Botanist.

From the foundation of the Field Naturalists' Club up to the present day there has always been a close and friendly association with the Garden, whose officers and workers, from the "old Baron" to the present entourage, have mostly been members or well-wishers of the Club. Among the former will be recalled Messrs. Neale, C. French, senior and junior, F. Pitcher, P. R. H. St. John, and J. W. Audas, while Messrs. P. F. Morris, J. H. Willis, P. N. S. Bibby and R. V. Smith, of the present Herbarium staff, are all active members.

POLLINATION OF *Calochilus campestris*

By F. FORDHAM, Brunswick Heads, N.S.W.; with Introductory
Note by the Rev. H. M. R. Rupp.

Mr. F. Fordham, headmaster of the Brunswick Heads Public School, on the North Coast of N.S.W., has sent me a most valuable account of observations made by his wife and himself, covering the procedure of the pollination of the orchid *Calochilus campestris* by the males of a flower wasp.

Mr. K. C. McKeown, of the Australian Museum, Sydney, has identified the wasp as *Campsomeris (Dielis) tasmaniensis*. He remarks: "This species is widely distributed along the south-eastern coast of Australia. The males of the flower wasp (family Scoliidae) are much smaller than the females. In this family both sexes are winged. Scoliids are parasitic upon the grass-root feeding larvae of beetles, especially those of the family Scarabaeidae. The female wasp burrows down into the soil, and deposits an egg upon the beetle larva. On hatching, the wasp larva feeds upon the body of its host and, when fully fed, pupates in a brownish papyery cocoon. The perfect insects emerge in the following spring. Both sexes of the wasps are commonly taken upon the blossoms of flowering shrubs, where they feed upon the nectar."

The three "apparent stings" mentioned by Mr. Fordham as used by the wasp in stroking the hairs of the orchid labellum are appendages, the functions of which seems to be unknown, but they are probably concerned with the mating of the insects.

Following is a summary of Mr. Fordham's report.

H. M. R. R.

At 11.45 a.m. on September 9, 1945, in bright sunshine, with a light S.-E. breeze, a wasp-like insect was observed flying about a vase containing flowers of *Calochilus campestris*, which was standing on our verandah. The insect was a little under an inch in length, dark in colour, with light yellow bands on the abdomen. Our attention was at once attracted by what appeared at first to be a supplementary pair of antennae. These were pale yellow, and were not in any way like the usual types of antennae, but resembled a capital M across the "face" of the wasp. The effect was grotesque. As the wasp was flying, we could not make a closer inspection.

Some fifteen minutes later it reappeared. The "M" antennae were still conspicuous. The wasp now definitely manifested interest in the orchid flowers. It circled the vase, darted in, and hovered in front of a flower, then flew off a few feet, returned, and repeated its performance. This was done several times. At last it made a selection, and landed on the hairy labellum of a flower towards the apex. Immediately it deflexed its abdomen, and made several stabbing movements, as if it were stinging the hairless "ribbon"

at the apex. When these movements ceased, it began to brush or stroke the labellum hairs with three apparent stings. (See introductory note.) This action continued for fully half a minute, and was obviously deliberate. No other body movements were observed at this stage. The wasp then began to move slowly towards the column behind the base of the labellum, the brushing of the hairs continuing all the time. Its head was then pushed up under the anther, as if searching for nectar, but at this point something caused it suddenly to fly away.

During these observations we had forgotten the "M" antennae. But ten minutes later the visitor—or another of his kind—returned, and flew directly to the flower previously visited; and it was immediately noticed that the "M" antennae were absent! Light broke: these imaginary antennae were really pollinia from a flower visited before our observations began. An inspection of the flower under observation during the wasp's absence showed that no pollinia were visible. Upon the return of the insect, exactly the same performance was repeated as described above. But this time, when the head was pushed up under the anther, it made sharp upward movements, almost as if trying to dislodge the pollinia. There being none present, the wasp flew off and, so far as we know, returned no more that day.

At 9 o'clock next morning the orchid flowers were again placed in sunshine on the same verandah, and watch was kept. At 10:28 the first visitor arrived. It went through precisely the same performance as I have described. This wasp was captured and consigned to the killing bottle for examination. Less than a quarter of an hour later, another similar wasp came to investigate, but it went off again almost immediately. Soon after 11 a.m. a fine specimen flew in, and at once alighted on a flower. Before its head reached the anther, another wasp, with pollinia on its head, came along. It was at once attacked by the one in possession, and was driven off. The aggressor appeared very agitated by the incident, and after flying about for a few seconds it disappeared. Shortly afterwards another pollen-bearing visitor arrived. This was captured and sent to join its fellow in the bottle. The pollen was found to be identical with some we had taken from a flower in the vase. We could now no longer doubt that this wasp does remove pollinia from the flowers of *Calochilus campestris*: it remained for us to try and ascertain whether it also places these pollinia on the stigmatic plates of other flowers of the same species.

The next visitor that came along gave us no evidence. Fresh flowers were now obtained, for we thought that the old ones, having been in water for several days, might be losing their power of attraction. We ourselves could detect no odour of any kind in the flowers. No sooner had the fresh lot been placed in position

than a pollen-bearing wasp flew in and alighted on a labellum. The same movements were gone through; and so engrossed was this insect with its labours that it paid no attention to us when we made close-up observations with a magnifying glass. It succeeded in removing the pollinia from this flower, then flew away; immediately we turned our attention to the stigmatic plate, and to our great delight we found a pair of pollinia caught there—undoubtedly those which the wasp had brought with it. We were now fully satisfied that, in our district at all events, we had discovered the pollinating agent for *Calochilus campestris*.

It is worthy of notice that this wasp paid no attention whatever to the flowers of another species of *Calochilus* (probably *C. Robertsonii*) which were placed in the same vase. And I would finally remark that on both days during which our observations were made, the attraction of the flowers for the wasps appeared to end a few minutes after noon. Although watch was kept, no wasp was seen to approach the vase later.

DEFOLIATION OF FOREST TREES

The note by Mr. L. M. Carritt in the *Pict. Nat.* for February brings to mind three examples of extensive damage to leaves.

About 1928-9 forest officers in the Otway district observed large patches of Mountain Ash "dying out." They were much concerned. Several areas along Turton's Track showed not one green leaf. One large infestation could be seen like a burnt area from Apollo Bay. In 1930 I camped near one of the patches and examined the fallen leaves. They were completely eaten out by leaf-miners. Next year there was not a leaf to be seen with the miner, and the trees were as vigorous as ever. A similar visitation occurred between Stawell and Horsham in 1932; but there were no ill-effects. Quite recently we had reports of cup-moth caterpillars killing the trees. Has anyone observed these areas since?

Defoliation in a large tree with healthy wood and roots would have to continue for several years before all the food obtained by the leaves could be exhausted. Here is an example in illustration: A resident of Brighton bought a well-grown apple-tree in the hope of getting good crops without wasting years. All through the next summer, it did not bud. The wood remained flexible, so he left it in. In the next growing season it still remained dormant, but a "false spring" in April started a few tufts of leaves. This year it is doing fairly well. With its roots in a bad way, that tree persisted fully two years without leaves.

A. J. SWABY.

EXCURSION TO AQUARIUM

A large number of members, young and old, attended this excursion on Saturday, February 9, and enjoyed seeing the excellent series of Australian marine fishes on exhibit. The Toad, Old-wife, Leather Jacket, small Cow Fish, Fiddler Ray and various crustaceans (Hermit Crab, Spiny Lobster, etc.) were of absorbing interest. Miss Wigan rendered a signal service in naming many birds also housed at the Aquarium, while the leader was endeavouring to cope with the throng of enquiring excursionists clustered around the fish tanks.

P. F. MORRIS.

THE CASE-MOTH MYSTERY

By EDITH COLEMAN, Blackburn, Vic.

Here is a problem that may be solved by some enthusiastic junior field naturalist.

At the present time (November) many Case-moth larvae of various species are active on eucalypts, the native cherry, and even alien trees and garden plants. From September 1st the Great Saunders larvae were busy on male and female catkins of the alien Goat- or Pussy-willow (*Salix caprea*), feeding on and sewing them into the foundations of their first caravan homes. It is said that the adult female lays her eggs in the case, but who knows?

There is no mystery about the male, which many of us have seen and photographed after he has left his case, leaving his pupal skin protruding through the opening.

It is almost certain that the female never leaves her case. She is destitute of wings and has only rudimentary traces of legs and antennae. A glance at the beautiful illustration in C. French's *Destructive Insects of Victoria* stresses the, surely, insurmountable difficulty of return, even should she manage to leave the case. Mr. French says: "I must here express doubts as to the correctness of the assertion that the females never leave the case, as good observers have noticed that these do occasionally leave the case, but only for a short period and for the purpose of mating with the male."

Has anyone seen eggs *in* the case?

Mr. French says: "With regard to egg-laying, I cannot say for certain whether eggs are deposited by the females of these insects or not, but the bodies of the females contain vast numbers of eggs. Pro-



Caravan home of Saunders Case-moth, *Metura elongata* (male).

fessor McCoy doubts whether any eggs of this curious creature have ever been found."

However, Mr. French gives an illustration of a small cluster of eggs found in the body of a female. They were given to him by Mr. Spry, "who is an excellent observer and on whose responsibility the egg-cluster is figured."

It would be interesting to know at what stage those eggs were found in the adult female body. It seems probable that the eggs hatch within the female, where they remain till the day of emergence. This takes place, not one by one as hatching might occur, but en masse.

One sees a stream of dusky larvae dropping on threads from the opening of the case until all have left. Has anyone seen larvae in the caravan? If the eggs hatch within the female, on what do they feed as they wait for "the call"?

It has been suggested that they feed on the tissues of the parent body, but I have been unable to satisfy myself on this point. At whatever period I have opened a case I have found nothing but the pupa in various stages of development, its last shed skin neatly suspended at the top. When all the larvae have emerged the dried body is a mere skin filled with a mass of dusty debris which may be portions of egg membranes, parent-tissues or excrement. How many observers have noted empty pupal skin and adult female case-moth in the one caravan?

Although the larvae are vegetable feeders, it is quite possible that they feed on dried tissues of the pupal cradle while waiting for "the call," a tropism to which the larvae appear to respond simultaneously. Other caterpillars make their first meal of egg-membrane and first-shed skins. Spiderlings waiting within the egg-sac for their day of emergence exist for long periods without food. These, however, are carnivorous, and are said to make an occasional meal of their brothers and sisters.

I have never been able to verify this. I have opened sacs and counted eggs, fertile and infertile, of the Huntsman Spider and have found the number of fertile eggs and spiderlings to tally. (Fertile and infertile eggs are readily distinguished by their shape. Fertile ones swell, but infertile ones collapse as they dry.)

Another interesting feature noted is that while Case-moth larvae are able to repair a damaged case, they appear unable to build a new one if accidentally deprived of the one in which they have lived from infancy. They will wander, houseless, over the leaves of their food plant, but I have not seen them feed. It would seem that their life-processes are a set piece of mechanism in which false steps cannot be retraced, yet the mending of a damaged caravan could not have been included in the "set piece."

NUTRITION OF THE HYACINTH ORCHID, *DIPODIUM PUNCTATUM*

By A. J. SWABY, Hampton, Vic

More notes on this subject, mentioned in the February issue of the *Vict. Nat.*, may be interesting and stimulating to further study.

Mr. V. Bennett, of Surrey Hills, writing to Mr. Charles French, tells of a *Dipodium* which he grew and which was exhibited in flower by Mr. French. It was lifted in flower in January, 1939. The soil was shaken off in transit, but was used for repotting. It was kept on the bench in the glass-house, but it did not bloom in the summer of 1940. In September, 1940, after lying on its side several months to avoid over-watering, it began to grow. That shoot flowered late in December, carrying into 1941. It was again rested; but the rats found it and the record closed.

Enough had been done to indicate:

- (a) The plant flowers in alternate years.
- (b) It is more than biennial.
- (c) It can live and flower away from other living plants for some years.

The biennial flowering has been observed in normal surroundings by Mr. Bennett, some of his friends and myself.

The matter of existence away from gum-trees seems to call for further observation. After writing the last note, I saw the Hyacinth Orchid at Myers Creek, Healesville. The season had been the worst on record. I have never seen bush anywhere so dry. But the orchids were better in numbers and quality than I have ever seen. In about two acres we counted 24 large clumps up to 3 feet high. In the bracken at least the same number could have been missed. I tried to get specimens to demonstrate the closeness of gum-tree root, fungus and orchid, but could not find any actually in contact with roots.

That, however, proves nothing. The mycelium of a fungus was there in each case. It could easily extend for several feet to where there might be a root. Or, again, since the fungus could use dead organic matter, it is possible that fallen leaves might provide nutriment.

Mr. P. Crosbie Morrison throws more doubt on the exclusive association with gum-trees. He has found good specimens amongst tea-tree, with no gum-trees anywhere near. It should be noted that tea-tree is related to gum-tree both in morphological classification and in the nature of sap and oily extractives.

This is a most interesting orchid and further observation is worthwhile. It is hoped that members and their friends who visit its habitat will keep definite notes on their observations. It is further suggested that the Club commence an index of researches

being carried out by members—either individually or collectively. This would direct and stimulate field observation. Possibly we are wasting our time going over the same ground each year when there is so much still to be discovered.

Here are some leaders:

1. How long does *Dipodium* live?
2. How often does it bloom?
3. Do dry seasons stimulate flowering?
4. Are gum-trees or other Myrtaceae always near?
5. Which other native plants are near enough to contribute?
6. Can it be grown in soil not found about it?

[The special attention of members is invited in regard to Mr Swaby's suggestions for organized research.—Editor.]

VICTORIAN COUNCIL OF SCIENTIFIC SOCIETIES

The F.N.C.V. was represented by a delegate (Mr. J. H. Willis) at the first meeting of this newly formed association, held in the Assembly Hall on Tuesday, February 26. Including our club, the foundation member-societies of the council number fifteen and at least five meetings will be held each year. As stated in clause 2 of the adopted constitution, the main objects of the council shall be to "promote a closer liaison between the scientific societies and to establish contact between the societies and the general public." To demonstrate its eagerness for constructive work, the council has at once engaged on the planning of a conference on "Atomic Energy," which will probably be held during May or June.

THE MONGOOSE IN AUSTRALIA

The following notes are offered as evidence of the danger inherent in the introducing of fauna to a "new" country:

In 1884 the mongoose was introduced from Ceylon into North Queensland to cope with a plague of rats which threatened ruin to the sugarcane planters. For some inexplicable reason the creatures did not thrive, numbers were turned adrift in the canefields, but with the exception of one, which had evidently been a pet, and which, in consequence, soon established itself as a member of the neatest household, the whole lot mysteriously disappeared.

What the result might have been in North Queensland, had the mongoose thrived, as was expected of them, none can say, but judging by precedent established in Jamaica, Queensland escaped a worse infliction than the intermittent one of rats. In 1872 nine mongoose were imported into Jamaica in the hope that they would thrive and exterminate the "cane-rat," which was making impossible the cultivation of sugar. The mongoose thrived and multiplied, and by destroying the rats restored the sugarcane industry, and also made the cultivation of cocoa possible. But when the cane rats became few and the mongoose many, the latter turned their attention to ground-nesting birds and killed these.

Between the mongoose and the tree-climbing rat the birds suffered terribly, and the disappearance of insectivorous birds was soon followed by the spread of the cattle tick (which heretofore the birds had kept under) until the ticks became so prevalent as to be a perfect scourge. Cattle tick has caused immense damage in Queensland, and would, in all likelihood, judging by the experience of Jamaica, have occasioned much more had the mongoose caught on in the manner that was expected of them.

STONE ARTIFACTS FROM WOODSTOCK, MOLONG AND CALOOLA, N.S.W.

By C. C. TOWLE, Eastwood, N.S.W.

The three stone artifacts illustrated in the plate were found in a relatively small area of country situated between the Macquarie and the upper Lachlan Rivers. They are now in the collection of Mr. C. S. Ashley, of Rockdale, near Sydney.

1. *An Uncommon Axe-like Form*

Mr. Ashley informed me that this artifact was ploughed up some years ago on a property known as "Chiel," situated four miles west of Woodstock.

The artifact, which is $25\frac{1}{2}$ inches long, is most symmetrical in every respect. In cross section it is circular, its circumference being only $6\frac{1}{2}$ inches. It appears to be composed of a very hard sandstone. The entire surface of the stone has been shaped by hammer dressing, and smoothed both by grinding and, as it seems to me, more so from the handling which it has received. One end of the stone has been ground to form a symmetrical cutting edge; the other tapers somewhat and is well rounded. A flake about $4\frac{1}{2}$ inches long has been broken off at this end, but the fracture has been rubbed smooth.

On close inspection it is seen that a small series of fine lines have been engraved around the stone. Most of them are faint, but some are sufficiently distinct to be definitely identified as engravings. Apparently, in their original state they formed rings around the stone.

Although the specimen is axe-like in form, its dimensions are such that it does not appear to have been intended for utilitarian purposes. It should be placed, in my opinion, amongst the ceremonial objects of the aborigines. Except for its axe-like ground edge, this artifact is similar in other respects to the cylcons.

2. *Double-grooved Conical Artifact from Molong*

Of late years a few specimens of the same type have been found in localities usually not far removed from the upper Lachlan River. Their purpose is unknown, but they are probably ceremonial objects. (See McCarthy, *Mankind*, Vol. 2, No. 6, 1939.)

The specimen illustrated is 11 inches long. Near the second groove it is 9 inches in circumference, its cross section being circular. It is composed of a very hard sandstone. One end of the stone tapers to a point; the other, although somewhat battered, is rounded and massive. The entire surface has been shaped by hammer dressing. There is no trace of grinding.

PLATE XII



Stone Artifacts from Woodstock, Molong and Caloola, N.S.W.
Photo. by C. C. Towle.

3. *A Stone Axe Grooved for Hafting*

This implement, made from a very coarse hard sandstone, was found at Caloola, south-west of Bathurst. It measures $8\frac{1}{2}$ in. x 5 in. x $1\frac{1}{2}$ in. Its entire surface, which is weathered, has been shaped by hammer dressing. There is no trace of grinding. The well-defined hafting groove goes completely round the stone.

If this implement is compared with the artifact found at Woodstock, it becomes clear that the Woodstock specimen is of a type entirely apart from stone axes as such.

Axes grooved for hafting are not plentiful in the more eastern parts of this State.

Of the three specimens illustrated, the purpose of two of them is unknown. So little has been learned from the aborigines of the area that we are not able to give adequate explanations of such specimens. We have to be content to treat them as ceremonial. One of them, the grooved conical stone from Molong, is perhaps associated in inland N.S.W. with the cultural development which produced such types as the cylcons and the artifacts shaped like bicycle saddles. (See Black, *Cylcons*, 1942; Etheridge, *Ethnol. Series No. 2*, 1916; Casey, *Mem. Nat. Mus., Vic.*, Nos. 8 and 9, 1934-6.)

BATS WANTED

(To the Editor)

Sir,—I am engaged in research on the animal and bird malarias of Australia. The flying foxes in Queensland have been shown to harbour a malaria parasite and I am attempting to transfer this parasite to any other species of small bat which can be kept in captivity. For the purposes of this experiment I require an almost unlimited supply of bats. As far as I can gather from personal contacts in many different parts of Victoria, the bats seem to be retreating from their usual haunts. I was wondering if some of the readers of your journal might be able to let me have some information as to where there are any colonies of bats which could be caught. I am particularly interested in the bats which would be found south of the Murray because these are unlikely to be already infected with malaria.

For the same purposes I require musk duck and wood duck (maned geese) and would also be grateful for information as to where these birds could be found in any numbers.

Yours faithfully,

DIANA DYASON.

Department of Physiology,
The University of Melbourne.

DEATH OF MR. J. A. KERSHAW

The death occurred on February 16 of Mr. J. A. Kershaw, a former Director of the National Museum and sometime President of the Field Naturalists' Club of Victoria. He was aged 80 years. A biographical notice will be published later.

ON KEEPING FROGS AND TOADS

By H. W. DAVEY, Melbourne.

I have always turned large frogs loose in my fish-house, where they lived very happily: a cement pond, level with the floor and holding about 200 gallons of water, enabled the frogs to enjoy themselves either by day or night.

The Tree-frogs, especially the large Queensland Tree-frog, *Hyla caerulea*, mostly frequented some large Staghorn ferns growing on a wall near the pond. *H. caerulea* is very common in northern Queensland and often, after heavy rains, I have seen them everywhere, scores of their crushed bodies killed by motor cars on roads at Townsville. These frogs even invade letter boxes, and if one go outside the house at night with an electric torch he could collect many in a very short space of time.

That lovely coloured frog *Hyla aurea*, so common in Victoria, does not possess the adhesive toes as in many hylas, but is nevertheless a good climber. It seems hard to believe that a frog can show temper, but I have frequently noticed the failing in this species. Often at feeding time, should one frog succeed in seizing a worm which another one appeared to consider his, the latter would jump at the successful competitor, making several bites at it and at the same time emitting sharp croaking noises; but in spite of its demonstration, I have never known one to succeed in taking the worm from another frog.

With *H. aurea* were also kept the Edible Frog of Europe, *Rana esculenta*, a pretty species, and more aquatic than *H. aurea*. On one occasion misfortune overtook one of these frogs. A cigarette butt on the cement floor of the fish-house was sending up a thin spiral of smoke, which a frog evidently mistook for life, because, like a flash, it leapt at the end of the cigarette, which was swallowed instantly. The unfortunate frog then jumped into the pond, but I found it dead next morning from, I expect, tobacco poisoning.

One of the most entertaining amphibians I ever possessed was the Chinese Singing Frog. This was a very ordinary looking, brown-coloured tree-frog. It reached Melbourne in a small cage with dome made of fly-wire gauze, a small door, and hook by which to hang it up, as a canary cage. The netting dome is attached to a bowl by means of clips that make it easy to detach for cleaning. The bowl has a small plug for letting out water when necessary. The size over all is 5 x 4 inches, so evidently, from the trouble taken, the Chinese set some value on the singing of this frog. Needless to say, I immediately transferred the little singer to better and more roomy quarters—a cage 18 in. high and 14 in. x 9 in., three sides being of glass.

The Singing Frog prospered under these conditions and fed well, trilling out his little song during the warm weather. The first occasion on which I heard it, I rushed out of doors to find what bird had honoured me with a visit, only to discover it was my Chinese frog. During cold weather I kept it inside the house.

The Singing Frog had for company two delightful little tree-frogs, *Hyla cinerea*; were it not for the white stripe on their jaws, the prevailing beautiful green colour made it a difficult matter to detect them amongst the leaves of the small orange tree in which they sat. These frogs do not occur in Victoria, being native to New South Wales. Another pretty little frog is *H. ewingii* and remarkable for spawning so early in May or June. Once I came across two small *Hylas* sitting on a leaf of a Croton bush at Townsville, North Queensland. These frogs were white in colour and, even after I brought them back to Victoria, they always remained white, so apparently this was their normal colour.

The noisy Bull Frog, by many people called a "toad," is the species that creates such a din in most swampy parts of the State. Its name is *Limnodynastes dorsalis*; the generic epithet may be rendered "Lord of the Marshes," and is most appropriate for such a noisy creature. This frog is a great burrower and I blame it for the escape of marbled newts from a mud-bottomed enclosure in which they were securely housed.

There are no typical toads of the genus *Bufo* native to Australia, but their family, *Bufo*nidae, is represented here. I have had some very fine specimens of *Bufo* from Japan. *B. vulgaris* occurs in England and, I believe, also across Europe and Asia to Japan, increasing in size as it goes east. Toads have great appetites and these big toads would swallow large garden snails, the wonder being how they were able to dissolve the shells so quickly; in fact, it appears to me that a toad will swallow anything that can move, providing the dimensions are not too great. I have seen these toads swallow large golden beetles (*Lamprina*) and, stranger still, the large mole crickets that are often so noisy in suburban gardens after rain. I trained these toads to take strips of beef dangled in front of them when living food was scarce.

A toad is an interesting sight when shedding its skin, which is dragged off the body by means of its feet (both back and front) and mouth; the skin is swallowed as it comes away from the body.

The Giant Toad, *Bufo marinus*, from tropical South America did remarkably well in my collection during the hot months. This fine toad can attain a length of 8 and a breadth of 5 inches, and has been successfully introduced to most sugar growing countries for the purpose of controlling insect pests attacking sugar cane. It is now firmly established in West Indian Islands, Puerto Rico, Hawaii, the Philippines, and now in North Queensland, from

where I received my specimen. In every country where this toad has become naturalized it is very highly esteemed. I have seen large specimens swallow live mice at the London Zoo.

A delightful little toad known as the Holy Cross Toad, *Notaden hennetti*, of Queensland and northern New South Wales, derives its common name from a bright green cross on its back, the rest of its body being pale yellow with small rosy spots. These toadlets thrived well with me.

Another pretty little toadlet is *Pseudophryne australis*, confined, as far as I am aware, to the Hawkesbury sandstone area of New South Wales. It is coloured black and orange or coral red, with white spots behind arms and thighs, and is less than an inch long when fully grown. These *Pseudophrynes* would not eat flies, and the smallest of earthworms appeared to be too large for them, but I discovered they would eat enchytree—tiny white worms usually bred for the purpose of feeding very young fishes. A common toadlet, *Pseudophryne bibronii*, is very plentiful in the Otway country, laying its eggs on land often far from water. The eggs hatch out during wet weather, and the young tadpoles pass through their metamorphosis very rapidly. I found that if the eggs were placed in a saucer of water they failed to hatch, but when eggs were placed on a piece of wet rag in the saucer they soon hatched out small black tadpoles.

NATURE IN A WOODSHED

On 19th January last, during a visit to Mount Buffalo, a nest was brought to me by Mr. Peter Hargreaves, engineer at the Government Chalet. It had been found by Mr. Douglas Alexander, also of the Chalet staff, in the engine-house woodshed, whilst pulling out logs to stoke the boiler fires. The nest, placed on a substantial foundation of dry bark of Alpine Ash (*Eucalyptus gigantea*), was deftly woven of tussock-grass and lined with feathers of the Crimson Rosella. Of the three fresh eggs in the nest, two were broken and the remaining one chipped. The nest has been identified as that of the Large-billed Scrub-wren (*Sericornis magnirostris*). The species was recorded for the Plateau, sight observation, by L. L. Hodgson in the *Vict. Nat.* (November, 1927, p. 190). A previous sight record, given by A. F. A. McHaffie in same journal (March, 1904, p. 149), though shown as *Sericornis osculans*, is assumed to be the Large-billed species.

In January, 1944, I closely watched, in the vicinity of the Gorge, a bird which resembled the Large-billed Scrub-wren. On checking up at the National Museum with skins of both the Large-billed and the White-browed (*S. frontalis*) species, in various plumage phases, positive identification could not be established. The general opinion expressed at the time was that the Large-billed Scrub-wren could not be a denizen of the Buffalo, that being outside and above its normal range.

The nest and eggs now place beyond all doubt the presence of the bird on the mountain. The bird's Victorian range must therefore be extended to the north-east of the State, with a breeding record of 4,500 feet altitude.

H. C. E. STEWART.

THE LATE DR. GEORGINA SWEET, O.B.E.

A link with "official" natural history of a generation back was severed with the death, on January 1, at her home in Canterbury, of Dr. Georgina Sweet, former Associate-Professor of Zoology in the University of Melbourne. Her father, George Sweet, figures in the scientific literature of his day in company with such picturesque figures as Bracebridge Wilson and Sir Frederick McCoy, and other pioneers of biological study in Victoria. The family consisted of two girls, both of whom took doctors' degrees—Elizabeth in Medicine, and Georgina in Science—at a time when it was exceptional for a woman to take any University course other than Arts. Indeed, Dr. Georgina Sweet was the first woman in Australia to take the degree of Doctor of Science. Dr. Elizabeth Sweet died some years ago.

Joining the Victorian Field Naturalists' Club in 1901, Dr. Georgina Sweet was for many years a valued member. Educated at Parkville Ladies' College, Dr. Sweet matriculated and entered the University soon after Sir Frederick McCoy retired from the chair of Natural Sciences, and so was one of the earliest students of the new School of Biology under Professor (later Sir) Baldwin Spencer, another enthusiastic member of the F.N.C. in its early days. She completed a brilliant course, and after graduation she was awarded the McBain Research Scholarship in 1898.

From then until her retirement in 1925 she continued her association with the School of Biology (later of Zoology), becoming Associate-Professor in 1920, when Professor W. E. Agar succeeded Sir Baldwin Spencer in the Chair. She continued as honorary lecturer in Zoology until 1934. On several occasions during the absence abroad of the Professor, she held the post of Acting Professor of Zoology.

Her work overlapped several University science schools, and at various times she was Lecturer in Parasitology (1909-1925), a member of the Faculty of Science (1911-14), and of the Faculty of Veterinary Science (1914-42), and of the Board of Social Studies (1940-44). She was Acting Dean of the Faculty of Veterinary Science from 1914 to 1918.

It has been given to very few people, men or women, to show such brilliance as did Dr. Sweet in so many fields. In her researches she chose deliberately some of the most difficult groups in the animal kingdom—she was at one time a leading authority on such diverse subjects as the parasitic worms, parasitic flies, vertebrate osteology, and animal geography. As a member of the Australian National Research Council she travelled abroad for the Federal Government to investigate *Onchocerca gibroni*, a worm parasite causing worm nodules in cattle, and later she made a further tour abroad in connection with her researches on the buffalo fly in its relation to veterinary disease—two major pieces of work which were of great value to the Commonwealth.

Then, as a hobby, she entered with the same boundless energy into the field of women's social services, and became world vice-president of the Young Women's Christian Association, first president and life honorary president of the Pan-Pacific Women's Association, and a delegate to world conferences concerned with women's work in Kyoto, Japan (1929), Banff, Canada (1933), Spain (1928), and Cracow, Poland (1936). And, to complete merely the outline of a long and strenuous career of service, she was a founder, first president, and life member of the University Women's College Council, a member of the Council of Queen's College since 1920, first president of the Victorian Women Graduates' Association, and, since 1936, a member of the Council of the University of Melbourne—the only woman to hold that position in her own right.

Those who were privileged to know her and study under her remember her as a brisk and confident lecturer, and a wonderfully helpful tutor, with a quick command of detail. More than that, she was a shrewd administrator, and withal a woman of deep and wide sympathies. Seldom was an honour earned so thoroughly, and lived up to so consistently, as the O.B.E. with which her services were recognized.

The disposition of her estate of £100,000 was characteristic of her wide interests and of her care for detail—dozens of charities and educational organizations were mentioned specifically, the Methodist Church (of which her family were staunch members) benefited, and she bequeathed funds to found three University research fellowships, besides other bursaries and scholarships, and the University Women's College will receive half of the very substantial residuary estate.

P.C.M.

PREPARE NOW FOR PLANTING TREES

Now is the time to make plans and prepare for planting trees in the late autumn, winter and early spring. In every district, even in forested areas, there is some scope for further planting. Most districts are woefully short of trees and few projects are more deserving of public support than the State-wide community tree-planting which is now being organized by the "Save the Forests" Campaign.

The first step to be taken in every locality is to form a district committee. The municipal council is asked to take the initiative in forming such a committee and to be represented on it. Most councillors will have had the experience, however, of sponsoring movements and then finding that the work is all left to them and their officers. Offers of support by responsible citizens may induce councils to take up this important work. Where a committee has already been formed, it may be strengthened by adding experienced tree-planters and representatives of organizations willing to take part in a community planting effort.

The second stage is to make a survey of the tree-planting needs of the district. Municipal councils, the Forests Commission, the Lands Department and the Country Roads Board are all supporting the campaign and can be relied on to help as far as lies in their power.

The third stage is to decide on the particular project to be undertaken this year. Trees may be obtained free of charge on conditions set out in the 1946 community tree-planting notes. Advice on the best trees for the district may be sought from successful local growers. Where a clear space is available, ploughing and harrowing prior to the planting will contribute greatly to the success of the young trees.

From the Forests Commission's nurseries *Pinus radiata*, the Insignis Pine, is the main species available. To supplement this supply, a member of the Campaign Council has raised 50,000 eucalypt seedlings in trays. These will be supplied free of charge for community planting, one tray to each district applying before the end of February, provided suitable arrangements can be made for transport and applicants are prepared to transplant the seedlings into tubes or pots as soon as they are received. Species available include Sugar Gum, Mahogany Gum, Gippsland Grey Box, Red Ironbark, Forest Red Gum, River Red Gum, Blue Gum, Yate, Bushy Yate, Tuart, Lemon Scented Gum, and Spotted Gum. Each tray contains from 200 to 500 plants of one species only. Applicants should state order of preference.

All enquiries should be addressed to the Honorary Organizer, Save the Forests Campaign, 314 Collins Street, Melbourne.

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PROCEEDINGS

The monthly meeting of the Club was held on March 11, 1946, at the Lecture Hall of the Public Library, the President (Mr. H. C. E. Stewart) and about 150 members and friends attending.

The President referred to the death of Mr. J. A. Kershaw, and mentioned his long association with the Club. Mr. F. S. Colliver spoke of Mr. Kershaw's consistent interest in all phases of natural history since his retirement from active work at the National Museum, and told how, just a few moments before he died, a discussion on the names of shells was in progress, so that he actually passed on whilst engaged in natural history discussions. With the death of Mr. Kershaw the Club has lost a member of more than 40 years' standing, and science had lost one of its grand old men.

The President welcomed to the meeting a number of visitors, and specially welcomed Mrs. Chugg and Mr. Chas. French, both members who have returned to meetings after serious illness.

A letter was received from the Forestry Department stating that a watch was being kept on the Gonyah Gonyah reserve, and that the stealing of ferns from the area had been noted.

The McCoy Society wrote stating that the grave of Sir Frederick McCoy had been put in order and they would now be interested in assisting the F.N.C.V. in replanting the plot. (Mr. Stewart said it was proposed to have a planting ceremony at the grave in the near future.)

Reports of excursions were given as follow:—Yarra River trip, Mr. H. P. Dickens; Blackburn Lake, Mr. A. S. Chalk; Botanic Gardens, Mr. H. C. E. Stewart

The following were elected as Ordinary Members of the Club:—Miss Lynette Carver, Mr. J. K. Moir; and as Country Member, Mr. R. G. Taylor.

It was reported that supplies of club badges were now available, at 2/6 each, and badges similar to those worn by members of Committee could be obtained by ordinary members at 2/3 each. Members interested in these badges are asked to give their names to the Secretary.

The chief item for the evening was a symposium by four members of the Plant Names Sub-committee, whose lectureries will appear elsewhere in the journal.

Mr. W. F. Gates asked what had happened to Mr. H. B. Williamson's list of Victorian plants. Mr P. F. Morris replied that it was used in compiling the first Census, and the original list was still in the library of the National Herbarium.

The appreciation of the Club was conveyed to speakers in the symposium.

EXHIBITS

Mrs. M. E. Freame: Angler Fish, found at St. Kilda, 11/3/45

Miss Ina Watson: Wild flowers (Berry-Heath, Snow Berry, Gentians and Mountain Rockets) and Mountain Shrimps (*Anaspides tasmaniae*) from Cradle Mount, Tasmania.

Miss H. Kriep: Mounted specimens of West Australian wild flowers, including—*Grevillea Wilsonii*, *Dryandra nivea*, *Petrophila biloba*, *Lambertia multiflora*, *Scaevola striata*, *Leschenaultia biloba*, *L. formosa*, *Amigoanthus bicolor*, *A. Manglerii*, *A. humilis*, *Blancaea canescens*, *Tribouanthes multiflora*.

Mr. J. H. Willis: Two Alpine flowering plants new to Victoria. 1. A small undescribed species of Bluebell (*Wahlenbergia*), collected by the exhibitor on Older Basalt of Dargo High Plains, Jan. 1946. 2. *Actinotus bellidioides*, a diminutive Flannel-flower previously known only from Tasmania, collected at the source of the Thompson River, Baw Baws, by Miss Coryl Skewes, Jan. 1944. (This latter is a particularly interesting record, and adds another genus to our Victorian Census.)

Mr. T. S. Hart: *Dipodomys*, rhizomes and buds to show style of growth, specimen from private property at Croydon. *Centella asiatica* (Indian Pennywort) a plant widely spread in many countries.

Mr. R. D. Lee: Fungi (*Boletus luridus*) from Fern Tree Gully.

Mr. H. P. Dickens: Two studies of Orchids: *Dianis pedunculata* and *D. punctata*.

Mr. Tom Griffiths: Collection of 15 mosses from Kallista.

Mr R. Savage: Garden-grown native plants, including:—*Melaleuca pulchella*, *M. thymifolia*, *Correa alba*, *C. glabra*, *C. rubra*, *Cassia australis*, *Pholidia gibbosifolia*, *Grevillea Hookeriana*.

Mr P. Fisch: Fungi, *Boletus portentosus*, *Ananthe farinacea*, *Pleurotus lampos* ("Ghost fungus").

Mr. F. S. Colliver: Glass rope sponge, and figure of living animal.

ARE YOU INTERESTED IN GEOLOGY?

The Club has recently formed the Geological Discussion Group, for the benefit of members who are interested in this branch of Natural History. The Group meets on the first Tuesday of each month, 8 p.m., at the Royal Society's Hall, in Victoria Street, between Exhibition and Spring Streets.

These meetings, which are entirely directed to Geology, are both varied and educational. An excellent programme has been prepared, the outstanding feature being a series of elementary discussions by Mr. F. C. Elford, of the Teachers' College, Melbourne. The subjects to be discussed at coming meetings include, Igneous Rocks, Weathering, Sedimentary Rocks, Metamorphic Rocks, Structures of Rocks, Fossils, Relationship between Rocks, Geological Maps, and the Complete Geology of an Area. The meetings are followed by field work, to localities having bearing on the previous discussion.

Members of the Club who are definitely interested are invited to attend the meetings, or to communicate with the Hon. Secretary, Mr. A. A. Baker, 53 Carlisle Street, Preston, N.18.

"FAIRY DELL"—A JUNGLE PATCH NEAR BRUTHEN (E. VIC.)

By N. A. WAKEFIELD, Orbost.

One late spring day last year, Mr. Frank Johnson, an apjarist of Bruthen, introduced the writer to a small patch of typical East Victorian jungle about three miles west-north-west of the township. Our route led through the village of Wiseleigh, then along a forestry track and across a small stream known locally as Deep Creek, and thence upstream along a small dry tributary thereof,—the heads of which constitute "Fairy Dell."

As is usual with these isolated jungle "islands," the change from ordinary open forest of White and Yellow Stringybark, Mountain Grey Gum and Common Peppermint on stony hillslopes with shrubby Acacias and Bracken Fern, to a dense forest of Lilly-Pilly and Treeferns festooned with lianes and epiphytic ferns, was startling in its suddenness. One moment we were in the open Eucalyptus forest with a wall of greenery in front of us; and the next, we had pushed through the jungle margin to find ourselves in a semi-tropic world of tree and fern trunks, with a dense mass of foliage many feet overhead to the exclusion of all direct sunlight.

As usual, the Lilly-Pilly (*Acmena Smithii*) was in great abundance, and there were numerous Blackwoods (*Acacia melanoxylon*) but no species of *Eucalyptus* in the actual jungle. Smaller trees were represented by *Blue Olivecherry (*Elaeocarpus cyanens*), *Yellow-wood (*Acronychia laevis*), Sweet Pittosporum (*P. undulatum*), Prickly Currant-bush (*Coprosma Billardieri*), Musk Daisy-bush (*Olearia argophylla*), Hazel Pomaderris (*P. apetala*) and Blue Howittia (*H. trilocularis*).

The jungle lianes comprised *Austral Sarsaparilla (*Smilax australis*), *Wombat Berry (*Eustrephus latifolius*), *Erect Clematis (*C. glycinoides*), *Staff Climber (*Colastrus australis*), Twining Silk-pod ("Lyonsia straminea" so called), *Stalked Doubali (*Marsdenia rostrata*) and *Jasmin, Morinda (*M. jasminoides*). Other flowering plants noted were Scrub Nettle (*Urtica incisa*), *Bearded Wort-flower (*Tylophora barbata*), Toothed Nightshade (*Solanum xanthocarpum*) and *Rose-leaf Bramble (*Rubus rosaeifolius*).

Ferns were much in evidence, with *Felt Fern (*Cyclophorus rupestris*), Fragrant Polypody (*P. pustulatum*), Necklace Fern (*Asplenium flabellifolium*) and Mother Spleenwort (*A. bulbiferum*) epiphytic on tree and fern trunks. Terrestrials included Shining Wood-fern (*Dryopteris Shepherdii*), Mother Shield-fern (*Polystichum proliferum*), Shade Spleenwort (*Diplozium australe*) and *Jungle Brake (*Pteris umbrosa*), each forming dense patches; while Tender Brake (*Pteris tremula*), Gristle Fern (*Blechnum*

cartilagineum), Fishbone Fern (*B. nudum*), Strap Fern (*B. Patersonii*), Sickle Fern (*Pellaea falcata*), Hat's-wing Fern (*Histiopteris incisa*) and Swamp Hypolepis (*H. Muellera*) were less in evidence.

The Treeferns were represented by an abundance of Rough Treefern (*Cyathea australis*) and Soft Treefern (*Dicksonia antarctica*); but more interesting still were some scores of fine specimens of the *Prickly Treefern (*Cyathea Leichhardtiana*) both young and old! The Prickly Treefern was first noted in Victoria by Mr. Frank Robbins at Mount Drummer, and later by the writer in the Howe Ranges beyond Mallacoota, being very abundant in both areas within the limits of the jungles; it is rather remarkable to find it so strongly established nearly ninety miles farther to the west, after having completely missed (apparently) the jungles of the Thurra, Cann, Benin and Snowy Rivers.

This hundred-acre area was extensively, though hurriedly, explored during the few hours available and probably many species of plants were overlooked, but it seems unlikely that such climbers as *Gum Water-vine (*Cissus hypoglauca*), *Big-leaf Vine (*Sarcopetalum Harveyanum*) and *Scrambling Lily (*Gonolobium cymosum*) could have escaped notice had they been present; and all three are very abundant in the lower Snowy River Valley. (See also *Vict. Nat.* Vol. LXI p. 139,—“A Remnant of the Snowy River Jungle”).

The species I have indicated by an asterisk are restricted in Victoria to the far east, and it will be noted that they comprise just 50% of all the flowering plants seen at Fairy Dell. It would be interesting to hear from other observers, through this journal, and thus have brought to notice the western-most records of many such plants of the subtropical extension into eastern Victoria.

[The Asst. Editor has recently collected Rough Maidenhair (*Adiantum hispidulum*) in the jungle gorge of Deadcock Creek, Parish of Glenakdale, 15 miles N.W. of Bairnsdale, thus extending the range of this tropical fern more than 120 miles farther west than existing records for the Genoa area.]

REGISTER OF RESEARCH

Several members have indicated agreement with the suggestion under "Nutrition of *Dipodium*" (March, pp. 204-5) for an index of research. The President has approved of an offer by Mr. Swaby to conunence the compilation of a register. Members who undertake an investigation—however simple—in any branch of nature study are requested to send a memorandum to Mr. Swaby. Announcements will be posted at Club meetings and published in this journal from time to time. Requests for seasonal observation should be at least two months ahead to ensure inclusion. Requests for specimens, observations, tests or other data will be advertised among members. It is expected that their characteristic readiness to co-operate in field work will be extended to all research.

Please address communications to Mr. A. J. Swaby, 17 Avondale Street, Hampton, S.7.

AUSTRALIA'S TINIEST ORCHID (*BULBOPHYLLUM GLOBULIFORME* NICHOLLS)

By W. H. NICHOLLS, Melbourne.

This very diminutive Australian orchid was originally described by me in *Orchidologia Zeylanica* (Vol. 5 (1938) pp. 123-124), the official Journal of the "Orchid Circle of Ceylon," a publication somewhat inaccessible to Australians, and it is felt that a description of such an interesting epiphyte, in an Australian journal, may be welcomed.

B. globuliforme is closely allied to F. Mueller's *B. minutissimum*, also to *B. moniliforme* Reichb.f., a Burma species. It is specifically distinct from Mueller's plant in its still *more diminutive* size, in its globular pseudobulbs (as opposed to the flat, shield-like pseudobulbs of *B. minutissimum*) in the different nature and the colour of the flowers, and in the dissimilarity of the labellum and column. From *B. moniliforme* it differs in the different size, structure, and colour of the flowers.

The author's specimens of *B. globuliforme* (the original) came from Mr. A. W. Dockrill, who wrote:

"They were collected on the New South Wales side of the Macpherson Range, the border between Queensland and New South Wales. The nearest town is Kyogle, which is 15 miles away. It grows in small colonies, often strung out on high branches of the Hoop pine (*Araucaria Cunninghamii*). I found it on a number of trees in a limited area, about 1 mile this (the New South Wales) side of the Queensland border, and about 1 mile west of the Sydney-Brisbane railway line. The only other orchid in association was *B. Weinthalii*, Rogers."

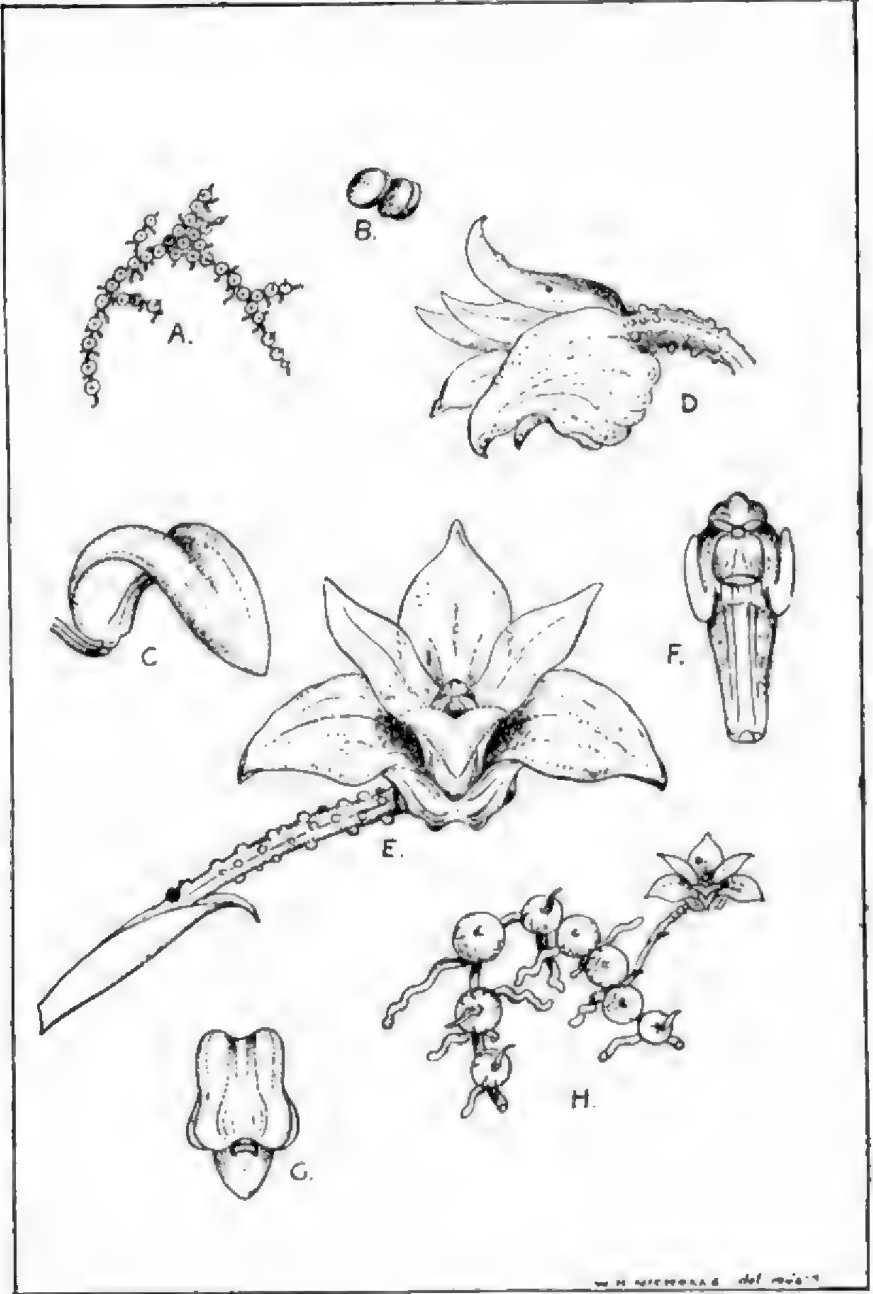
Mueller's specimens of *B. minutissimum* are preserved in the National Herbarium, Melbourne. Among this material (the TYPE) the writer found additional specimens of *B. globuliforme*—collected by Hartmann in 1883, on the Condamine River, Queensland. Even in a dried condition, the pseudo-bulbs of *B. globuliforme* do not lose their characteristic globose appearance, thus they are readily distinguishable from those of Mueller's species.

Further material of *B. globuliforme* (plants in full flower), and in perfection condition, has been forwarded to me by the Rev. H. M. R. Rupp of Northbridge (N.S.W.), enabling the following amended descriptions to be given:

BULBOPHYLLUM GLOBULIFORME Nicholls.—

Rhizome creeping on the bark of trees. Pseudobulbs very small, globular, green, about 1-1½ mm. in diameter. Leaf solitary at the apex of the pseudobulb, linear-subulate, fugacious, about 2½ mm. long. Flowers small, solitary, about 3-5 mm. in diameter, white, suffused with pale yellow, and in some flowers with crimson on the spur and sepals.

Perianth-segments widely expanding: dorsal sepal lanceolate; lateral sepals broad. Spur short and obtuse. Petals lanceolate. Ovary short,



(For Key see page 219).

glandular-rough, the upper part of pedicel also marked with glands. Pedicel rather long, the subtending bract long, loosely sheathing.

Labellum with entire margins, oblong, curved, channelled towards the base, cream or pale yellow, the apex hardly acute. Column very short and broad, the base produced into a slender, curved foot, about $2\frac{1}{2}$ times the height of the column, 2 prominent upward curved subulate lobes in front.

Flowering: October, November.

Date of collecting: January 1937, November 1939 (Dockrill).

Distribution: S.E. Queensland, N.E. New South Wales.

(TYPE material in the Author's Herbarium.)

KEY TO ILLUSTRATION

BULBOPHYLLUM GLOBULIFORME, Nicholls.

- A. A typical colony of plants (natural size).
 - B. Pollen masses.
 - C. Labellum.
 - D. Flower (side view).
 - E. Flower (viewed from front).
 - F. Column.
 - G. Labellum (from rear).
 - H. Plant colony, with flower.
- (Note: Figs. B to H are variously enlarged.)

BOTANY DISCUSSION GROUP

At a preliminary meeting held on March 22 it was resolved to form a Botany Discussion Group within the Club. The following were appointed as a sub-committee: Mr. A. J. Swaby (chairman), Messrs. J. H. Willis, B.Sc., and R. D. Lee, and Miss N. Fletcher, with Mr. H. C. E. Stewart as Hon. Secretary (pro tem). A further meeting is arranged tentatively for Monday, April 29 in the Royal Society's Hall, at 8 p.m. Mr. J. H. Willis will give a short talk on "The Collecting of Native Flora." The Wildflowers Protection Act will be explained, and there will be discussion, questions and exhibits by group members. The group is open to all F.N.C.V. members, especially beginners. It is hoped to meet on the fourth Monday in each month, and regular botanical excursions to link up with the monthly meetings are projected.

URGENT NEED FOR EWART'S *FLORA OF VICTORIA*

(To the Editor)

Sir,—We have more than double our usual number of senior students at the Botany School this year and we are almost in despair about the supply of Ewart's *Flora* for their systematic work. We have about one copy between two or three students, which makes serious work difficult.

I wonder whether you could inform your Club members of our need. We are willing to buy copies at current rates, or to hire them subject to proper arrangements about their care. It is just possible that some members no longer use their copies or that they have a friend who is in that position. Many of our students are returned men and we want to give them the best we can.

Yours sincerely,

University of Melbourne, N.3.

J. S. TURNER, Professor of Botany.

OBSERVATIONS ON AUSTRALIAN SPIDERS

By A. P. & R. A. DUNN, Melbourne.

Of all our little neighbours of the fields there are few that are more universally shunned and feared than spiders; and fewer still that deserve it less.

There is a widespread belief that spiders are liable to bite and that their bites are very venomous. This may be true of certain species, but the spiders of temperate regions are practically harmless.

It is true that spiders bite and inject into the wounds sufficient venom to kill an insect. But they are exceedingly shy creatures, fearing man more than they are to be feared. If an observer will refrain from picking up a spider, there is not the slightest danger of being bitten, and except for one or two species no spiders are known here whose bite would seriously affect a human being.

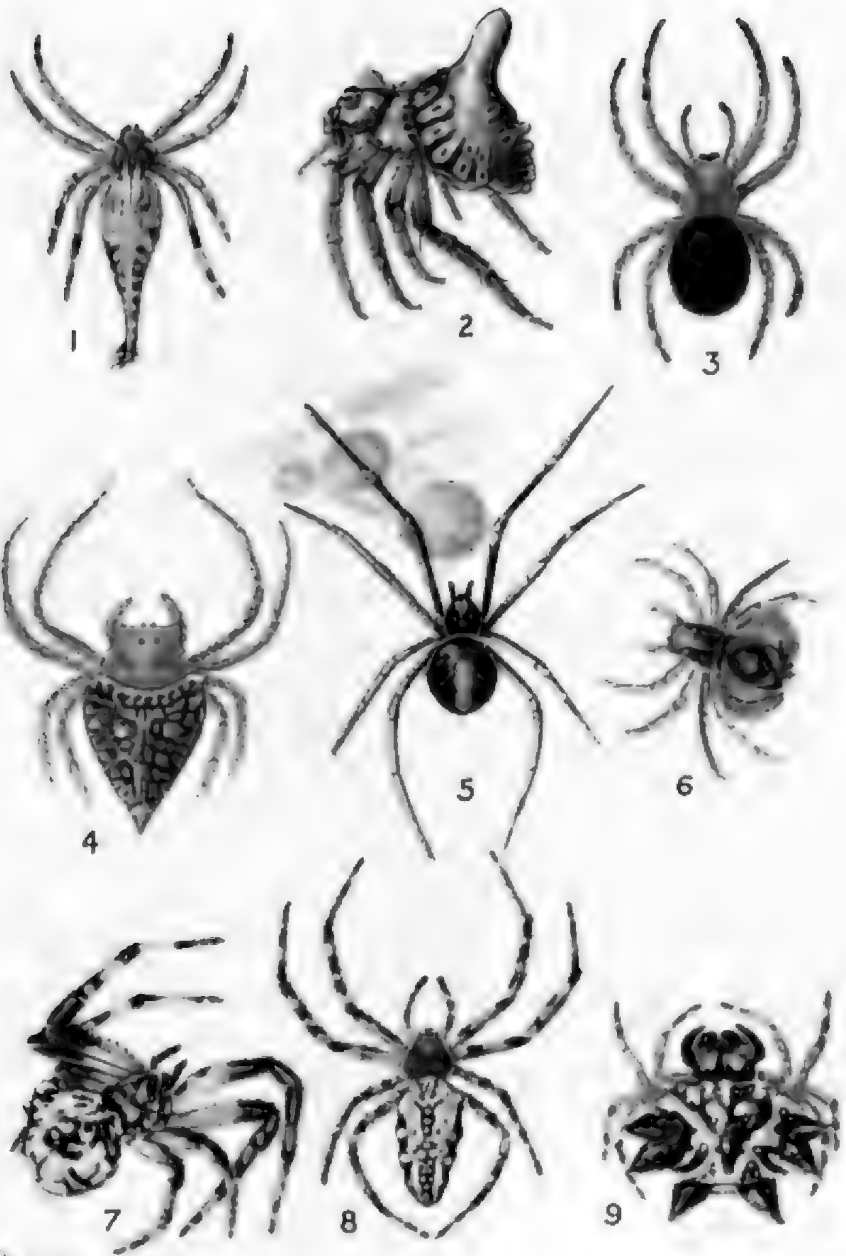
On the other hand, spiders are exceedingly interesting subjects to study, for some of the most remarkable exhibitions of instinctive powers are presented by them; and what product of instinctive skill is more wonderful than the web of an orb-weaving spider?

For the spider enthusiast, holidaying in the country holds promises of delight. Autumn is the best time for the fairy spinners to be observed at their best, for small dainty webs, usually overlooked, stand out in perfect design against the green of leaf and grass, the filmy silk glistening with dew. Webs—webs everywhere, hundreds of them, thousands of them. There are funnel-webs, sheet-webs, hammock-webs, webs of indescribable shapes, and, finest of all, the beautiful orb-webs, bejewelled in their radiant symmetry.

While the web-building spiders are those that most often attract attention, there are many, differing greatly from these in habits and the stratagems employed, to escape their enemies and to obtain their prey, that are scarcely less wonderful than those of web-building species. In a word, the abundance of spiders, the great variation in the habits of the different species, and the high development of their instinctive powers make them very suitable for purposes of study of animal behaviour.

The structure of spiders also offer an attractive field for study. This is especially true if attention be given to the correlation of structure and habits. Some spiders are sedentary, either trapping their prey by snares or lying in ambush for it; others, like wolves, stalk their prey; some make use of any retreat that they find, while others dig tunnels in the earth. Of the burrowing species, some merely strengthen the walls of their burrows with silk, leaving the entrance a simple opening into the earth; some build watch-towers or turrets about the entrances, and some close the entrance with a cunningly constructed hinged door. In each case the structure of the spider is specialized in a way that adapts it to its peculiar mode

PLATE XIII



1 The Tailed Spider, *Arachnura higginsii*. + 11. 2 The Turret Spider, *Dolophones turrigera*. + 4. 3 The Red-and-black Spider, *Nichodanus bicolor*. + 23. 4 The Triangular Spider, *Arcys clavatus*. + 33. 5 The Red-back Spider, *Latrodectus hasseltii*. + 1. 6 The Gliding Spider, *Saitis volans*. + 4. 7 The Bird-dropping Spider, *Celaenia excavata*. + 1. 8 The Enamelled-back Spider, *Aranus bradleyi*. + 13. 9 The Spiny Spider, *Gasteracantha minax*. + 4.

of life. Students believe that the first web evolved from the drag-lines used by the spider going in and out of a hole in the ground, which was its first retreat. The threads of silk finally lined the nest and radiated from the entrance. Striking against these lines, victims would be detected and seized by the watchful spider. Webs of this type are still constructed by the spiders of the family *Segestriidae*, and species of this family are fairly common about Melbourne, in brick walls or in corners of fences, etc. These spiders make merely a single tube, but the spiders of the family *Amaurobiidae* make a similar type of tube but with the fringe portion relatively much larger.

The next stage was the extension of the lower part of the web into a horizontal hammock-like sheet, which earned for its makers the title of Sheet-web Spiders. This type of web is spun by the *Agelenidae*; it can often be seen between the rafters of a shed roof, although it is not confined to indoor positions. Out of doors, however, such closely woven sheets offer dangerous resistance to the wind, and spiders have modified sheet-webs in two ways. They may bring the side of the web upwards to produce a hammock or bowl, or downwards to form a dome.

The dome-shaped web is better suited for catching insects rising from the ground in flight, as many do about dusk or in the morning. Irregular or tangled net-webs, being haphazard tangles of threads of all lengths, are spun by that annoyer of housewives in all temperate climates, the common house spider (Daddy Long Legs, *Pholcus litoralis*). The red-back spider (*Latrodectus*) also builds a tangled web. Once considered primitive, such webs now are regarded as degenerate. They probably represent an evolution from the sheet type altered to decrease resistance to the winds and to facilitate mending. As fly traps they are effective and, in addition, usually serve well for rearing the brood of spiderlings.

Like human fishermen, many spider species have learned that a plain net of two dimensions is not only economical of weight and material but ideal for landing a catch. The orb-web built on this principle may be put in exposed places where prey is most plentiful, since with its open construction it offers little resistance to the wind. In the net-snare method of catching prey, the orb web is the spider's last word. Few other animals, whether human or otherwise, have equalled it.

Spiders catch their food in a variety of ways, of which web-spinning is but one. Many spiders are merely night wanderers and seize whatever they encounter, provided that it is alive. Others hunt by day, and the wolf-spiders are capable of a very fair speed in chase. Others stalk their prey and leap upon it, covering several inches at a bound. Others again are more cunning and lie hidden beneath stones and logs, or under the bark of trees, until an insect approaches, when they leap upon it suddenly. Even among the

web-weavers, some stretch their webs high in trees, while others build among the low herbage. The student should therefore pursue his studies in as great a variety of situations as possible.

Although the finer details of the life-histories of the majority of our spiders have not yet been recorded, all spiders may be said to have a similar general life-history. Eggs are small yellowish or creamy-coloured spheres, laid in silk cocoons in varying numbers. The spider that hatches from the egg is at first unable to feed or to spin, but after its first moult it is able to do both and exactly resembles its parent, save in colour and size. Thus there is nothing in the life of the spider which corresponds to the caterpillar or the pupa of an insect. The development is direct and is only an increase in size. Only in rare instances does a social or family life exist.

Most spiders are cannibals and when the young ones break out of the cocoon they are generally bent upon dispersal. Some species, but by no means all, effect their distribution by a flight on a thread of gossamer, as has so often been described. The small spider first climbs as high as possible, and, having reached an exposed position, turns its head towards the breeze. It then raises its abdomen and excretes a drop of silk which is drawn out by the wind into a streamer a yard or more long. When the right moment comes the spider is lifted away upon a flight which, be it yards or miles, helps to spread the race. The crab spiders use this method, which accounts for many of the species being so widespread.

Spiders can eat large meals and can store some of their food in tubes which open out of the intestine. This enables them to tide over long periods of scarcity and to fast for months at a time. When they are well fed their characteristic method of growth can be seen. The supporting skeleton of a spider's body is on the outside, so that growth within makes this coat become tighter and tighter, and when it becomes too small it is moulted. The spider hangs itself up, with its feet close together and the abdomen supported by a thread from the spinnerets. By bending its legs it causes the skin of the abdomen to split along the middle of the back, the split extending round the sides of the cephalothorax. The skin soon shrivels off the abdomen and the carapace falls away easily. Then the legs are slowly pulled from their old casing by a series of jerks.

After the moult the spider is of a paler colour than usual and is quite soft at first. Seven or eight of these moults may take place before the spider is mature. Male spiders, which are almost always smaller than female, cease to spin webs and become wanderers until they find their mates. The popular belief that the female spider always eats the male is an exaggeration. Such happenings do occur and do so more frequently with some species than with others, but it often happens that the two sexes live together in the web for a short time and that a sort of common life is possible.

The cocoons in which the mother spider lays her eggs vary from

plain round cases of silks to elaborate and beautiful structures which take a whole day or more to make. Very often the cocoon is at once abandoned by the mother, but some spiders remain on guard, and a few even tear open the egg-sac to help the young ones to escape. Others carry their egg-sacs about either in their jaws or attached to their spinnerets. Wolf-spiders carry their young ones clustered upon their backs for the first few days of their lives.

If it is a collection you require, spiders may be caught everywhere at all times. The best methods of finding them are by beating, sweeping, sifting and digging. In beating, a good thing to use is an old umbrella, held open and upside down under bushes and trees. When the foliage above is vigorously shaken or beaten, a shower of creatures falls and is caught in the umbrella. Instead of an umbrella, an easily-made catcher is sometimes used. The catcher is made with a light triangular wooden frame with a tight canvas bottom. The top has an overlap on the inside of the frame. The point is pushed into the bush and the bushes above are beaten. The arrivals on the sheet run to the sides and, meeting the overhanging rim, crouch there instead of running over the top. Sweeping is done with a stout canvas net which is dragged through the undergrowth.

In winter and spring spiders can be caught by sifting; that is, by using the smallest mesh wire-netting in which fallen leaves and so on are shaken over a newspaper or canvas. Half-embedded staves or logs should always be turned over for inspection, and then replaced. The spiders that are revealed by any of these methods should be covered with a small specimen tube, up which they will run and in which they can be kept until preserved. By digging, you very carefully follow the hole or burrow down to the nest in which the spider sits, which may be from four inches to twelve inches or even as much as two feet deep.

Orb spiders are best caught at night, after they have built or when they are building their webs. You go out with a torch and bottle or specimen tubes and place the mouth of the tube under the spider, upon which she will drop into it, as orb spiders usually drop when touched.

It has been said by many writers that spiders cannot be set like butterflies and will never form a beautiful collection. With this statement we disagree. Spiders, properly set and mounted, form a very fine collection, for many are very brightly coloured and marked. When ready to preserve, first kill with fumes of chloroform in a killing bottle, then lay out in desired position as naturally as possible. Then place in spirits in a corked specimen tube, colourless industrial spirit being better than purple methylated spirit. Some brilliant colours may fade, especially the green, but the spider is always readily available for examination. With large spiders the spirits may go brown at first and must be changed after

a few days. Evaporation of the spirit may be reduced by dipping the cork in melted paraffin wax; when the tube is corked the top of the tube is dipped in the wax. The name of the specimen and details of its capture should be kept either by number in a book or written in pencil or Indian ink on paper and kept in the tube with the spider. Spiders are best examined in spirits lying in a small white china saucer. A microscope should be used with the one-inch objective and a strong direct illumination.

For elementary work a microscope is not essential and much may be done with a good pocket lens. But it is well to remember that spiders, like other animals, may also be studied alive. Collectors should therefore carry a number of specimen tubes in which living spiders may be brought home. All kinds of spiders do not take kindly to being kept in captivity but most of the web spinners will spin webs in cages and catch live flies and other insects. For cages, plain cardboard boxes with glass on top will serve, but it is always possible to construct more elaborate apparatus, often with profitable results. The addition of stones or paper tubes to provide shelter or ready-made burrows is an advantage, and a constant supply of water is sometimes a necessity. (Many spiders which can go without insect food for some days cannot live without water.) With a little care and originality in the making of cages, most spiders can be made to live normal lives, undisturbed by captivity, and some of the most interesting observations have been made in this way.

In order to study spiders or any other animals it is necessary to be able to name the species that are found, so that already existing knowledge may be traced and newly discovered facts made available for others. There are at least 20,000 species of spiders in the world, classified nowadays into five suborders and 64 families. The first practical problem that the student encounters is therefore to decide to which suborder and to which family any given spider belongs. Three of these suborders may be very briefly discussed.

The suborder *Liphistiomorphae* contains spiders characterized by their segmented abdomen, and their eight or seven spinnerets placed underneath the abdomen towards the middle, but these spiders are restricted to a very small area, which includes portion of the Malay Peninsula. The suborder contains three families, two of which are extinct and belong to the Carboniferous Period. These spiders are very primitive.

The suborder *Hypochilomorphae* agrees with the *Liphistiomorphae* and also with the *Mylgalomorphae* by the possession of two pairs of book-lungs, but differs from both those suborders by having their fangs articulated so as to give a true bite. There is only one rare family in this suborder, and one species has been recorded from Tasmania.

The suborder *Apneumonomorphae* differs from all the other suborders in that their members have no lungs, but breathe entirely by means of tracheae. Probably many of the smaller spiders belong here, but a lot more work is required before the extent of this suborder is at all certain. The majority of the approximately 1500 Australian spiders, however, belong to the *Mygalomorphae* and the *Dipneumonomorphae*, and it is necessary to discuss these two in greater detail.

The suborder *Mygalomorphae*, containing the trapdoor spiders, can be characterized by the two pair of lungs and the fangs striking downwards. These spiders are particularly well represented in Australia—five families have been recorded here, but I intend to mention only three of these families. First comes the family *Theraphosidae*, which includes our largest Australian species, *Selenotypus plumipes*, which is almost 2½ inches in body length. Second is the family *Ctenizidae*, which contains the true trapdoor spiders. Outstanding in this family is *Missulena occatoria*, sometimes called the Maltee Mouse-Spider although it is distributed all over Australia and also has been found in Papua. What is probably the male of this spider is the Red-headed Trapdoor Spider, until lately known as *Missulena rubrocapitatum*. No males of *occatoria* and no females of *rubrocapitatum* have been found, and on this circumstantial evidence the name *rubrocapitatum* has been discarded.

But probably the most interesting at the moment is the family *Dipluridae*, to which belongs the Melbourne Trapdoor Spider, *Anamie butleri*. Although called Trapdoor Spiders, none of the spiders of this family constructs a trapdoor to its burrow in the ground, and in this connection it is interesting to note that some species of burrowing Wolf-Spiders (which are not Trapdoor spiders) do construct a door to their burrow.

Although science has exploded most of the exaggerated fears of spiders in general, it has convicted three species as being dangerously venomous. These are *Atrax robustus*, *A. formidabilis* and *Latrodectus hasseltii*. Of these, the two former, also belonging to the family *Dipluridae*, are closely related to the Melbourne Trapdoor Spider.

Eight species of the genus *Atrax* are known from eastern Australia and Tasmania, but toxic bites have been recorded only from the two named. Both are found only in New South Wales, where they live in natural crevices, such as holes in the ground, under logs, in stumps or under houses. They are very pugnacious and attack on the slightest provocation. Their venom is very deadly; in some cases an interval of a few hours only has elapsed between the bite and the death of the person bitten. *Atrax robustus* is a large black or reddish-brown spider between 1 inch and 1½ inches

in length, and is, as far as we know, confined to a small area around Sydney. *A. formidabilis* is very similar in appearance but is slightly larger than *A. robustus*. It is apparently confined to the North Coast of N.S.W., but only a few specimens have been found and the female is unknown.

Although both the *Atrax* species cause the death of the individual directly by venom injected at the time of biting, the Red-back Spider (*Latrodectus hasseltii*), because of its normal habitat in outdoor privies and other unsavoury localities, apart from inoculating its own venom, may introduce at the same time very virulent organisms which cause the death of the individual indirectly. In a few cases some doubt has arisen, as a considerable time elapsed between the bite and the death of the person, but it is impossible to rule out the fact that these deaths have been due to the bite of the spider.

The genus *Latrodectus* is spread over all the world and includes the well-known "Black Widow of America," which is very similar to our own Red-back. These spiders build their webs in dark corners, in empty tins, watering cans, and flower-pots, or among loose rubbish; they also occur under stones or rock shelters, while their favourite haunts are in the iron covers of water-meters, and under the seats of closets in country districts where the dry earth closet is in vogue. It is impossible to estimate the number of actual bites from Red back spiders, but in the medical literature of Australia there are references to 98 cases, although only 56 are described. An analysis of the actual recorded bites show that 64% were bitten on the buttocks and neighbouring parts, 8% on the hand, 8% on the arm, 5% on foot, 5% on leg, 5% on thigh and 5% on head.

An analysis by the Government Statistician of New South Wales of the deaths from venomous bites from 1927 to 1932 reveals that deaths from snake-bite totalled ten, while deaths from spider bites totalled seven.

Also belonging to the family *Theridiidae* is the Red-and-black Spider (*Nicodamus bicolor*), which is perfectly harmless but which has often been mistaken for the deadly Red-back. The abdomen is all black without the stripe and the cephalothorax and legs are red, whereas in *Latrodectus* they are black. *Nicodamus* is common under bark, stones and logs, and seldom roams from these positions.

We may now consider briefly the family *Epeiridae*—the orb-web spiders. The Tailed Spider (*Arachnura higginsi*) is fawn coloured with lighter patches at the front of the abdomen, which is lengthened into a tapering tail. The spider is about half an inch in length. It is not very common about Melbourne.

The Turret Spider (*Dolophones turrigera*) is one of the rarer and more remarkable of the spiders occurring near Melbourne. It is about five-eighths of an inch in length and brown in colour, and

has a cylindrical "tower" standing upright from the centre of the abdomen. Nothing is known of the habits of this spider. The Triangular Spider (*Arceys clavatus*) is another spider whose habits are unknown. It is about half an inch in length and has a mosaic pattern on the back of the triangular abdomen.

The Bird's-Dropping Spider (*Colaenia excrucians*), although not very common, is so remarkable that it is probably one of our best known spiders. The habit of choosing leaves and twigs on which to sit huddled up with the legs folded close to the body makes the name particularly appropriate. The male is unknown.

The Enamelled-back Spider (*Araucus bradleyi*), which is very common in the Dandenong Ranges, is about five-eighths of an inch in length. The abdomen is long and tapered to the rear, and the back is beautifully enamelled and creamy in colour, with a dark brown or reddish pattern, sometimes with a touch of green down the sides.

The Spiny Spider (*Gasteracantha minax*) is another spider having an enamelled finish to the abdomen, which is black and white. About half an inch or larger, this is a distinctive and easily recognized spider.

Another interesting spider is the Leaf-curler, *Phonognatha wagneri*, which although fairly common is not often seen. The spider itself is about half an inch in length, yellow-brown in colour with darker brown anterior patches and green marking on the abdomen. A dried curled leaf is built into the centre of the web and here the spider hides. The leaf most commonly used is that of a eucalypt, which is rolled into the desired shape, the edges bound down with silk and the inside lined to make a snug retreat. Where eucalypt leaves are not available, other leaves may be used, and even an empty snail shell may be made to serve.

One of the commonest spiders around Melbourne is the Funnel-web, *Ixenticus robustus*, which belongs to the family *Amaurobiidae*. This spider is about half an inch in length and the whole body is covered with fine black hairs, while the abdomen also is mottled with grey hairs, which sometimes form a distinct pattern. The web of this spider is usually very distinctive, for not only is it of funnel-web type but is also of a bluish colouring due to the silk combed from the cribellum which this spider possesses.

All of the spiders so far mentioned have been of the web-building families, but there are many others, equally if not more interesting, which exist by their skill as hunters.

Foremost amongst these are the Wolf-Spiders—the family *Lycosidae*—among which are some that live in holes in the ground and even have lids to their burrows, and so are sometimes confused with the Trap-door spiders. In another way, too, they have added to the confusion existing in the use of common names, as the term "Tarantula," in spiders at least, was applied originally to a wolf-

spider from southern Italy. In Australia the name "Tarantula," as well as its corruption "Triantelope," is applied to those large spiders belonging to the family *Eusparassidae*, the Crab or Huntsman Spiders. Although these crab-spiders look very formidable, they are actually quite harmless, and are one of the most useful of all spiders. Instead of killing them when they enter the house, it would be a far more sensible idea to encourage their presence by opening all the doors and windows to enable sufficient flies to enter to provide the spiders with food.

The name "Crab-Spider" has been suggested on account of their ability to run sideways. One of the commonest of these spiders is *Isopoda immanis*, which is about one and a half inches in body length with a leg-span of about five inches. The body is mottled with black and white and the legs are broadly banded with the same colours. One of the distinguishing features of this spider is the black patch at the front end of the abdomen. Altogether it is a rather striking spider when examined closely.

While on the subject of Crab-Spiders, it may be of interest to mention a remarkable spider discovered in Tasmania in 1939 by Dr. V. V. Hickman, who is Australia's chief authority on spiders. Although only about a one-tenth of an inch in body length, this spider, *Toxops montanus*, differs so much from the other known spiders that a new family was established for its reception. Although the majority of crab-spiders have only two claws on their tarsi, this spider has three, and the arrangement of the eyes also differs from all other families.

There is another very rare family of which Dr. Hickman has done much to increase our knowledge, namely, *Hodrotarsidae*. Only four of this family appear to have been found up to 1942, and some authorities suggested that the family should be abandoned and that the two genera known should be transferred to other families. Dr. Hickman, however, then described three new species and showed that the characters of the spiders were such as to justify the retention of the family. Of these three species, two have been found in Victoria. Although the largest is less than one-sixteenth of an inch in body length, their eyes are almost sufficiently distinctive to be used as a guide to the family.

Reverting to the more common spiders, there are three families which I feel I cannot pass without some remarks. One of these, the family *Gnaphosidae*, has a well-known representative in the White-tail Spider, *Lampona obscoena*. Although actually a forest spider, the White-tail is fairly commonly found on walls inside houses. It is about five-eighths of an inch in length and is black in colour, but has a dirty white patch on the tip of the abdomen which gives the spider its name. This is one of the hunting spiders; it does not build a web to capture its prey. For such a common spider, it is remarkable that more is not known of its habits.

Fairly close to the family containing the White-tail is another family, the *Clubionidae*. Generally the spiders of these two families have similar habits, but there are some representatives of the *Clubionidae* which build a flat web, generally on the underside of stones and logs. One of these spiders is *Miturga ugelensis*, which has a range from Western Australia to Victoria and Tasmania. This spider favours open sunny situations and avoids the dense forest and shady gullies. At times the web is built in a thick shrub and may be about two or three feet from the ground, but generally it is close to the earth. Apparently this spider has found it easier to sit in a web and wait for its food than to go out and hunt for a living.

Finally we come to what is probably the most specialized group of spiders, the Jumping Spiders of the family *Salticidae*. This family has spread all over the world and contains more species than any other family of spiders. Many of the species are beautifully coloured, especially those from the tropics. These spiders capture their prey by a slow approach, followed by a sudden spring. The structural peculiarities make them very easy to recognize. The eyes are in three rows, the first consisting of four large eyes which necessitate a broad front to the cephalothorax. It is obvious that these large eyes are associated with the spider's mode of life and the keener vision which it demands; and Jumping Spiders are in fact more long-sighted than any others, for they respond to the movement of insects ten or twelve inches away. Before a Jumping Spider jumps, it always fastens a line of silk to its resting-place. Thus, however far it may go over a precipice it is always safe from a fall. By means of the silken line, it can regain its former position.

NOTES FROM A GULLY GARDEN

"I was very interested in Mr. L. M. Carritt's remarks on looper caterpillars in the February issue of the *Victorian Naturalist*. They trouble my garden in the Dandenong Ranges, where they attack a Kowhai and the Hoveas.

Regarding the death of a platypus at the Zoo. A friend of mine found at the back of a gully here a platypus lying dead in a shallow pool of the creek. It was fully grown and must have died from the heat.

A great event (per the *Victorian Naturalist*) is the centenary of the Melbourne Botanic Gardens. My mother often told me of her picnics there in the early days, when she was a child—how it was all bush where Government House now stands, and how she used to gather wild flowers, especially sky-blue pincushions (*Brunonia australis*), which she always loved. I have tried to grow them here, but without avail. Someone told me that the way to grow them was to get them up from freshly gathered seed. If I could obtain seed I would try again.

This morning (March 7), for the first time this season a lyre-bird was reported in the gully singing for all he was worth."

(Extract from letter from A. I. L., country member in Dandenong Range.).

NEW BEES AND WASPS—Part II

Describing Two Black Species of *Exoneura*.

By TARLTON RAYMENT, Melbourne.

In August, 1945, several "nest" series of *Exoneura* were received from New South Wales. The bees were all black, and taken by my correspondents to be *Allodapula*, and, since the typical species of *Exoneura* have a red abdomen, it was a very natural conclusion. Despite a singular likeness, two related but quite distinct species were involved.

In the absence of the larvae, this determination might have been regarded as a debatable one, but the structure of the larval forms is so remarkable that their specific position cannot be debated. One has a simple lateral appendage, and the other a conspicuous dactyliferous structure, as will be seen from the figures. The simple appendages of *E. roddiana* measure 650 micr. in length.

The taxonomic position, too, is remarkable, but nevertheless clear. *E. roddiana* sp. nov., is to *E. lawsoni*, in the black series, what *E. holmesii* (see *Vict. Nat.*, Feb., 1946, p. 181) is to *E. perpensa*, in the red-bodied species, but the accurate separation certainly would only be determined with difficulty in the absence of good nest series. The clypeal mark of the female of *E. lawsoni* is very like that of the female of *E. holmesii*, but the male resembles *E. perpensa*. The female mark of *E. perpensa* has a close resemblance to that of *E. roddiana*, while the clypeal mark of the male resembles that of *E. lawsoni*:

There are thus not only parallel, but also diagonal, lines of relationship between these four remarkable species (*q.v.* text diagram). These black species, in a genus typified by red bodies, find a parallel in the genus *Parasphocodes*.

In view of the very unusual taxonomic position, the author presents his diagnosis of the two new species by comparison, as follows:

SPECIFIC DESCRIPTION

E. LAWSONI, sp. nov.*E. RODDIANA*, sp. nov.TYPE: Male—Length, 4.5 mm.
approx.

TYPE: Male—Length, 4 mm, approx.

Clypeal Mark

With tiny lateral marks.
Female with a "T."No such marks.
Female with a "T."

Scape

Yellow in front.

Black.

Antennae

Ferruginous beneath.

Black.

	Anterior Orbital Margins
Converge below.	Converge below.
	Labrum
Ivory.	Ivory.
	Mandibles
Ferruginous on apical half.	Blackish.
	Mesothoracic Disc
Polished.	Shining.
	Tergites
A few white hairs.	More white coarse hairs.
	Legs
All knees and tarsi ivory, Anterior tibiae red.	All knees and tarsi red, Anterior tibiae red.
	Wings
Hyaline.	Somewhat dusky.
	Nervures
Light sepia. Cubital cell narrower at apex.	Dark sepia. Cubital cell wider at apex.
	Locality
Canberra, F.C.T. Newton R. Lawson, July 1945. (ALLOTYPE and COTYPES in the collection of the author.)	Lane Cove, Sydney, N.S.W. Norman W. Rodd, August 1945. (TYPE and ALLOTYPE in the collection of the author.)

DETAILED DESCRIPTION OF *Exoneura*
LAWSONI, *sp. nov.*

TYPE: Male—Length, 4.5 mm. approx. Black.

Head transverse, shining; lateral face-marks ivory-coloured, somewhat finger-shaped at apex; frons raised to a carina; clypeus entirely ivory-coloured; supraclypeal area finely aciculate, sparsely punctured; vertex wide, with polished areas below the ocelli; compound eyes large, convex, strongly converging below; genae polished, large; labrum ivory-coloured; mandibulae obscurely brownish, with an ivory dot; antennae black, brownish beneath, scapes ivory in front, with a dot of like colour at the base.

Prothorax not visible from above; tubercles large and ivory-coloured; mesothorax shining, with extremely delicate sculpture; scutellum and post-scutellum dull; metathorax with microscopical lineation; abdominal dorsal segments shining, minutely lineate, a few large punctures, hind margins obscurely brownish, a few white hairs on tergites 4-5-6; ventral segments shining.

Legs black, knees ivory, anterior and median tibiae light-red; tarsi ivory-coloured; claws bifid, reddish; hind calcar ivory, finely serrated; tegulae pale-amber, with a dark dot; wings hyaline;

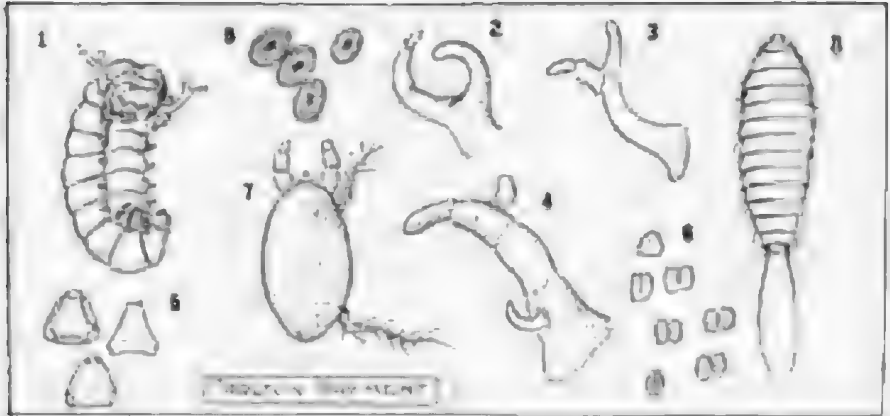


Fig. 1

1. Ventral view of young Larva of *Exoneura lawsoni*, sp. nov.
- 2 3 4. Various views of the larval appendage.
5. Pollen granules from Myrtaceous plants formed only 10 per cent. of the food in the mesenteron.
6. Small granules (undetermined) formed 90 per cent.
7. A partly digested Acarid mite was among the granules.
8. A minute insect, too, was taken from the mesenteron. It could be a triungulinid.
9. The few oenocytes present were creamy-coloured, large and opaque.

nervures brownish; the second cubital cell wide, but sharply contracted at apex; pterostigma large and brown; hamuli five.

ALLOTYPE: Female—Length 6 mm. approx. Black.

Very like the male, but larger, and head longer than wide, face-marks limited to an ivory-coloured "T" with a thick stem on the clypeus; compound eyes parallel, not converging below; antennae black, flagellum brownish beneath, not any ivory colour on the scape; tubercles ivory-coloured.

Legs black, with anterior tibiae bright-red; wings sub-hyaline; axillae all ivory.

ALLIES: *E. roddiana*, which has black scapes.

Notes on the Biology

The series of eighteen (11 males and 7 females) was taken alive by the author from a small dry twig of introduced *Hydrangea*, 6.5 cm. in length and 6 mm. diameter. The gallery ran the entire length of the twig, with a diameter of 2.3 mm., the soft, loose-celled pith being easily excavated by even such tiny bees.

There was no trace whatever of any cell-divisions in the gallery, although most other bee "nests" investigated by the author have contained cells separated by substantial divisions of some material.

Obviously, none of the imagines had flown, and they were packed closely along the gallery, heads touching tails. There was no doubt

whatever that the imagines had developed in the positions in which the author had found them, and that all were in a state of semi-hibernation, and had passed through the winter in that condition.

One place only showed a trace of pollen, and there was a considerable stain from the yellowish oils of the pollen-granules. It would appear from this fact, and the utter absence of cell-divisions, that there is a communal feeding of the young in this genus, hence the Australian species would have a close relationship with the African species of *Allodape* studied by Doctor Brauns.

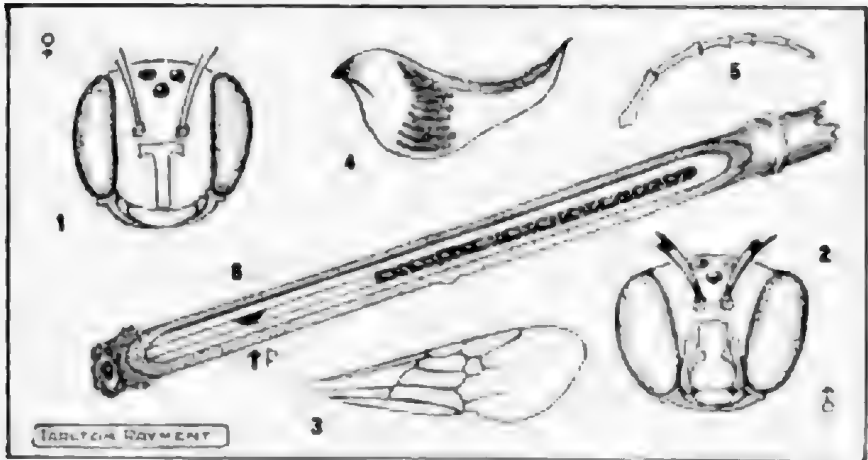


Fig. 2

1. Front of head-capsule of *Exoneura lawsoni*, sp. nov.
2. Front of head-capsule of female.
3. Anterior wing of female.
4. The remarkable sagitta of the male genitalia with its 17 spines.
5. Maxillary palpus of the female.
6. Plant-tube showing the imagines, also the pollen-stain, "P."

In August, 1945, more plant-tubes, together with mounted specimens of young larvae, were received from Norman W. Rodd, of Lane Cove, Sydney. The youngest had just hatched from the egg, and, examined microscopically at that stage, there was a stud-like indication of the fleshy lateral appendages. These constituted the new species just described, viz. *Exoneura roddiana*.

The mesenteron did not contain any pollen-granules whatever, and since the contents were clear when viewed by transmitted light, it would appear that either the larva had been fed with predigested colorless "pap" regurgitated by the mother, or had not received any food up to that time. There were a few oenocytes along the dorsal area of the hind portion.

The older larvae had the mesenteron distended with yellowish pollen-granules massed into a pasty condition, and it was evident

that the conjunction of the mesenteron and the proctodeum had not yet been effected, although the union was not far off. The age, then, of these would be probably about eight days.

The really remarkable feature of the older larvae was the long lateral arms which were quite simple—not a trace of the “hand” and “fingers” observed on the larvae of *Exoneura holmesi*. These “arms” are quite rigid, and project at a right-angle from the first thoracic segment. However, although these are much more elemental structures, yet they *could* be of service in holding and maintaining the larval position in a smooth plant-tube.

Whichever way one views these lateral appendages of the larvae of *Exoneura*, they are full of interest, because they are unique in an Order where the larvae are singularly deficient in appendages, and therefore extremely helpless during the nursing period.

One tube from Lane Cove was excavated in the dry pith of the stem of a weed, *Lantana*, and it contained five adult bees (three females and two males) and 25 larvae in many stages, but not any pupae. It was plain that these had been nurtured during the winter, and were being fed progressively, for the mesenteron of each was distended with bright-yellow granules from a species of wattle (*Acacia*) and many from another leguminous plant.

There was not a trace of either cell-divisions or of a pollen-store, and the larvae when received were being pushed into a confused heap by the head of a female, but it was observed that some were attached to the wall by a few threads of white silk. On this point Norman Rodd writes:

Although I have not yet thoroughly investigated the habits, yet they would seem to be similar to those of the African species of *Allodape* mentioned in your monograph, *A Cluster of Bees*, for there is no permanent store of pollen-batter; the larvae are fed from day to day. They are attached to the walls by the anal end, and project out at right-angles. All stages of developing larvae are present.

It will be observed that the anal segments of the larva differ from the typical form of bees, being long and pointed, and probably adapted for adhering to the wall of the tube. The mass of larvae, with the numerous rigid projecting arms, presented an astonishing spectacle for a student of bees accustomed to the normal disposition of one larva in a distinct and separate cell.

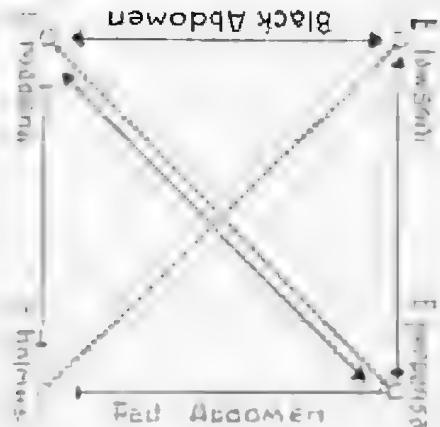


Diagram showing relationships of four species of *Exoneura*, circles represent females; arrows the males.

There is, of course, some communal feeding of the first brood in the Bumble bees (*Bremus* = *Bombus*), but this genus has never reached Australia naturally. The author introduced a number of Bumble "queens" to Victoria many years ago, but insectivorous birds defeated the experiment.

These are the first nests of *Exoneura* to be described, for, while the bees are often collected in the northern parts of New South Wales and Queensland, the nesting sites remained unknown until these twigs were received from Canberra in July and August, 1945, and John Hardcastle's tube in 1933 and, later, Norman W. Rodd's specimens.

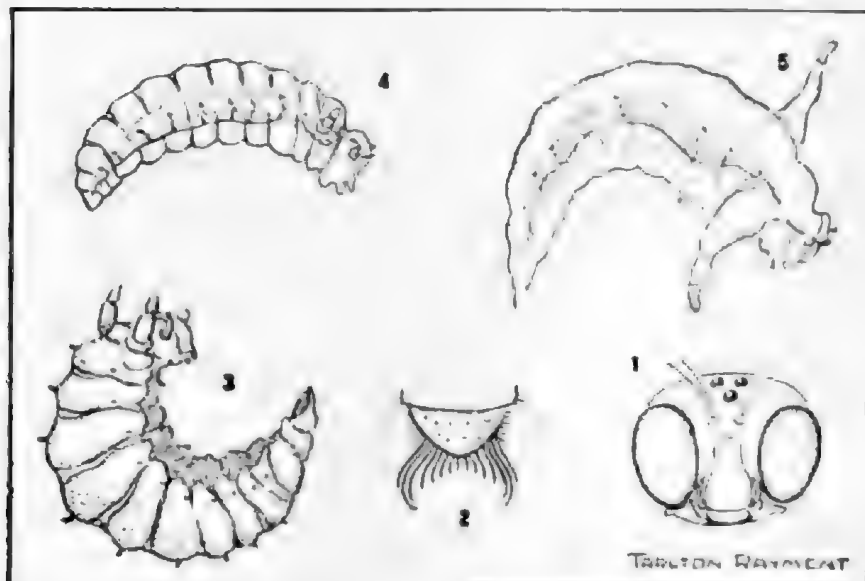


Fig. 3

1. Front of head-capsule of *Exoneura roddiana* sp. nov.

2. Spiny hair at apex of male abdomen.

3 4 5. Larvae at various stages, showing development of the appendages.

(N.B. No. 5 was drawn from a glycerine-jelly mount, by transmitted light; the appendages are thereby pressed out of position by the cover-glass.)

The African *Allodape* are sharply divided into three groups, differentiated by the manner in which the young are reared. Doctor Hans Brauns (1926) says these bees exhibit a striking transition from the solitary to the social form of life. One group deposits the eggs in a cluster at one end of the gallery, but another deposits but one egg, and then gathers the necessary food for it before depositing any more. The third group deposits the eggs in a spiral form, and a common pudding serves for all.

It will be of great interest to discover to just which group the

numerous Australian *Exoneuræ* conform, or whether they are outside the rather complicated behaviour pattern of their African relatives. However, now that the preferred sites are known, there is a chance that careful study will yield many more details of these very remarkable bees.

Australian Allodapulae

Several of my collectors have taken *Allodapula* on various plants, and the author appends a list of these in the hope that other nature-lovers may pay some attention to the tiny bees in this genus:

1. Two females, *Allodapula diminuta*. Typical in all characters. Edungalba, Queensland, 15th July, 1940, Ernest E. Adams. (On flowers of *Loranthus* species, gathering pollen.)

2. A series of females *A. plebeia* Ckll. Typical. Edungalba, Queensland, 15th July, 1940, Ernest E. Adams.

3. A series of females. Typical in all Characters. Mossman, Queensland, 11th November, 1939. J. Shaffery.

4. A series of females and one male. Typical. Edungalba, Queensland, 6th December, 1940. Ernest E. Adams. (On flowers of *Plectronia attenuata*.)

5. A series of females, *A. simillima* Sm. Typical. Edungalba, Queensland, 15th July, 1940. Ernest E. Adams.

6. Cairns, Queensland, 10th May, 1940. J. Mansky.

7. White Swamp, New South Wales, 19th March, 1939. J. Hardcastle.

8. Gosford, New South Wales, 12th December, 1932. H. Cambourne. (On flowers of *Loranthus* species.)

9. Como, New South Wales, 27th November, 1940. Alex Holmes. (On flowers of *Angophora cordifolia*.)

10. Mackay, Queensland, female. Not typical by the face-mark. 19th June, 1941. Ernest E. Adams.

11. The author has collected various specimens in New South Wales and Queensland. (On *Angophora* and *Tristania* species.)

Professor T. D. A. Cockerell, in his *Keys to Australian Bees* (1933), gives the following distribution:

A. picta Sm. "unfortunately only Australia."

A. grisea Alkin Denham, West Australia.

A. unicolor Sm. North-West Australia and Baudin Is.

A. plebeia Ckll. Thursday Is.

A. diminuta Ckll. Yarrowin, N.S.W.; Brisbane and Stradbroke Is., Queensland.

A. clarissima Ckll. Thursday Is., North Australia.

A. bribiensis Ckll. Bribie Is., Queensland.

A. simillima Sm. West Australia; Townsville; Mackay; Brisbane; Stradbroke Is.

THE 1946 WILD NATURE EXHIBITION

The Hawthorn Town Hall has been reserved for the next Exhibition on Tuesday and Wednesday, 8th and 9th October, 1946. This preliminary intimation is made so that Club members can plan their engagements well ahead, and give thought to new ideas for the exhibition. The interest of every member, country and city, is urged and suggestions invited.

SYMPOSIUM BY THE PLANT NAMES SUBCOMMITTEE

I. VERNACULAR NAMES FOR ALL VICTORIAN VASCULAR PLANTS
(A History of the Achievement)

By E. E. PESCOTT

About the year 1886, not long after our Field Naturalists' Club was inaugurated, there appeared a long article in the *Argus* on the desirability of common names for native plants. The article was not signed, but it was written by a member of this Club, and, although the author was never definitely revealed, it was generally considered that he was Mr. T. S. Hall, B.A., who afterwards became a Doctor of Science, Lecturer in Biology in the Melbourne University, and, later, President of this Club, and a well known writer and lecturer. His frequent remark was "Technical terms are necessary—sometimes." He would then add, "If there are two ways of expressing an idea, take the simpler one."

While the idea of vernacular names was occasionally talked about, it did not resolve into a general discussion until Mr. F. G. A. Barnard published his arresting article in this journal (November 1906) entitled, "Are Popular Names for our Native Plants Desirable." Mr. Barnard was a foundation member of the Club, later on a President, and as well, Editor of the *Naturalist* for forty years.

Mr. Barnard told of the difficulties met with by flower lovers, who were not botanists, in remembering the botanical names of plants. When collecting one day a friend asked him what would be the common name of *Gompholobium Huegelii*? "Huegel's Gompholobium," was Barnard's reply. The friend's retort is not recorded. Shortly after, they came to a patch of *Leptorrhynchus squamatus*. A local lad was passing, and Mr. Barnard asked the boy for the name of this plant. "Billy Buttons" was the reply; and the first official name for one of our plants was born. "Billy Buttons" it became and remained so for many years, until a change was necessary because other Composites had a prior right to the name.

In his article, F. G. A. Barnard definitely advocated the formation of a Committee to discuss, determine, and publish vernacular names. His scheme was to invite people to send in plants with their local common names attached. These were to be submitted to a Committee composed of the Government Botanist, Government Entomologist, Director of the Botanic Gardens, two school teachers, and a Club representative. Later, when names were decided upon, pictures of the flowers were to be printed in the *School Paper*, with their Common names, the blocks to be kept and published in book form. Barnard said, "Do not imagine for one moment that I want to coin a name for every individual species of our flora." Further he added, "I am well aware that the publication of such a work is beyond the means of this Club."

Barnard's proposition seized the imagination of the Club, and in less than a year, i.e. in August, 1907, such a Committee was formed, with full authority to go ahead. The members of this first Committee were: Professor Ewart (Professor of Botany and Government Botanist), chairman; Dr. C. S. Sutton (past president), secretary; and Dr. Leach, Messrs. F. G. A. Barnard, F. Pitcher, C. French, P. R. H. St. John, J. R. Tovey and J. P. McLennan, all representing various interests, and all members of the Club. Subsequently, and at various times, the Committee was enlarged by the inclusion of Messrs. J. W. Audas, C. French jr., C. Daley, P. F. Morris, J. Cronin, A. G. Campbell, H. B. Williamson and E. E. Pescott; at a later stage, Mr. F. P. Morris succeeded Dr. Sutton as secretary.

Professor Ewart and the Herbarium officers (Messrs. Tovey, Audas, and Morris) prepared a classified list of Victorian plants, and a book was issued, with the scientific names listed and accompanying blank spaces for

the writing in of records, observations and suggested common names. This book, or Census, was published by the Department of Agriculture and distributed as from the "Plant Records Committee." There was actually no such Committee; plant recording was, and is, clearly the work of the National Herbarium. The proposed work was to be undertaken by the Vernacular Plant Names Committee of the F.N.C.

This recording census was sent out to Schools and to anybody who was likely to be interested, with requests to fill in the blank spaces and suggest names. Dr. Sutton was appointed secretary, and all persons interested were asked to send to him or to Dr. J. A. Leach of the Education Department, the book with all or any recommendations or local records.

The Committee met regularly each month at the old National Herbarium building, now demolished, for over twelve years. Changes were occasionally made in the personnel, owing to removals, and the addition of interested people. Members were at first invited to accept responsibility for making a primary revision of any family in which they were particularly interested. *Orchidaceae* was thus allotted to me, *Leguminosae* to Mr. H. B. Williamson, and so on. One member facetiously offered to do *Palmae*, as the family he knew best! (For the benefit of the non-botanical, *Palmae* is the palra family that has but one native species in Victoria, i.e., the Austral Cabbage Palm of Cabbage Tree Creek, near Orbost.)

The method of selection was to take the plant families in their botanical sequence, the Herbarium officials selecting and preparing dried specimens for each evening's discussion. Thus the actual plants were inspected when suggested names were being discussed. Barnard's original suggestion that we should not vernacularise all plants was soon dropped, every plant being given a name.

Provisional lists were published from time to time in the *Journal of Agriculture*, Victoria, the Government Botanist being then an officer of the Department of Agriculture. Suggestions were invited and received, and the lists finally revised.

As the years passed, the problem of publication ceased to be a problem at all. Whether the popularising of names fired the public imagination or whether the Wild Flower and Wild Nature Shows were the chief attraction *per se*, is hard to judge. People rolled along to the St. Kilda Town Hall, Show after Show; money came flowing in, a publication fund was established, and soon this was large enough to launch the long anticipated book. During 1921-4 profits from Nature Shows gave nearly £600 to this fund.

Two members now stood the brunt of the work, Dr. C. S. Sutton, and Mr. H. B. Williamson ably assisted by Messrs. Tovey, Andas and Morris, all of whom worked hard in the completion and proof reading of the compilation.

The Census was published in 1923, and a copy, leather bound, was presented to each member of the Committee. In addition, a few interleaved copies were issued to botanists. Soon the edition was sold out, much to the surprise of the Club Committee, for an issue of about 3000 had been ordered and paid for, and yet the Club funds showed that little was in hand from sales. It was then found that hundreds of copies were "missing." Search was made, and the building turned almost inside out. Mr. Williamson was very persistent in his searching, and he ultimately found that the printers had delivered only half of the issue! The mistake was unfortunate for the printers, especially as their metal had been melted down. They did the only thing they could do, and offered to set up the type again and print the missing books.

Mr. Williamson at once seized this golden opportunity for a complete revision, called the Committee together, had all new additions and sundry corrections incorporated in the Census and so the second edition came into

being—at no cost to the Club! The entire work of writing the revised lists was accepted by Mr. Williamson and full credit must be given to him for this task, whilst it should here be recorded that the whole book reflects painstaking effort and is remarkably free from errors, either of typography or of botany. And so the good work, after nearly forty years, finally came to fruition.

A sub-committee consisting of Messrs. Audas, Morris and St. John was now appointed to act continuously, keeping records of new plants and changes in nomenclature. Gradually, so many additions and changes accumulated, that a new compilation was deemed necessary, a work modernised and made even more useful than before.

In May, 1943, the Club appointed a new Plant Names Subcommittee with the following personnel: Dr. R. T. Patton (chairman), Messrs. T. S. Hart, E. E. Prescott, J. W. Audas, N. Lothian, P. F. Morris, J. H. Willis (secretary) and P. Bibby. Mr. Lothian resigned on his leaving for New Zealand and, later, Mr. R. V. Smith was added to the list of names. It is to be regretted that Dr. C. S. Sutton felt unable to join in this new project. The first committee had ceased its work on the publication of the Census, but the present body is established on a permanent basis. If, for any reason, a member drops out, the Club Committee nominates a new member to sit on the subcommittee. There must be at least five members, who will carry on the work in perpetuity, and three constitute a quorum. The revision is being done systematically, plant by plant, and with excellent unanimity; most of our disagreements are with the loose findings of others, in particular the C.S. & I.R., which recently (1942) published a list of vernaculars for pastoral plants and weeds.

This came into being and grew, after many years' effort, a most useful work, the only one of its kind in the Commonwealth—a work of great value to plant students everywhere: it must now be recorded (and, it is hoped, fully realised) that every hour of the work often so laboriously but always happily spent, has been a labour of love, *without any cost whatever* to this Club.

II. THE VALUE OF (AND NECESSITY FOR) COMMON NAMES

By P. F. MORRIS

The purpose of standardizing common names for plants is to bring intelligent order out of chaos, particularly among those plants having products of vital importance to man (sources of food, timber, fibre, oil, rubber etc.). Such work must be supported by adequate authority; in Victoria, the botanical names are supplied by our National Herbarium and the common names only are dealt with by the Plant Names Subcommittee, of this Club. Although it may not be possible to correct all the errors of the past, the very existence of a recognised, authoritative list should aid the next generation in avoiding the errors of the past and be a basis for sound work in the future. It may be useful to cite here a few of the principles, guiding the subcommittee in its acceptance, or rejection of popular names:

1. When genera are represented here by species common to Great Britain (where they already possess suitable vernacular names of long standing), British names shall be adopted, and when other singularly appropriate names are already prevalent in the State, these also shall be indicated in parenthesis.
2. Substantive names are to be the same for *all* members of a genus, except in special instances of long usage or singular aptness.
3. Where suitable native (aboriginal) names are already in use, and are seemingly appropriate, they shall be adopted.

4. Where the scientific generic name is already in popular use, it shall be preferred.
5. No popular names shall be admitted for plants if they are the scientific names for other species or genera.
6. Where possible the qualifying adjective "native" shall be dropped.
7. Consolidating compound names and the elimination of hyphens.

Some difficulty has been experienced in establishing a standard practice in the use or omission of hyphens in compound words. For simplicity and convenience, hyphens are avoided where not clearly desirable; but a hyphen must be used where the meaning is made clearer, or where the pronunciation of the compound word would be difficult to recognise when printed as a single word, e.g. Bellflower (not Bell-flower), and Longleaf (not Long-leaf).

The Committee decides on names for both native and naturalised aliens, including the introduced grasses and clovers used by pastoralists. It is hardly necessary to affirm that a uniformity of common names is of great practical importance in the farming community, especially with such native plants as are being introduced into commerce. *One common name* is an advantage to all—the forester, timber dealer, builder, carpenter, farmer, nurseryman, school teacher and householder. It is essential for the smooth flow of trade, for the convenience of experts, and a guarantee to the man in the street—the last purchaser or user. It is of great importance to this State that we further encourage this work so useful to citizens.

The selection of the best common name for each species is often very difficult. One universal standard common name for each plant is the objective, but the confusion which exists is even worse than in scientific nomenclature. A single plant is sometimes known by several different names, some of purely local application, some very widespread. For example, the common noxious weed *Echium plantagineum* is known and proclaimed in Victoria as "Paterson's Curse," and in South Australia as "Salvation Jane," while the American standard name is Viper's Bugloss. It is apparent that a plant proclaimed as noxious by law, *should* have some standard common name. In Ewart's *Flora of Victoria* the cosmopolitan native grass *Paspalum distichum* is named "Sik Grass," in the C.S.I.R. *Plant Names Bulletin* it is "Water Couch," whereas the American Standard Names Committee adopts Knot Grass. In America the name "Bulrush" is standardized for species of *Scirpus*, the C.S.I.R. and Ewart's *Flora* give this name to *Typha angustifolia* which French, English and German works call "Reed-mace." There seems little doubt that the true Bulrush of the Bible was *Cyperus Papyrus*, still found along the Nile.

Many of the plants, sent to the Herbarium for identification, are often advertised and sold under wrong or misleading names—for trade and profit. It is well known that among importations of timber, fibre, rugs, cereals, gums and other plant products a similar condition exists (perhaps to a less degree than in native plants). A few well known examples are "Oregon" which is an Australian trade name for Douglas Fir, although it must be admitted that it has *eleven* other names in American timber trade! The American standard name for Zea Mays is Corn, but in Australia it is known as Maize, hence the trade names "cornina" and "maizena." Cinchona is an American standard, while Australians prefer to name it "Quinine."

Only 32 native (aboriginal) names have been adopted for the Victorian Flora, eight of which are applied to species of *Acacia*.

The adoption of a universal language, such as Esperanto which does not favour any one nation, would be a probable solution to the confusion in common names. So let the slogan be *one common name for the commoner*. Members will confer a great favour by constructive criticism of the names recommended by the Subcommittee and published from time to time in the *Victorian Naturalist*.

III. SOME DESIRABLE CHANGES AMONG FAMILIAR VERNACULAR NAMES

By J. H. WILLIS

The Plant Names Sub-committee has taken Ewart's *Flora of Victoria* (1930) as the basis for a careful and critical revision of all the common names applied to our vascular plants,—some 2700 species, including naturalised aliens. Happily, most of them are well chosen and need no alteration at all, thanks to the excellent work of our pioneer Plant Names Committee which prepared the F.N.C. Census. But certain names, particularly among naturalised and cosmopolitan species, call for special attention and these have been considered under four categories by the sub-committee. Let us select examples from each group:

I. Standards that have been proposed by responsible bodies of opinion and published outside Victoria.

We are bound to take heed of such publications as the *Standardized Names for Australian timber trees, 1939*, and pasture plants (including weeds), 1942, prepared by the Council for Scientific and Industrial Research, and of the comprehensive *Standard Plant Names, 1942*—an American work. Only the most serious objections should affect our adherence to these standards. So, we must change our familiar—

1. Murray Pine (*Callitris glauca*) to White Cypress Pine (*C.S.I.R.*)
 2. Shell Grass (*Brisa maxima*) to Quaking Grass (*S.P.N.*)
[Similarly, Shivery Grass (*B. minor*) becomes Lesser Quaking Grass (*S.P.N.*)]
 3. Gnat Orchid (*Acianthus reniformis*) to Mosquito Orchid, and Mosquito Orchid (*A. exsertus*) to Gnat Orchid.
[This transposition of vernaculars follows Rupp's *Orchids of N.S.W.*, 1943, and is very appropriate.]
 4. Wireweed (*Polygonum aviculare*) to Prostrate Knotweed (*S.P.N.*)
[The former epithet seems to be of purely Australian usage.]
- II. Clashes with standards proposed (or established) overseas for entirely different plants.
1. "Umbrella Sedge" must be dropped for *Cyperus Eragrostis* (syn. *C. vegetus*), because the name has long been applied to another tropical *Cyperus* (*S.P.N.*)
We recommend "Ditch—or Drain Flat-sedge" instead.
 2. "Lizard Orchid" should not be used for *Burnettia cuneata*, since an English species of *Orchis* bears this name. Why not simply "Burnettia," there being only one species in the genus?
 3. "Waxberry" for our *Gaultheria appressa* clashes with the name of a Californian *Symphoricarpos*. "Austral Wintergreen" would be a good substitute.
 4. "Yam" for *Microseris scapigera* is ridiculous, when the true yams have always been members of *Dioscorea*—a genus of lily-like tropical climbers. "Myrnong or Murr-nong Yam" would be preferable, as it also embraces the aboriginal name.
- III. More descriptive, euphonious, or otherwise appropriate names, as chosen and recommended by the sub-committee.
1. Wallflower Diuris, instead of Tall Diuris for *D. longifolia*—a gold and purple-brown blotched orchid.
 2. Cinnamon Bells, instead of Potato Orchid for *Gastrodia sesamoides*—a cinnamon-brown, leafless plant.
 3. Fig Marigold and Noon-flower for the fleshy and dry-fruited species

respectively of *Mesembryanthemum*, instead of the uncomplimentary "Pig-face" for all members of this group of charming flowers.

4. Honey-pots or Honey-pot Heath, instead of Green Ground-berry for *Acrotriche serrulata*.

IV. Disagreements with certain standards proposed outside Victoria.

1. Retain the very appropriate "Wire-grass" for *Tetrarrhena juncea* of our mountain gullies, and reject Wiry Rice-grass (C.S.I.R.)
2. Retain "Rat-tail Grass" for the introduced African pest *Sporobolus capensis*, and reject Parramatta Grass (C.S.I.R.)
3. Change the established but inapt "Myrtle Beech" (Census and C.S.I.R.) to Austral Beech for *Nothofagus Cunninghamii*.
4. Retain "Spotted Emu-bush" for *Stenochilus maculatus* and reject the foolish, misleading name of Native Fuchsia (C.S.I.R.)

Apart from the four categories of changes, exemplified above, mention may be made here of the numerous recent additions to our flora, for which names must usually be invented. Here are four samples of this kind:

1. Add *Cyathra marcescens*, "Skirted Tree-fern,"—in allusion to the dead fronds which are characteristically draped around its trunk, like a "hula" skirt.
2. Add *Nolathixas subaureus*, "Golden Mistletoe,"—from the vivid yellow colour of leaves and branches.
3. Add *Bossinea Walkeri*, "Cactus Pea,"—descriptive name suggested by local school children of Piangil.
4. Add *Eucalyptus crenulata*, "Zebra Gum"—young saplings are banded with black and white, in striking resemblance to the legs of a herd of zebras. (A remarkable endemic species from Buxton).

IV. A NEW DISTRIBUTION MAP

Dr. R. T. Patton, after alluding briefly to the praiseworthy accomplishments of the pioneer Plant Names Committee and the enthusiasm displayed by the present subcommittee, gave examples of names in which members could not reach agreement: for instance, Victorian *Casuarina*-species are spelt She-oak in the Census and in Ewart's *Flora of Victoria*, whereas it is almost certain that the early colonists used the spelling She-oak, from the resemblance of *Casuarina* timber to that of English Oak; how should we standardize the spelling? [Club members would greatly assist the Subcommittee, by giving their personal opinions in this connection. The name "Buloke" for one particular species of *Casuarina* does not concern the argument, since it is an aboriginal word meaning "place of frogs."—J.H.W., Asst. Ed.]

He then explained the need for a map to show more accurately the regional distribution of plants in Victoria than is possible with the existing very arbitrary division of the State into five sectors (based on a conception of Baron von Mueller's). The Subcommittee has prepared a draft plan, using both geographical and ecological features, whereby Victoria will be divided into 12 major vegetational regions with as many subdivisions, e.g. there will be a Mallee division with two subdivisions (Little Desert and Millewa or the Far North-west), a Grampians, a Glenelg and a Wilson's Promontory division, while the Alps will be a subdivision of the Eastern Highlands, determined by the 4,500 ft. contour. This plan (in colour) was screened so that Dr. Patton could discuss the boundary lines between divisions and indicate some of the difficulties experienced by the Subcommittee in defining them—East Gippsland was a special problem, opinions varying widely as to just where its western boundary should be fixed. When the map is finally completed, it will be a valuable aid to botanists in the field.

THE LATE J. A. KERSHAW

With the passing of James Andrew Kershaw on February 16, 1946, at the age of 79, a link with the pioneers of science in Victoria has been broken. He was a contemporary of Sir Frederick McCoy, Baron von Mueller, and Dr. Alfred Howitt in their latter years.

He was born on April 13, 1866, at Fitzroy, Victoria. His father, William Kershaw, was employed in 1856 as an assistant to the National Museum, together with Henry Edwards, the well known actor, who was also a lepidopterist. He was educated at the Alma Road State School and finished off at the Grammar School, East Street, St. Kilda. He was appointed to the staff of the Museum as an assistant on October 1, 1883, when that institution, under the directorship of Frederick McCoy, was housed in the Melbourne University grounds. He used to say that although his early work was of a general nature it was largely connected with entomology; in this way, his life-long preference for that subject was fostered. Later, as assistant to McCoy, he had exceptional opportunities to gain a wider and more technical training in general zoology and museum administration.

The period of his training coincided with that of the scientific revival during the closing decades of last century—a revival brought about in Victoria by the publication of McCoy's *Prodromus of the Zoology of Victoria*. That period might well be called the Taxonomic Period, for, during it, scientific work in Natural History consisted chiefly of systematic description. Besides such doyens as McCoy, Mueller, and Howitt, there was, at that time, a galaxy of talent—a number of enthusiastic younger workers who were the associates of young Kershaw. They included O. A. Sayce, T. S. Hall, A. J. Campbell, W. Baldwin Spencer, Albert Kitson, E. O. Teale, H. Sumners, G. Weindorfer, D. LeSouef, J. H. Gatliff, C. J. Gabriel, F. G. A. Barnard, C. French, G. B. Pritchard, T. S. Hart, George Lyell, A. Mattingley, and others whose names appear frequently in scientific literature.

In 1886 Kershaw married Elsie Charlotte Brown, who predeceased him.

After the retirement of his father in 1891, he succeeded to his father's position. On the death of Sir Frederick McCoy in May, 1899, Sir W. Baldwin Spencer was appointed Honorary Director of the National Museum and suggested its removal to its present site; about this time Kershaw was appointed Curator. Sir W. Baldwin Spencer resigned in 1929, when Mr. Kershaw succeeded him as Director, a post that he occupied until he retired in 1931. Thus, a Kershaw, father or son, had been intimately associated with science and museums in Victoria for 75 years!

After his retirement, J. A. Kershaw was appointed Honorary Curator of Zoology at the National Museum, but he was still interested in all matters relating to the institution and science generally. A few minutes before he passed away, he had been discussing matters of scientific interest with one of the younger school. He kept in touch with his many earlier co-workers in entomology, not only in Victoria, but in other parts of Australia.

Keenly interested in the work of the Field Naturalist's Club (of which his brother, David Kershaw, was a foundation member), he took a prominent part in its activities. Although a frequent visitor at its meetings as early as 1883, he did not become a member until 1888. He had been one of the committee for more than 30 years and was Honorary Secretary from 1901 to 1903. His papers published in the *Victorian Naturalist* cover a wide variety of zoological subjects.

He took a prominent part in securing the permanent reservation of Wilson's Promontory as a National Park and a sanctuary for the preservation of the native fauna and flora. He was Honorary Secretary to the Committee of Management continuously from its inception in 1908 to 1946;

38 years is a long span in a man's life, and this effort for the preservation of the fauna and flora is, in itself, an outstanding contribution to science.

He was elected a member of the Royal Society of Victoria in 1900, and a member of its council in 1902. He was elected President in 1918. He occupied the positions of Honorary Secretary from 1920 to 1923, and Honorary Librarian from 1924 to 1925. He was appointed a Trustee in 1922.

In 1934, he was elected Vice-President of the Zoological Section of the Australian and New Zealand Association for the Advancement of Science. From an early date he was a Fellow of the Entomological Society; in 1927 he was elected a Corresponding Member of the Zoological Society of London.

One would expect that he, who had led such an active life, would have travelled far. In 1908, he accompanied the Royal Australian Ornithological Union's expedition to Bass Strait; in 1909, he visited the Bass Strait islands; in 1913, he journeyed with Dr. MacGillivray and his son to Lloyd Bay, Queensland, and examined the Barrier Reef; in 1911, he investigated the platypus in the Hopkins River, Victoria, and, in 1921, he visited, with J. G. Davidson, Ooldea in Western Australia, where his interest was ethnology and general zoology.

Although James Kershaw was habitually kindly and urbane, he could be, when occasion demanded it, strong and forceful. Those who worked with him esteemed him for his sincerity and singleness of purpose; the advancement of science was always his ideal and he subserved personal ambition for it. Truth was his watchword throughout his simple life. He stood and fought for his convictions.

—R.A.K.

MORE HONOURS FOR VETERAN BOTANIST

Members of the F.N.C. will be happy to learn that Mr John McConnell Black of North Adelaide has just been awarded the Clarke Memorial Medal for 1946, in recognition of his distinguished contributions to natural history over a great many years. This coveted award has been made annually since 1878 by the council of the Royal Society of New South Wales. Mr. Black, who is 91, took up botanical work seriously in 1902 and he is still an active research worker and writer on the flora of his State; it will be recalled that this Club made him the recipient of the Australian Natural History Medallion for 1944.

FASCINATION IN THE STUDY OF SEEDS

Throughout 1945, and continuing into the present year, a remarkably good and valuable series of articles has appeared in the *New Zealand Journal of Agriculture* under the heading "Weed Seeds in Agricultural Seed." Mr. E. O. C. Hyde, Seed Analyst at the Palmerston North Seed-testing Station, is the writer and his large-scale drawings (numbering dozens) of those seeds, which render farm produce unfit for the export trade, are indeed works of art. Quite apart from the economic value of the articles, any nature lover could not help poring over the unrealized exquisite beauty of form and sculpture that are portrayed, much as the microscopist delights in his diatoms and radiolarians. One sincerely hopes that the pictures and their descriptive text will eventually form the basis of a comprehensive manual on the alien seeds of agriculture.

—J.H.W.