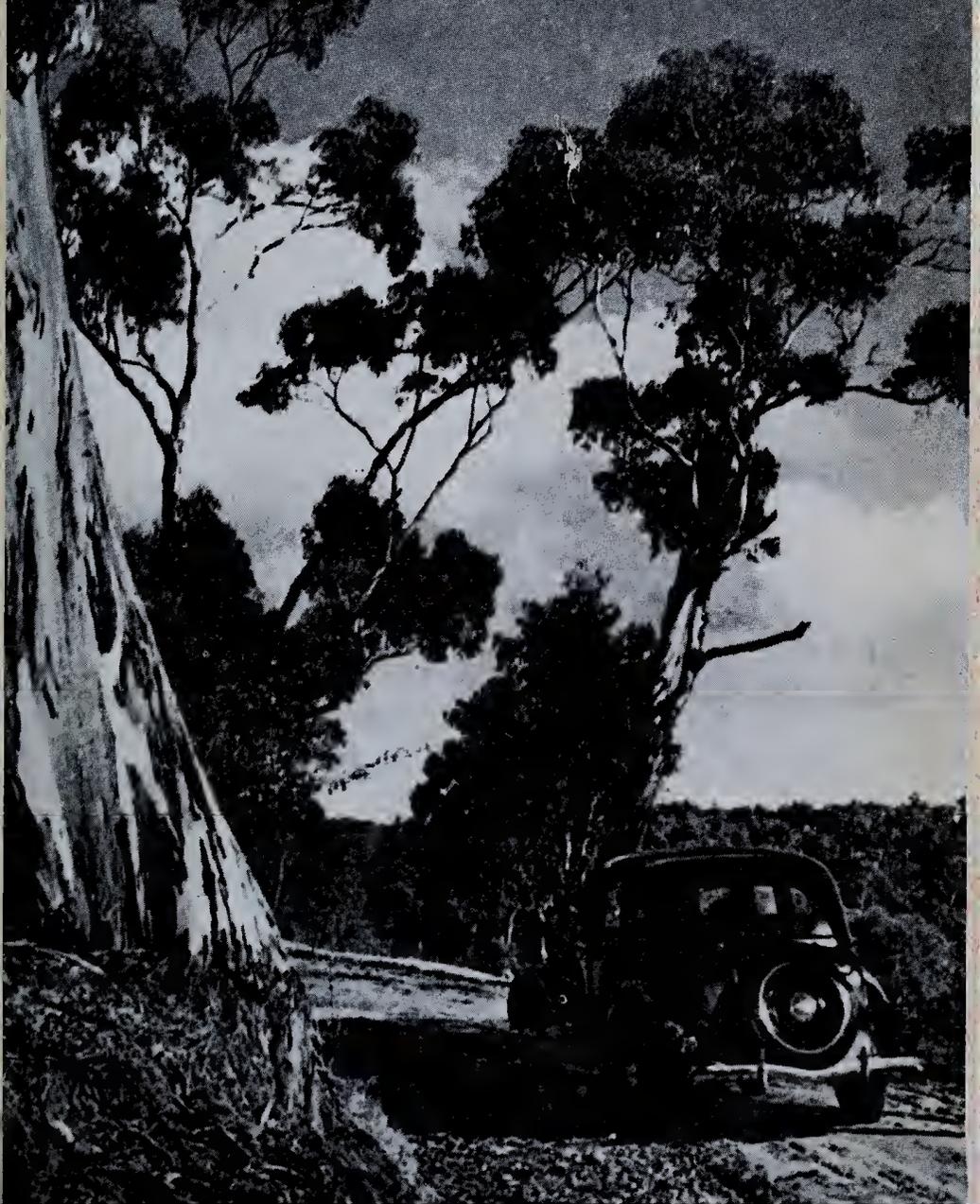
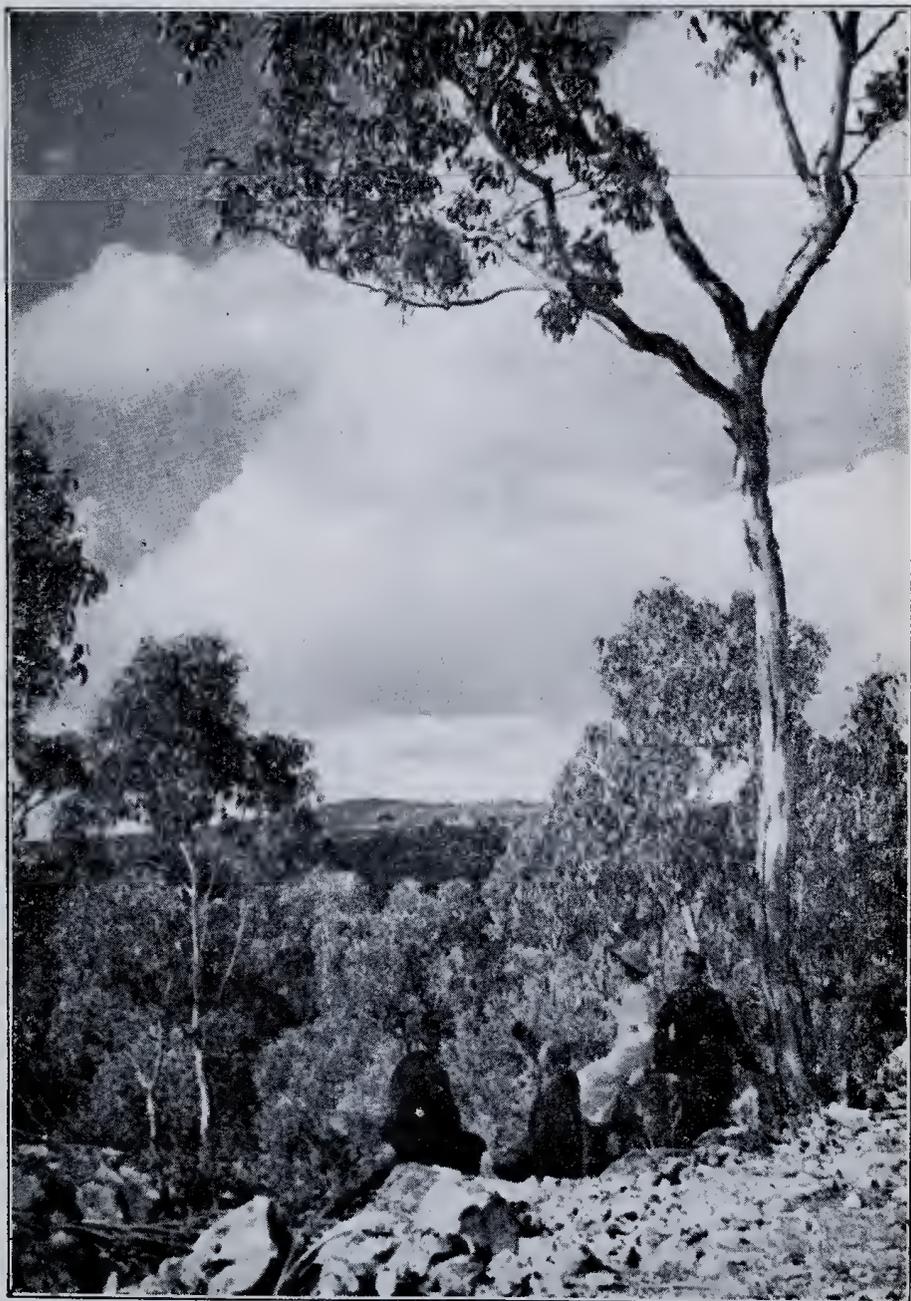


# NATIONAL PARK

## SOUTH AUSTRALIA







From the Heights of the Plateau, in the north-east corner of National Park, Belair, looking towards Mount Lofty. Pink Gum on the right.



*National Park*  
*Morialta and Waterfall Gully*  
*Reserves*

Containing an Account of  
their Natural History

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*Published by the Field Naturalists' Section  
of the Royal Society of South Australia,  
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ADELAIDE, 1936



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## *Foreword.*

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The Field Naturalists' Section of the Royal Society and the Commissioners of the National Park are to be congratulated on this publication, giving such interesting and valuable information regarding some of our National Parks. The authors of the articles, too, are deserving of the grateful thanks of the people of South Australia for the able manner in which they have handled their subjects.

In the Mount Lofty Ranges we have a heritage of scenic beauty that rivals anything in the world. Fortunately, in days gone by there were men of vision who took steps to preserve for all time large areas in order that future generations might enjoy Nature's handiwork. True, certain improvements and conveniences have been provided, but these have but added to the charms of the various Reserves. The National Park and other pleasure resorts belong to the people — they are merely held in trust by responsible authorities — and it is the people whom we desire to derive the greatest enjoyment therefrom.

I trust that this little booklet will be the means of increasing the interest in our beauty spots. It should certainly make a visit to any of them much more interesting.

A handwritten signature in black ink, appearing to read 'R. G. Sedgwick', written in a cursive style.

Premier.

PREMIER'S OFFICE,  
ADELAIDE.



# *Introduction.*

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By E. H. Ising

This booklet has been made possible by generous assistance from the Commissioners of the National Park, Belair, the Minister of Immigration, and by various members of the Field Naturalists' Section of the Royal Society of South Australia, who undertook to write the articles. The photographs are the work of the Government Intelligence and Tourist Bureau (by courtesy of the Director, Mr. V. H. Ryan, O.B.E.) and Mr. C. P. Mountford, President of the Adelaide Photographic Society, to whom we owe much.

It is hoped that the booklet will appeal, not only to interstate and international visitors, but also, and perhaps chiefly, to the people of South Australia. It is written from various stand-points so that its interest and usefulness may reach a wide circle of friends. Those who seek healthful recreation or quiet solitude in the midst of nature will find these reserves all that they could desire. The reserves, which are all situated within easy reach of the city, have been specially selected for their natural charm and beauty. From open, rolling country, with a wealth of springtime flowers, to shady glades overtopped by a canopy of gum tree saplings, one can wander on to be delighted by distant vistas gained from favoured vantage points.

To those who are interested in any of the subjects herein dealt with, the appeal should be very strong, as the subject matter has been compiled with care and scientific accuracy, and is the result of many years of work. Students of botany, particularly, should find this work useful, and it is hoped that both teachers and scholars in our schools will find it of assistance in their work.



# *The National Park.*

## *Its Attractions.*

By C. P. Hodge

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IN 1891 an Act of Parliament was passed to establish a national recreation and pleasure ground for the use of the inhabitants of South Australia. Fortunately, a large tract of country situated in one of the most beautiful localities in the hills was obtained.

No other State in Australia is so fortunate in the situation of its National Park, for here it is possible to enjoy the pleasures of virgin scrub country after a brief journey of twenty minutes by motor car, or forty-five minutes by train.

The management of the Park was vested in Commissioners appointed by the Government, and to provide the necessary conveniences for visitors an annual grant was made available by Parliament. With the money thus obtained, improvements have gradually been effected.

It would be difficult to imagine an area of land better adapted by Nature as a pleasure resort. A bituminous road runs from the entrance at Belair Railway Station throughout the Park to Long Gully and Karka, a distance of three miles. This road follows, for the most part, flat country, bounded on either side by well-wooded hills, making a very picturesque drive, which is availed of by thousands each year.

Most of the improvements effected have been confined to this relatively flat area, which lends itself to beautiful picnic grounds. Three large pavilions, capable of accommodating from two to four hundred people, have been erected, besides thirty-two arbours for the convenience of smaller parties.

Since the advent of motor transport, most people visit the Park by this means, but a new stopping-place on the railway to serve the Long Gully and Karka ends of the Park, is in course of construction, and when completed those travelling by train will be able to reach Long Gully Pavilion after a walk of only 280 yards, instead of one mile as heretofore.

In addition to buildings, ample provision has been made for all forms of sport. For those interested in cricket or football seven ovals are provided with a malthoid-covered concrete cricket pitch on each, and for further convenience a large shed is built beside each oval. In addition to providing for cricket and football, these ovals are largely utilized by large picnic parties, as they offer facilities for athletic sports, all the material for which is kept for hire at the Park Sports Sheds. Three running tracks are also provided. For a small fee these will be marked out and prepared before the parties arrive. Tennis enthusiasts are well catered for, as there are forty-four earth and six bituminous courts available.

In May, 1935, a nine-hole golf course was made available, and this has already become very popular. In spite of the short time it has been laid down, the fairways are becoming well turfed and the slag scrapes are large, well kept, and play very true. These facts, coupled with the beautiful scenic surroundings, are inducing an ever-increasing number of people to visit the Park Links.

To keep the grass short, for the convenience of visitors, and to minimize the risk of bush fires, it has been found necessary to graze livestock at the Park. This practice has had the effect of denuding the Park to some extent of many forms of the native flora, and to obviate this danger as far as possible it has been decided to fence off certain areas where the vegetation has been less affected, comprising about five hundred acres in all. These areas at least are protected from livestock and are preserved in their native state, and should prove valuable to those interested in natural science.

Thus it will be seen that the Commissioners have done, and are still doing, all in their power to make the National Park a natural public pleasure resort for the residents of South Australia.

# *The National Park*

## *Historical Account*

By J. M. Black, A.L.S.

[IT was in very early colonial days that the present site of the Park was reserved as a "Government Farm," and for many years it was used for depasturing horses belonging to the Police and Survey Departments. The stockyards below the curator's house and the remains of the neighbouring cottage are relics of that period. In an official statement for the year 1840 (four years after the proclamation of the Province), the cultivator's name is given as John McLaren. There was then a well ten feet deep, with three feet of water, a dwelling house, outhouses and stockyards, and one thousand acres of land were enclosed with posts and four rails. Of the pre-colonial days we know nothing. We may well suppose that the natives lived as those along the Flinders Range lived in historic times, that is to say, they hunted on the plains in the winter, and in the summer they wandered up into the hills, hunted, danced, and built their campfires beneath the giant gums of the National Park, but they have left no trace of their passage across the scene. The names now given to the gullies and ridges of the Park are artificial in the sense that, although they are chosen from aboriginal languages as appropriate terms, they are not a genuine local relic of the blackfellow.

### **"Old Government House"**

[IT was in October, 1851, that tenders were invited for a lease of the farm for a term of seven years, but nothing appears to have come of this proposal. In 1858 a sum of £1,000 was placed on the estimates for the erection of a "cottage residence" for the Governor and £500 for the renewal of fences. This "Old Government House" still exists, near some ten acres which have been reserved as a nursery, both the house and the ten acres being under the control of the Conservator of Forests. This was the summer residence of the Governors of South Australia in the days of Sir Richard MacDonnell (1855-62) and Sir Dominick Daly (1862-68). In the estimates of 1859 Government Farm is referred to as the "Park," but in the following year the old title is resumed.

## The Park in Danger

ON two occasions the National Park has narrowly escaped alienation from the Crown. The first time was in 1841, just after Captain (later Sir George) Grey had taken office as Governor. He wrote a dispatch to Lord John Russell on the financial state of the Province. "The revenue is decreasing," he said. "The balance at present in the Colonial Treasury is £713 9/10. . . . The estimated revenue for the present quarter is something more than £6,000 and the anticipated deficiency in the revenue for the present quarter is between £16,000 and £18,000." In order to meet the emergency he proposed the "sale of Government Farm, of Government horses, and other property of this description," but he acknowledges the difficulty there would be in getting a fair value for them in view of the "present depressed state of the money market." Fortunately, these drastic proposals were not carried into effect.

## Another Crisis

THE second crisis in the destinies of the Park came in 1881. The surrounding land had long ago been sold in small holdings — some of the earliest settlers were Tasmanians, who began their career in South Australia as wood-cutters in the "Tiers" — and there was a keen demand for more fruit gardens and vineyards in the Mount Lofty Ranges. The Ministry of the day proposed to cut up the Government Farm, but were, fortunately, met by a storm of public indignation. Sir Edwin Smith and Mr. A. McDonald, members for the district, also Mr. Walter Gooch, a resident of Belair, warmly advocated the preservation of the Park, and the daily press supported their efforts. In 1883 an Act was passed prohibiting the sale of the Government Farm, but the fight was not over for several years yet. The Field Naturalists' Section of the Royal Society — the section was founded in 1883 — now took up the running. Its object was to secure the Park as a national possession for all time by having it placed under the control of a board of trustees. This was necessary because there appeared to be still a danger that the Government might yield to the demands for a sale of the land to private purchasers. The principal movers in this praiseworthy effort to preserve the Park were Messrs. Samuel Dixon, A. F. Robin, and W. H. Selway. A deputation, representing several important societies, waited on the Government and in 1891 Parliament passed a measure vesting the National Park in twelve Commissioners — five appointed by the Government, while the rest were heads of various organizations and as such were Commissioners *ex officio*.

## Past and Present Commissioners

THE names of the original Commissioners, who were gazetted in January, 1892, and those now holding office are given below, the first five being the appointed members of the board:

1892	1936
Sir Edwin Smith, K.C.M.G. (Chairman)	Mr. C. R. J. Glover (Chairman)
Mr. A. McDonald, M.P.	Prof. J. B. Cleland (Deputy Chairman)
Mr. Walter Gooch	Mr. W. H. Bagot
Mr. J. C. F. Johnson, M.P.	Mr. George McEwin
Mr. S. Dixon	
Commissioner of Crown Lands— Hon. Thos. Playford, M.P.	Hon. M. McIntosh, M.P.
Mayor of Adelaide—Mr. F. W. Bullock	Lord Mayor of Adelaide—Mr. J. R. Cain
Conservator of Forests—Mr. W. Gill, F.L.S.	Mr. R. D. Rodger
Director of Botanic Gardens—Dr. M. W. Holtze, F.L.S.	Mr. H. Greaves
Director of Zoological Gardens— Mr. R. E. Minchin	Mr. R. R. Minchin
President Royal Society—Rev. T. Blackburn, B.A.	Dr. C. T. Madigan
President Agricultural Society— Hon. J. L. Stirling, M.L.C., K.B.	(Deputy) Mr. J. Harris Hobbs

All the original Commissioners and nearly all those who took part in the movement for establishing the Park, have now passed away.

The direct management is in the hands of a resident curator. Mr. W. H. Sanders was the first curator of the Park and secretary to the Commissioners. He was succeeded by his son, Mr. C. B. Sanders, and for the past two years the position has been held by Mr. C. P. Hodge.

### Useful and Attractive

THE Park is situated about eight miles from the city and is easily accessible by rail or road. The Belair Railway Station is opposite one of the main entrances. Those who travel by road get charming glimpses of the Adelaide plains stretched out below them, and the blue sea beyond, and by night the city and suburbs look like an illuminated chessboard. The Park comprises two thousand acres of undulating, mostly wooded country. As a refuge for the native flora of the Mount Lofty Ranges it is invaluable and, in a lesser degree, it is a sanctuary for native animals and birds. There are cricket pitches and numerous tennis courts, and golf links have recently been added. There are seven ovals, refreshment rooms for visitors and picnic parties, three fine pavilions with large luncheon-rooms, while good roads, footpaths, and bridges facilitate the exploration of the whole area.

# Geology and Physiography.

By Charles Fenner, D.Sc.

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## GENERAL DESCRIPTION

THE parks and reserves dealt with in these notes are those which lie on or near the western portion of the Mount Lofty Ranges, near Adelaide. They form an interesting series, including a wide variety of physiographic conditions, with consequent variety of soils, native vegetation, and scenery. It is to be regretted that there are not similar reserves including the following: (*a*) A typical sand-dune area; (*b*) a mangrove coast and flats; and (*c*) an area of mallee scrub. It is not too late for such reserves to be made and the cost would not be great.

The following is a brief account of the reserves themselves: 1. The largest and most important is the **National Park**, which is controlled by a body of Commissioners appointed by the Government; this beautiful reserve comprises two thousand acres of timbered hill and valley, and lies between the heights of 830 feet and 1,600 feet above sea level in the headward portions of a small northern tributary of the Sturt River; by judicious management this park has become one of the chief holiday resorts for city dwellers. 2. The next largest, and one that is very interesting from a geological and a scenic point of view, is the **Morialta Falls Reserve**, containing 540 acres, and varying from 400 to 1,400 feet in elevation, in the hills portion of Fourth Creek, a tributary of the Torrens. 3. The **Waterfall Gully Reserve** is also in one of the steep-sided valleys that seam the western scarp of the ranges; it includes ninety-six acres of the more rugged part of the upstream valley of First Creek.

The lesser reserves are: 4. **Mount Lofty Summit**, an area of fifty-eight acres, interesting botanically, historically, and for its magnificent outlook. 5. **The Knoll**, a small hilltop reserve of about four acres, which lies between Crafers and Upper Sturt. 6. **Kingston Park**, twenty acres, is historically of much interest, and has also the geological interest of being mainly upon the thick alluvial deposits that mark the meeting-place of the ranges, the plains, and the sea; this is the only one of the reserves that abuts upon the coast. 7. **The Brownhill Creek Public Pleasure Resort** has a venerable record as a reserve, as well as a resounding title. It is actually, for the most part, an unfenced, ill-defined, bare, scarred area of 120 acres, with every evidence of having been ignored and neglected by its controlling authorities.

8. Hazelwood Park, a delightful little area of thirty acres, is on the alluvial plain of First Creek, which runs through the reserve; it is a well-preserved example of the original red-gum country of the Adelaide district, and as such there should always be a number of young red gums coming on, for the benefit of future generations. A barbarous proposal to convert this pretty little stretch of creek into a brick-lined drain was, fortunately, defeated.

The following are more detailed accounts of the chief park areas, proceeding from north to south:

### Morialta Falls Reserve

THIS reserve, as will be seen from Figure 1, is shaped like the letter Y, lying with its wider portion to the eastward. The greater part is on the southern slopes of Fourth Creek, just within the ranges, but the steepest portion lies to the north, where the land rises to 1,450 feet at Hikers Hill. Fourth Creek is one of the series of short stream valleys which have been carved out on the western scarp face of the raised fault-blocks of the Mount Lofty Ranges. In this area the chief rocks are massive quartzites, with slates and phyllites.

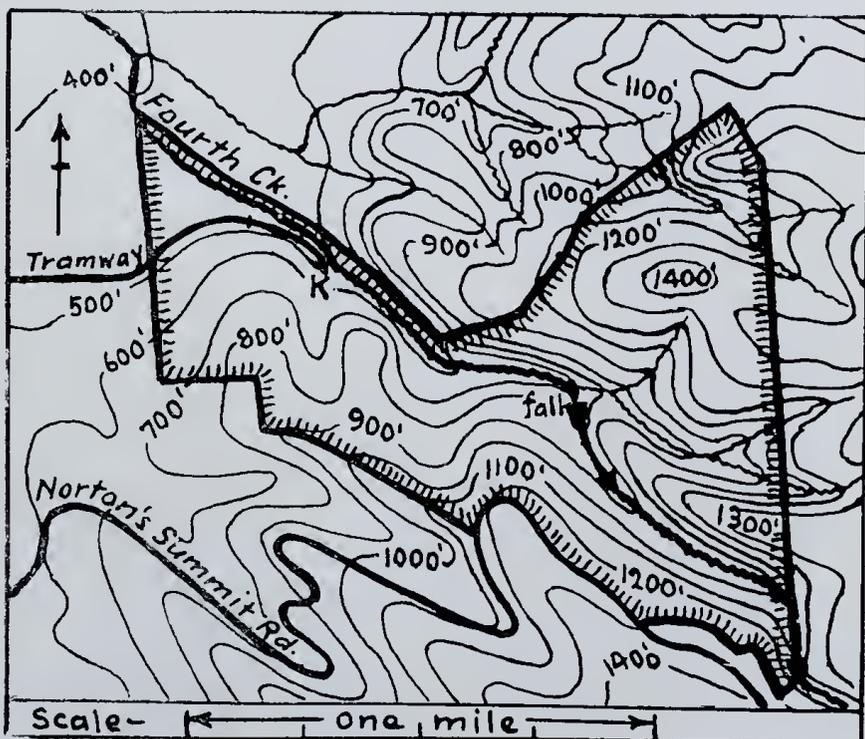


FIG. 1.—Contour Plan of Morialta Reserve.

As one approaches this reserve from the plains, the bold mass of Black Hill is seen to the north, typical of the scenery and vegetation of the quartzite rocks. The hills at the entrance to Morialta are more rounded and grassy, quite different in character from those of Black Hill; this is because they are formed of the more easily-eroded slates and phyllites. In the low cutting near the tram terminus, and in the higher roadside sections seen on the way to the kiosk, these rocks show many interesting features. Some of the slates are very calcareous, almost limestones. Here they are nearly level-bedded, very well jointed, bluish to cream in colour, with ochreous stains. There is a fairly strong development of horizontal quartz veins, accompanied by green, glistening chlorite. Here and there one may see veins of calcite with beautiful rhombs. Occasionally, the fern-like markings of dendritic manganese oxide may be seen along the joint planes. In these cuttings, also, narrow crush zones mark the positions of some of the smaller faults that divide the mountains from the plains, while in most of the roadside cuttings there is a fine variety of hill-slip material (talus, scree) consisting of all sizes of angular boulders interbedded with soil.

As we pass up the gorge towards the waterfall, the beds tend to take on a more and more steep easterly dip, until nearer the waterfall they become horizontal once more. The little stream which at present flows in this gorge is now called Fourth Creek, but originally was called Anstey Rivulet on the plains and Sinclairs Gully in the hills. The most interesting fact in the physiographic story of the gorge is that this small stream, working through a vast period of time, has carved out the whole of the valley and transported the materials westward to help to form the Adelaide Plains.

The waterfalls, three in number, which now form steps up the valley of this stream, were once on the edge of the scarp and have slowly retreated up-stream by a process of erosion, just as they are doing to-day. It is a slow process, and it is a fine exercise for the imagination to try to picture how it has occurred.

Just before coming to the kiosk (car park) the hill on the south, Hogans Hill (nine hundred feet), may be noted—more particularly for its smooth slopes and for the remarkable regeneration of sheoaks and golden wattles that has recently taken place there. Behind the kiosk a steep gully descends from the Norton's Summit road. This feature, called Reade Gully, is the gateway to many interesting rambles along the pathways originally designed by the late Charles Reade. On the right

hand, beyond this gully, rises a bold, rocky hill which contains half of a huge, broken, anticlinal fold. We may call it Anticline Hill. At the foot of this rock face there is a well-chosen look-out, from which beautiful views of the gulf and plains may be obtained. Somewhere near the foot of the anticline (upfold), there must be an east-west fault. The rocks of the anticline are a hard quartzite; wherever quartzite occurs we get rugged hillsides or steep cliffs, quite different in character from the hillsides and cliffs in the softer phyllites.

Just past the parking place, the bold mural scarp of the main Morialta Cliffs comes into view. These consist of almost horizontal quartzites, strongly jointed with heavy talus slopes. The rock faces are beautifully coloured by lichens. Framed in the native vegetation, and varied by the few exotics planted in the valley bottom, these cliffs form a striking sight. A footpath leads across the creek to the left here, and one may wander away up along the tops of the cliffs, and on up to the top of Reids Hill (just above the cliffs, 1,375 feet), and so on by winding paths to the remote and rarely visited Hikers Hill (1450 feet) in the extreme northern part of the reserve.

Both the quartzites and the phyllites (slates, etc.) belong to the Adelaide series of rocks, and were laid down in shallow seas in the long-distant past (Cambrian or Upper Pre-Cambrian), in the dawn-time of the world of living things. The phyllites were made of finer muds, with occasional limestone bands, and these have been profoundly altered by pressure and heat exerted upon them in crustal movements of the earth during the vast period that they have been in existence. No definite fossils have been found in such rocks, though it was one of the dreams of the late Sir Edgeworth David that convincing evidence of such fossils would be found — a dream that may yet be realized.

The quartzites were of coarser material, originally sandstones. That is to say, they consisted of grains of sand (quartz). In the course of the ages the passage of solutions through these rocks has caused all the spaces between the sand-grains to be filled by quartz, thus producing a very dense, resistant rock. The alternation of the softer phyllites with the harder quartzites gives character and variety to this valley — gentle slopes and rounded hills where the phyllites occur, rugged slopes and cliffs where the quartzites outcrop.

In places the rocks have been folded; one anticline (upward fold) has been pointed out. Farther upstream there is a syncline (downward fold), also in the quartzites, on the southern valley wall at the site of the Giant's Cave. The main quartzite band gives rise to the First Fall and the Second Fall, while a narrower and higher belt of quartzite causes the Third Fall.

In the lower part of the valley, small, level, alluvial flats occur — evidence of a brief period of still-stand when the stream ceased to erode and instead accumulated material. These flats have now been cut into once more, and the naturalist may spend quite an interesting time noting the character of the rocky boulders that form the stream's grinding tools, comparing these with others seen as one advances farther upstream. The boulders vary in coarseness and in angularity; the older ones are small and beautifully rounded, the younger ones (from the river's point of view) are larger and more angular. Most of the boulders and pebbles are quartzite, the phyllites soon wearing away.

Passing the Fourth Bridge, we come to the Giant's Cave, with the synclinal quartzite fold already mentioned. Farther on a steep, narrow, tributary gully comes in from the north. This consists of two streams; the main one, which flows due west, is Lovers Creek and in its valley is the interesting area of Cuttygrass Swamp. The other gully runs up past the foot of the cliffs and is known as Steep Gully. All these valleys have well-graded paths along them. Looking westward from this point, the bastions of the Morialta Cliffs are very impressive.

We are now not far from the First Fall. Note the difference of the vegetation on the southern as compared with the northern valley slopes, a difference due to the incidence of the sun as it affects the nature of the soils, of the slope, and of the moisture content. The yacka, casuarina, and other more xerophytic plants prefer the quartzites, while softer and more leafy gums, acacias, etc., are on the phyllites; imported trees thrive only in the moist alluvial flats.

On the left, facing the falls, is the bold quartzite buttress of the Eagles Nest Cliffs, and opposite these on the southern side, there is an almost bare hillside of cliffs and soil-slopes, thickly sprinkled in places by the picturesque yacka (*Xanthorrhoea*). At the fall itself, we have the silent beauty of the high-walled alcove fashioned by nature in the jointed quartzites; the only natural sounds are the echoed whisperings of the falling water. The character and individuality of the falls themselves is due to the bedding and jointing of the quartzite beds. The improvements of paths, bridges, steps, look-outs, seats, and shelters fit in delightfully with these surroundings.

Beyond and above the First Fall we may see the higher, shallower valley, with its parallel lichened walls of rock, containing also the Second and the Third Falls. Here, for those who are young and eager, there are new worlds of natural history and of scenic beauty awaiting exploration.

## Waterfall Gully

THIS is a relatively small reserve comprising that portion of the hills section of the First Creek which contains the First and Second Waterfalls. Like the Morialta Gorge, this valley is a short, scarp-face stream that has been actively eroded during and since the period of uplift of the Mount Lofty Ranges. This youthful topography provides a countryside which is of little use to man, but which has considerable scenic interest. The steep slopes of Waterfall Gully are well known as seen from the Prince's Highway, which passes along the upward margin of this valley towards Waverley Ridge.

Unlike Morialta Gorge, quartzites are less common and the phyllites tend to be more schistose. In the western part of the Waterfall Gully, the slopes are fairly gentle, and there are several cultivated alluvial flats, narrow but fertile. Entering the reserve, one notes that the rocks contain more quartzites, the easterly dip becomes steeper, and the valley slopes more rugged and irregular. Because of these rock differences the accompanying soils and vegetation differ, and we get a type of scenery that is quite distinct from that at Morialta. At Waterfall Gully Fall the rocks are much less silicified and less strongly jointed than at the Morialta Fall, and instead of being nearly level-bedded, they dip steeply eastward. This characteristic easterly dip in schistose rocks gives the fall its particular individuality. It is a fairly easy walk to the top of the fall, and there we note a narrower and more rugged valley leading upward to the Second Fall, and so onward up to Mount Lofty itself. It is among the rare privileges that have been given to adventurous Adelaide boys that they may, on some windy holiday, hike up the winding hills and valleys of Waterfall Gully to the coveted summit of Mount Lofty — a practice which has already prevailed for three or four generations.

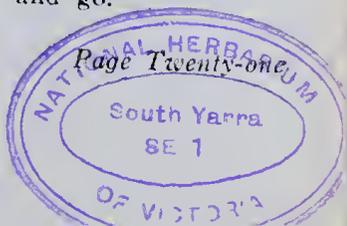
The lower portion of Waterfall Gully terminates abruptly at the First Fall. Here, as elsewhere, although the fall and its surroundings appear to be so permanent, and although we speak of the everlasting hills, the landscape features are transient and impermanent. The fall is moving slowly up-stream; once it was far down-stream at the face of the range. Ages hence it will have moved further up, but nature in these matters moves with extreme slowness — the inevitability of gradualness:

"The hills are shadows, and they flow

From form to form, and nothing stands.

They melt like mists, the solid lands,

Like clouds they shape themselves and go."



## The Brownhill Creek Reserve

THE Brownhill Creek public pleasure resort consists of 120 acres, and was surveyed as far back as 1858. It was gazetted a reserve in 1889, and has more recently had a small area added to it on its north-western extremity. This small area of six acres, which includes a swimming pool, was added in 1912, and is the only portion of the area which appears to be at all cared for. At Brownhill Creek we still have rocks of the Adelaide series, younger than those at Waterfall Gully and Morialta, largely clay slates, and including thin bands of bluemetal limestone (dolomites). It would appear that the wide, gently-rounded valley of the lower Brownhill Creek was at one time covered with fairly dense timber. There is at present one monarch living red gum, with a huge hollow butt, very worthy to be regarded as a public monument; but other native vegetation is almost wholly absent. There is a small avenue of well-grown plane trees, a few oaks, and a picturesque semi-circle of alluvium bordered by well-grown pines. Otherwise the valley is bare and open, dotted with evidences of the dairying industry, with a few ruins, with many quarries, and with much ugliness. This valley was at one time likely to be selected as the means whereby the railway from Adelaide should ascend the hills; but it is at the present time little used for communications, and the roads are poor. Indeed, the whole of this reserve is something of a puzzle; comparing the proclaimed boundaries of the "public pleasure resort" with the area itself, it would appear to be largely in the possession of private landholders, or occupied by quarries or quarry dumps. It is an area which, because of its natural soils and rainfall, might be made a place of beauty if placed under the control of interested authorities. [I believe that the venerable red gum above referred to has since been destroyed by fire.]

## National Park.

THE last of these reserves to be described is the National Park, which consists of two thousand acres of characteristic timbered hill and valley, situated in the Mount Lofty Ranges, somewhat farther back into the hills, on the headwaters of the Workanda and Minno Creeks, which meet near Blackwood and flow southward into the Sturt River. The rocks are somewhat similar in character to those described at Morialta and Waterfall Gully, but they are younger and include more clay slates and less quartzites. The area is also in close proximity to the famous glacial beds of the Sturt Gorge --- a classical area in geological history.

The natural advantages of hill and valley have been skilfully utilized to build up a playground and a picnic ground for the sport-lover as well as for those interested in the contemplation

of nature. While the level areas have been utilized for cricket pitches, tennis courts, sports arenas, and so on, the greater part of this large reserve is preserved unspoilt so that native plants, birds, etc., may flourish in security. The relief is sufficiently bold to afford good scenic effects, and the distribution of unobtrusive tracks along the valleys and the ridges enable the whole park to be explored by children or their parents with complete safety.

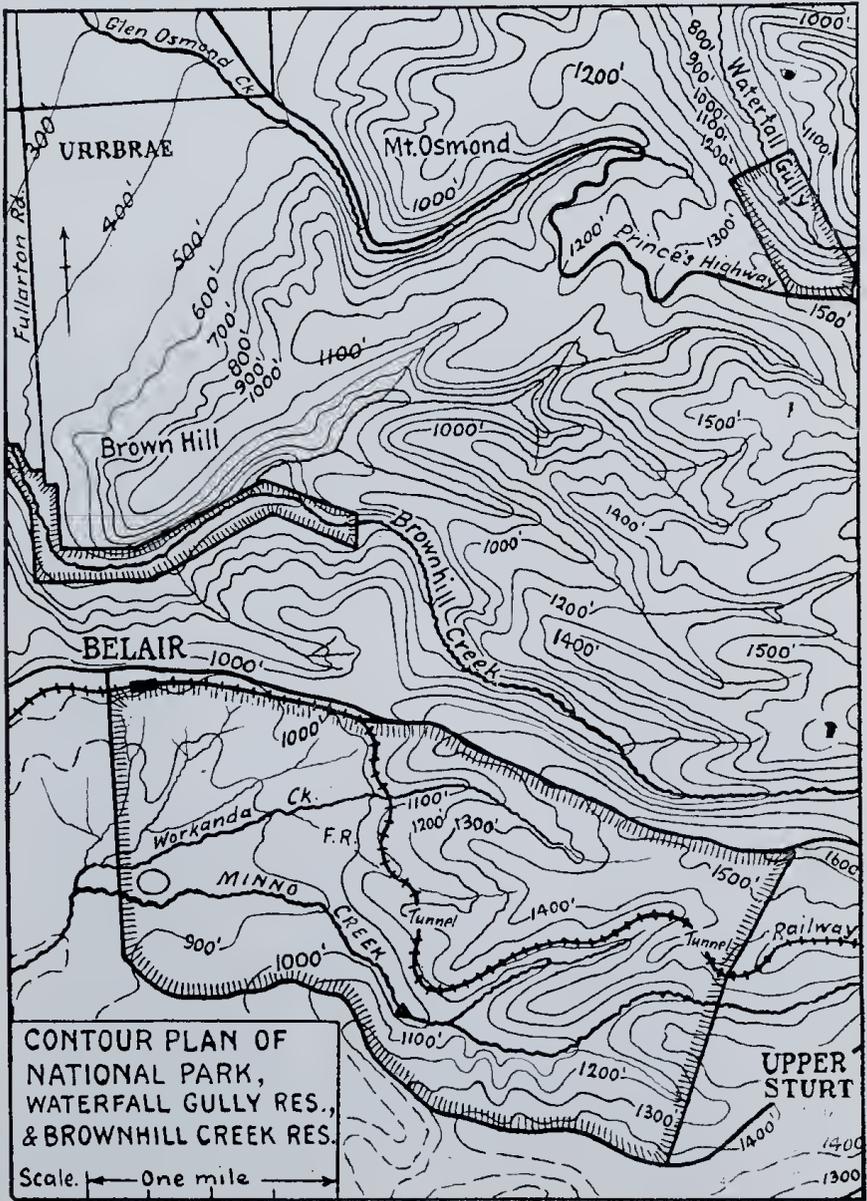


FIG. 2.—Contour Plan of National Park and Surrounding Area.

The area is roughly an oblong, bounded on three sides by main roads, and with the Adelaide to Melbourne railway passing through the reserve in a winding course. The western third of the area consists of low ridges up to two hundred feet high, converging towards the level area which contains the main sports ovals, tennis courts, etc. There is fairly good evidence that one of the main north-south faults of the Mount Lofty Ranges separates this western third from the eastern two-thirds, running north and south approximately, through the site of the old Government House. The eastern two-thirds of the park consist of much steeper hills, rising up to 1,600 feet above sea level. In places, such as the Long Gully sports ground, the valley floor is wide and level, providing a second series of sites for cricket, tennis courts, etc.

Otherwise the interfluves are long and narrow, and the valleys steep-walled. The physiography of the northern half is dominated by the Workanda Creek, upon which there are two prettily-situated waterfalls, and along which there are many routes for interesting rambles. Into the Workanda Creek from the north come the tributaries Peeroomba and Kurroo Creeks, while the main southern tributary is the Tilti Creek. The southern portion, which is more frequented, has been formed by the action of the Minno Creek, with its northern tributary, the Tarnma Creek, and its southern tributary, the Karka Creek.

Between these tributaries erosion has left a series of residual ridges roughly east-west. These are for the most part covered by a eucalypt forest, with interesting variations in vegetation, according to aspect and soil differences. The student of physiography may thus find in the National Park less spectacular effects than those at Morialta, but he will have the opportunity of studying a landscape of semi-mature erosion in the western portion, and of late youth in the eastern portion. Apart from this, there is a wide variety of topographic differences even in such a small tributary valley as the Tapurro Creek, which is little more than twenty-five chains long, rising from its small fan delta near the Blackwood Spring (1,000 feet) to the quarry near the road on the Warriparri Ridge (1,300 feet). The area can be strongly commended to naturalists and students as one well worthy of systematic study.

In conclusion, while South Australian naturalists are to be complimented on the variety of topographic, geological, botanical, and zoological material available in their public parks, the need for small reserves of mallee, mangrove, and sand-dune is worthy of emphasis. The possibility also of securing a coastal

area at Hallett's Cove as a national monument to include Tate's Rock, the Amphitheatre, the Black Point Cliffs, and a stretch of beach, should be continued until it reaches a successful issue.



FIG. 3.—Red Gum (*Eucalyptus rostrata*). Gums Oval.

# The Flora of the National Park.

By Ernest H. Ising

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THE reserve is situated in a part of the Mount Lofty Ranges where the flora of the foothills meets the flora of the mountains, more particularly as it applies to the gum trees (*Eucalyptus* species). The area is thus ideally located for the study of these two classes of flora, and visitors and students alike can become acquainted with the broad aspects of the region without having to travel very far.

The foothills flora extends from the Belair Railway Station to the foot of the range to the east, and is from 850 to 1,000 feet above sea level. The range beyond is from 1,000 feet to 1,550 feet above sea level, so the reserve may be divided into two portions as follows:

## I. THE WESTERN END,

comprising undulating country;

## II. THE EASTERN HIGHLANDS,

dissected by ridges and deep gullies.

The gum trees are distributed over the whole area as the main and dominating tree, and are found in the above divisions as follows:

### I. Western portion, about one-third of area of reserve:

1. The Blue (or Yellow) Gum (*Eucalyptus leucoxylon*).
2. The Red Gum (*E. rostrata*).
3. The Peppermint (*E. odorata*).
4. The Manna Gum (*E. viminalis*).

### II. Eastern highlands, about two-thirds of the area of the reserve:

1. The Blue Gum.
2. The Manna Gum.
3. The White Stringybark (*E. obliqua*).
4. The Pink Gum (*E. fasciculosa*).



FIG. 4.—South Australian Blue Gum (*Eucalyptus leucoxylon*).  
Near Main Oval.

## I. THE WESTERN END OF THE RESERVE

1. The flats surrounding the main oval.
2. The ironstone section along the north side.
3. The rising, open portion on the east.

### 1. The Flats Surrounding the Main Oval

*Trail No. 1, S. to S.E.*

TAKING as a starting point the main entrance to the reserve at the Belair Railway Station, the first trees seen (apart from planted ones) are red gums along a small creek leading to the main oval. On the ridge to the east the peppermint is found growing. Some very large trees of red and blue gum surround the main oval; one red gum is five feet in diameter breast high. In a small creek there is found a rush (*Cyperus vaginatus*), a hop bush (*Dodonaea viscosa*) and century (*Erythraea*), a herb with very bitter leaves.

Taking an easterly direction from the main oval, the flats contain mostly red gum; there are, however, a few manna gums which would appear to be outliers of the main group in the hills further east. Christmas bush (*Bursaria spinosa*) was in flower (February 18, 1933) along a small creek. The golden wattle (*Acacia pycnantha*) and the native cherry (*Exocarpus cupressiformis*) were seen here in flower. Away from the influence of the creek the peppermint gum is seen and is here mixed with red gum. With these trees are found the autumn amaryllid (*Calostemma purpureum*—in flower, February 18, 1933), the vanilla lily (*Dichopogon strictus*), also in flower and having a strong, sweet scent of vanilla, "cranberry" (*Astroloma humifusum*), *Bossiaea prostrata*, milkmaids (*Burchardia umbellata*) and sheeps burr (*Acaena orina*).

Now taking a south-easterly direction and encountering a gradual rise, the peppermints are more numerous, while the red gum is almost wanting. Associated with the gums in this locality are shrubs of golden wattle; a short round-leaf wattle (*Acacia obliqua*); a prickly heath (*Lissanthe strigosa*); dwarf wallflower (*Pultenaea largiflorens*); *Hakea rugosa*; a mat-forming legume (*Pultenaea pedunculata*); the dainty lady's fingers (*Grevillea lavandulacea*); *Calocephalus citreus* in flower, February 18, 1933; honey flowers (*Acrotriche serrulata*); guinea flowers (*Hibbertia spp.*); a white daisy probably *Olearia ramulosa*; a deep blue-flowered *Lobelia* (*L. gibbosa*) with a wonderful life history, being able to dispense with the work of its roots while in very early bud, and by means of sap stored in the stem is able to come to maturity some months afterwards (in flower February 18, 1933); *Bossiaea prostrata*; the harebell (*Wahlenbergia sp.*), in flower and an occasional blue gum.

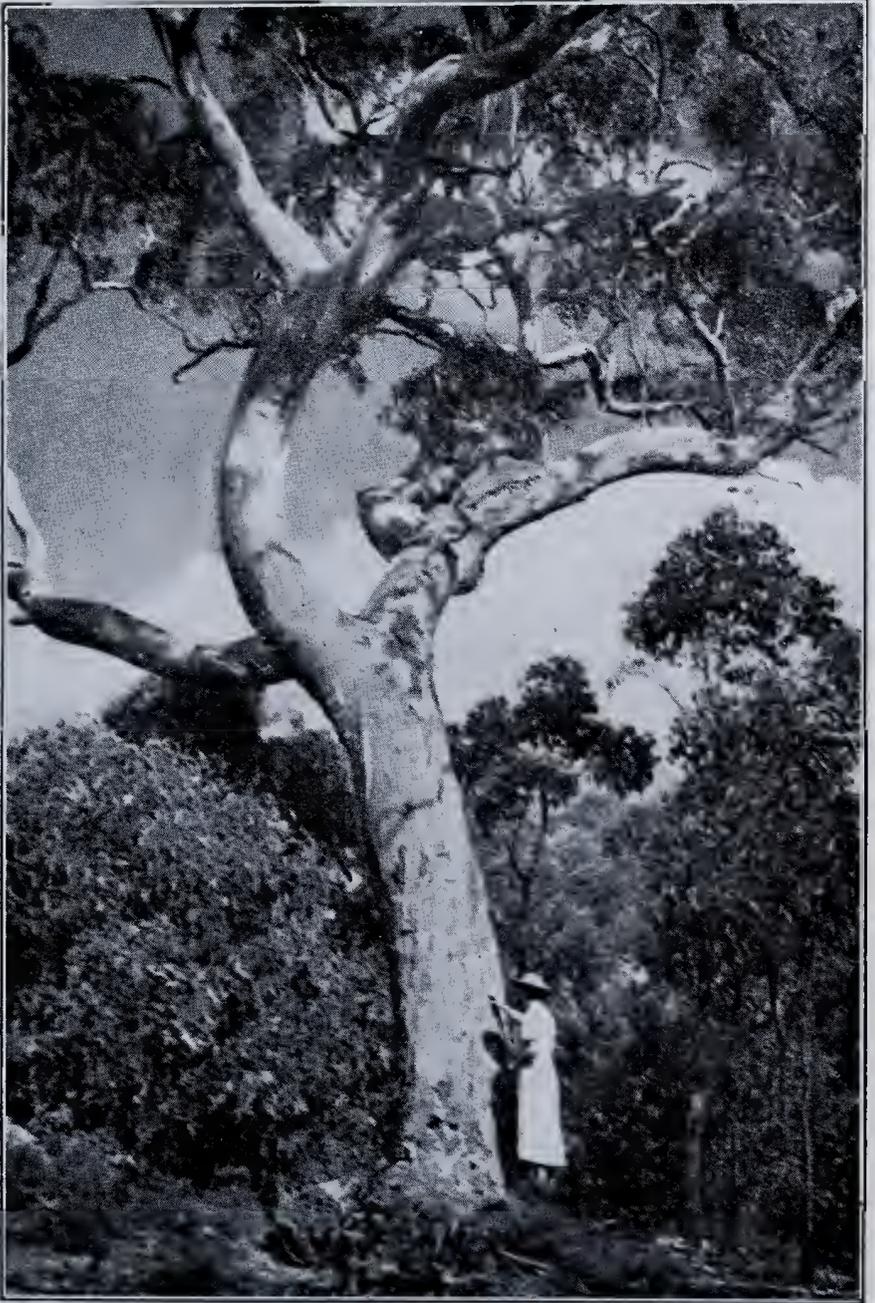


FIG. 5.—Pink Gum (*Eucalyptus fasciculosa*) with Golden Wattle on the left and Stringybark on the right. Queen Victoria Drive.

## 2. The Ironstone Section along the North Side

### A. Trail No. 2, East

THIS trail, from the Belair Railway Station, is easterly along the railway line to Sheoak Hill. It follows the ridge, where there is a good deal of ironstone, and on its south-facing slopes there is abundant peppermint and a profusion of flowers in the spring. The golden wattle is profuse here and the South African necklace daisy (*Osteospermum moniliferum*) is found spreading about; this latter plant, although having some floristic value, is not a desirable immigrant, as it develops into a large shrub, fruits, and spreads easily, and may become a pest in time. A fine colour scheme is made by an abundance of the mauve of the vanilla lily, the blue and white of *Caesia vittata*, and the yellow of *Bulbine bulbosa*. One of the guinea flowers (*Hibbertia stricta*) forms very striking golden patches with masses of flowers on the low-spreading, prickly shrubs. In the little creeks a rush (*Juncus pauciflorus*) and a small grass-like *Schoenus* is found. A small button-like yellow daisy (*Leptorrhynchus squamatus*) is plentiful in the open spaces, the cranberry is also in evidence and several varieties of the South African irids, in white, mauve, and reds, are taking charge to the detriment of the native plants.

Going up a western slope another guinea flower (*Hibbertia acicularis* var. *sessiliflora*) is prominent, some Cape-weed or dandelion (*Cryptostemma calendulaceum*) is seen, and among the more common plants are the following: The "yam" (*Microseris scapigera*); *Velleia paradoxa* which revels in open areas in which to exhibit its bright yellow flowers; a bush pea (*Pultenaea largiflorens*); a harebell; a wallaby grass (*Danthonia* sp.); and the daisy *Erechthites quadridentata*.

When the ridge is reached the hand flower (*Cheiranthera linearis*) is met with and with its rich blue flowers it is considered one of our best native shrubs; the blue pincushion (*Brunonia australis*) is also a plant with claims for cultivation, having blue flowers; the silky guinea flower (*Hibbertia sericea*) is common, and so is the billy button (*Craspedia uniflora*). Some blue gum and Christmas bush occur on this ridge. Down the eastern slope of this ridge are such plants as *Goodenia geniculata*, prickly guinea flower, the harebell, soursop (*Oxalis corniculata*), *Bossiaea prostrata*, fringed violet (*Thysanotus Patersonii*), and a prostrate peaflower (*Pultenaea laxiflora*). On the next western slope shrubs of fringe myrtle (*Calythrix tetragona*) are to be found and scattered plants of a prickly heath with white, waxy flowers (*Lissanthe strigosa*). A fair-sized patch of *Halorrhagis teucrioides*, a spreading under-shrub of a few inches in height,

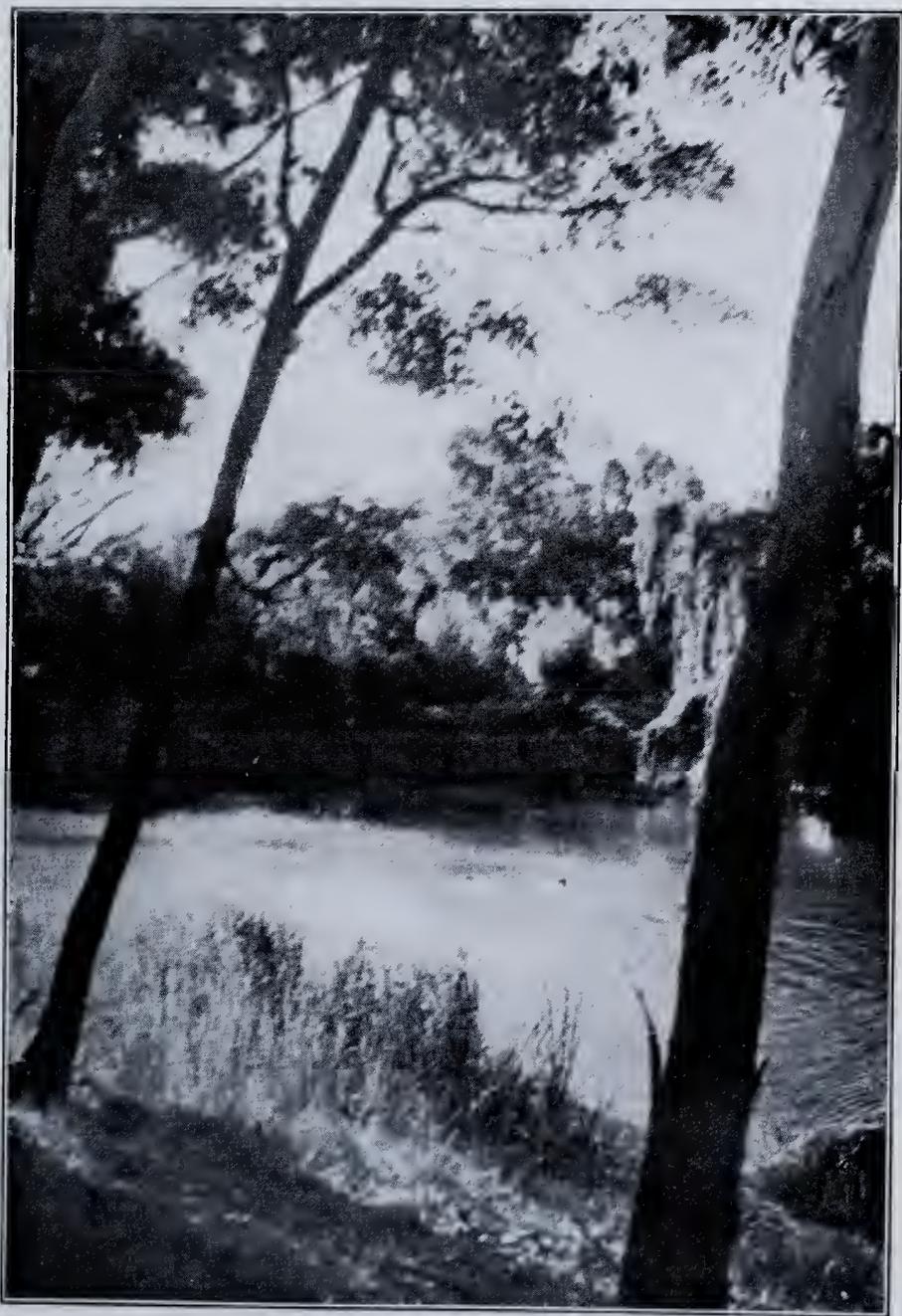


FIG. 6—The Dam, National Park.

was seen, and interspersed were plants of milkmaids and cockatoo orchid (*Glossodia major*); tiny plants such as *Hydrocotyle callicarpa* and trigger plant (*Stylidium* sp.) grow together in damp situations. A form of the prickly guinea flower, with dark green foliage, is also seen here.

B. Trail No. 3, Easterly

This trail takes an easterly direction again but, being further away from the north ridge, it encounters undulating ground. The trees are blue gum and peppermint mostly, with red gum in the lower parts; the golden wattle is also in evidence, and occasional plants of the Christmas bush. Our native flax (*Linum marginale*) is observed with its sky-blue flowers, the petals of which fall very early. Kangaroo grass and century are seen, but they are not so numerous as the guinea flowers, which are very much at home in this location. On a slope away from a little creek there is a sheoak (*Casuarina stricta*) about twenty feet in height. Then other plants occur, such as *Convolvulus erubescens*, a native and not a pest; *Acrotiche serrulata*; Christmas bush; hops (*Dodonaea viscosa*); cranberry, and a mistletoe (*Loranthus Miquelii*) on the blue gum. This parasite appears to infest the blue gums very largely, and rarely other species, yet the trees are not much affected by it.

Towards the tunnel hill the guinea flowers are much more numerous along a ridge where the blue gum and peppermint are to be seen. Associated with these trees are the following: Fringe myrtle; a mat-forming pea flower (*Pultenaea pedunculata*); a spreading Hakea (*H. rugosa*); a grass with bent awns (*Agropyrum scabrum*); a wattle (*Acacia obliqua*); a small wall-flower (*Pultenaea largiflorens*); the golden wattle, and the cranberry.

On this route several orchids are to be found in the spring, such as the sweet-scented sun orchid (*Thelymitra aristata*), a white variety of which was also seen, the cockatoo (*Glossodia major*) and two spiders (*Caladenia dilatata* and *C. leptochila*); blacks' comb (*Isopogon ceratophyllus*); a white everlasting (*Helichrysum Baxteri*) and the honeysuckle (*Banksia marginata*). On the last ridge before reaching the second range, there was an abundance of teatree (*Leptospermum myrsinoides*), *Hakea rugosa*, grass tree (*Xanthorrhoea semiplana*), a spreading rush (*Lepidosperma semiteres*), and less of the fringe myrtle and all over-topped by the blue gum.

Over this area and in many other parts of the park, St. John's Wort (*Hypericum perforatum*) has become a very serious pest. It has two methods of spreading, by seed and by

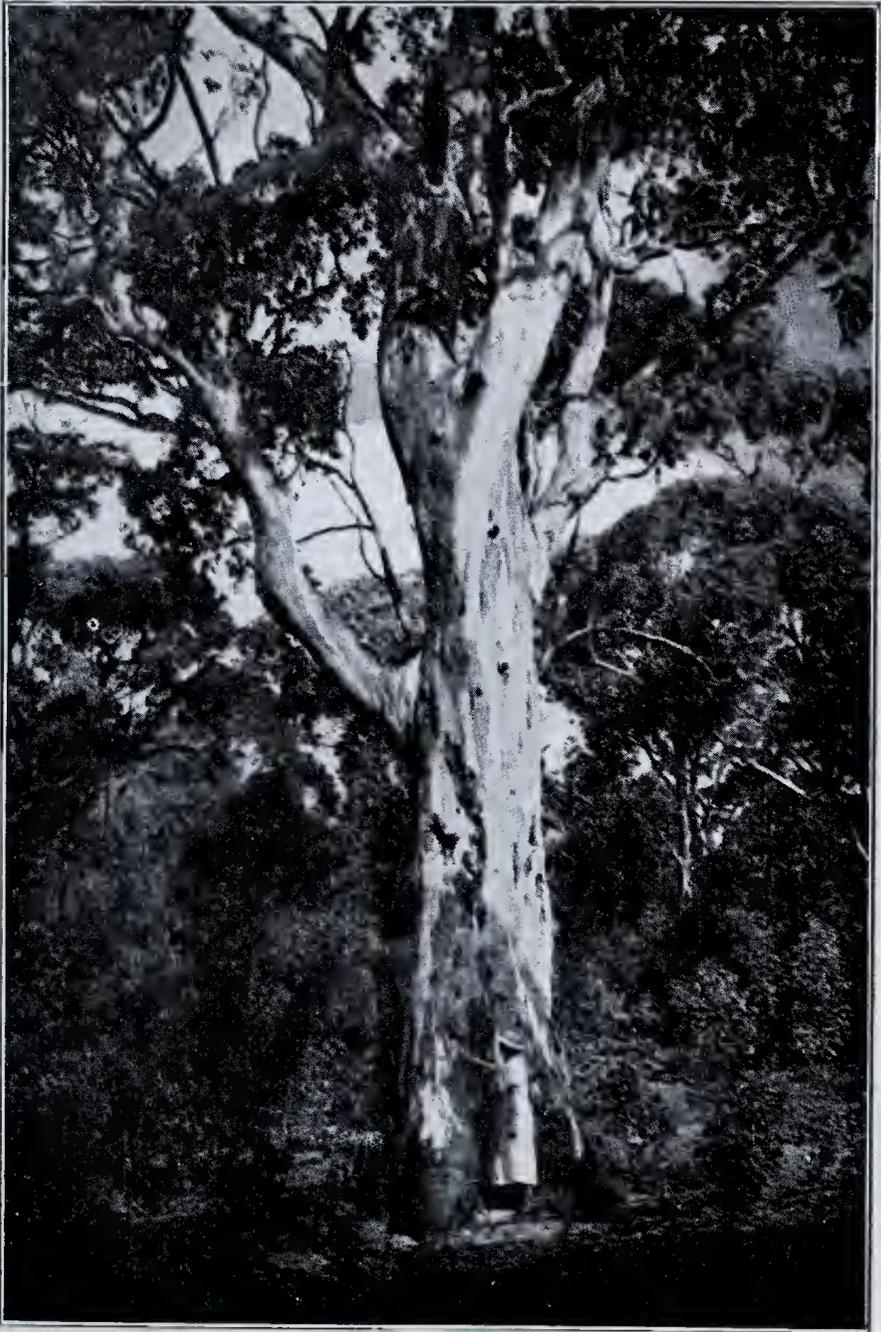


FIG. 7.—South Australian Blue Gum (*Eucalyptus leucoxydon*).  
Queen Victoria Drive.

an underground runner, and in places it takes charge completely. It is unfortunate that this plant has spread so much, as it must take the place of some native plants.

One of the Diana lilies (*Dianella laevis*), a rare plant in our State, was found in this portion of the park. We have only two kinds; the other one (*D. revoluta*) is as common as the other is uncommon. The former can be distinguished by its open leaf-sheaths and yellow anthers.

### 3. The Rising Open Portion on the East

HERE we have the red gum in the lower parts and the peppermint and blue gum on the higher slopes. The habitat here is fairly open and there are a few shrubs, many more under-shrubs, and an abundance of small ground plants, including annuals and bulb-like plants such as orchids and members of the lily family.

## II. THE EASTERN HIGHLANDS

THIS end of the park may be separated into three divisions as follows:

1. The north-east part, divided by the railway line.
2. The two ridges running into Long Gully.
3. Long Gully and the two slopes leading into it.

These eastern highlands cannot be separated arboreally, but they can physiographically, although the gum trees have their preferences as to habitat and soil.

### 1. The North-east Section

THIS section rises to the highest altitude in the park, ranging from 1,000 feet to 1,550 feet above sea level. It has two creeks, Workanda and one leading into it, two waterfalls, and two tunnels, and is deeply dissected by gullies and ridges. This park of the park is the least known on account of its rugged nature and its steepness, but it is the most interesting area and it contains the best scenic views and through it the Queen Victoria drive passes. It can be approached by the old road from Belair, passing Sheoak Hill, but is hardly suitable for motor traffic, or it can be approached from the opposite direction through Crafers, Waverley Ridge (of which the northern boundary is an extension), and Upper Sturt. By railway the train is taken to Long Gully and from the station it is necessary to climb up the hill at the back, from which point the various features diverge.

This section may be divided, for convenience, as follows:

- A. Workanda Creek.
- B. A long ridge running west.
- C. The Queen Victoria Drive.



FIG. 8.—Lower Waterfall on Workanda Creek. Blackwood tree on left.

### A. Workanda Creek

This creek takes its rise in the north-east corner of the park at the 1,550-foot level, where the stringybarks dominate and where there is also pink gum and blue gum. Not far from its source the first waterfall is to be found, where there is a drop of considerable height and which can easily be reached from the Queen Victoria Drive. The creek runs parallel with the northern boundary and is shut in by the ridge on that side, and by the long ridge running west shown below as B. This area is densely covered by trees, almost solely by Eucalypts, although native cherries are seen occasionally. The second waterfall is seen not far from the railway line, and it is at this point where the stringybark gives preference to the manna gum. The former is essentially a tree of the higher altitudes, and the 1,000-foot level is about the lowest point at which it is found. Near the fall the blackwood (*Acacia melanoxylon*) occurs and develops best on the richer, deeper soils in the gullies. Below the fall a prickly thistle (*Carduus tenuiflorus*) has taken charge of an area to the exclusion of almost everything else. A large growth of Buddleia occurs here also; no doubt it was planted and has spread itself, although it is not a pest. The briar (*Rosa* sp.) is to be added to the unwelcome plants in this location. The garden ivy is growing on the face of the rock forming the fall, and is well established. A native plant "chums" (*Acaena Sanguisorbæ*) is a mild pest here; the flower heads form into small ball about one inch in diameter with numerous hooked or barbed prickles surrounding them, so that they stick to any clothing coming into contact with them. As the plant spreads by long runners, the flower heads only come into touch with one's stockings or socks. Below this fall the hop is encountered again and the drooping sheoak (*Casuarina stricta*), and a trailing and climbing starwort (*Stellaria pungens*), which has only been found in this one spot.

### B. A Long Ridge Running West

To reach this ridge at its highest point, one has to climb the steep hill behind Long Gully Station and, on arriving at the top, the Queen Victoria Drive is to be seen. Stringybark and pink gum are now at home here and with the golden wattle they form the tree stratum of the vegetation. The shrubs are the next stratum and amongst them are teatree (*Leptospermum myrsinoides*); wallflower (*Pultenaea daphnoides*); scattered plants of the bundled ground heath (*Acrotriche fasciculiflora*), and *Olearia*, probably *O. ramulosa*, a white-scented daisy with an abundance of flowers (in flower April 27, 1935). Proceeding now along the drive and going west, the pink gum and stringybark is seen with the rock fern (*Cheilanthes tenuifolia*) among



FIG. 9.—Peppermint Gum (*Eucalyptus odorata*). Near Main Drive.

some stony rises. Coming to the last rock outcrop, and forming a small knoll, the stringybark is again the main Eucalypt and has associated with it two small trees in flower, *viz.*, the native cherry and the honeysuckle. The stringybark continues down the steep westerly slope and mixes with the golden wattle. The pink gum is again found with the stringybark here, but lower down it gives way to the manna gum. Then the last half of the slope before the railway line is reached is dominated by the blue gum, some of which are fine big trees, but with only a few manna gums. The stringybark has now been left behind and at this point does not appear lower than about the 1,300-foot level, while the pink gum finished even higher up. The blue gum came in at about the 1,270-foot level and manna gum at about the same or a little higher up.

The same ridge may be reached by going west along the railway line from Long Gully Station and ascending the old "runaway." This is on a slope facing south, and on it is an abundance of honeysuckle amongst stringybark. The honeysuckle is growing profusely here and, apparently, the clearing of the runaway of all the vegetation and the disturbing of the surface soil stimulated germination of the dormant seeds. A white daisy (*Olearia* sp.) was in full bloom (April 27, 1935) towards the top of the slope. Then, near the ridge, the pink gum was seen as the main tree, accompanied by a teatree; the autumn orchid (*Eriochilus cucullatus*, in flower April 27, 1935); silky guinea flower; *Acrotriche serrulata*; cranberry (in flower April 27, 1935); bundled ground heath; heather (*Tetradlea pilosa*); a greenhood orchid; wallflower; prickly guinea flower; native cherry (in flower April 27, 1935); and the native St. John's Wort (*Hypericum gramineum*), which is certainly not a pest. Proceeding westward along the ridge, the pink gum is found with the stringybark and the golden wattle. The guinea flowers are quite at home here, and the small under-shrubs are interspersed among the other vegetation. Misquel's mistletoe is parasitic here on the pink gum, but it is somewhat rare on this species. We now come to a small plateau at the junction of several ridges, and this area would make a delightful picnic ground, provided it is not spoilt by "modern" improvements, or that any trees are cut down. The pink gum is the chief tree here and also clothes the north and west slopes near the top. Descending this west slope, the pink gum is soon left behind and is almost completely replaced by a dense grove of young blue gums. It is hoped that these will be left in their natural state, as they certainly make a striking picture with their white, straight trunks. Some plants of the introduced cotton bush (*Asclepias rotundifolia*), which is the host for the wanderer butterfly, were in



FIG. 10.—Red Gum (*Eucalyptus rostrata*). Entrance to Long Gully.

evidence, and also *Lissanthe strigosa*. Going down the ridge now to where it opens out considerably, the blue gum dominates the position and on the right, near the steep bank of Workanda Creek, are some peppermints, which must be the highest location where this species is found. On this rocky north slope, the blue gum associates with the peppermint. Some bushes of black nightshade (*Solanum nigrum*), and the rock fern are also in evidence. Swinging round westerly near the railway line, the drooping sheoak is met with in company with the blue gum and peppermint. Silky guinea flower, rock fern, and pest St. John's Wort are also seen. On the return, keeping nearer the railway, the blue gum is dominant on a slope facing south, and it has with it some hop bush. Then, towards the lower tunnel where the soil is fine and deep and free from surface stones, the manna gum becomes the prominent tree on the lower slopes. Here the flora is altogether different—between the gums the spaces are grassy and with small herbs and annuals; there are no shrubs, and the aspect of the forest has completely changed. The slopes now are more gentle and, although a few rocks outcrop here and there, the soil is still deep and good. A little higher up the sandstone is present not far below the surface. A small gully is now entered and some blackwoods take advantage of the extra moisture and shade. Then, climbing out of this lower part and where the drive is reached, the stringybark comes in again. The blue gum now joins the stringybark as the top of the gully is approached, and guinea flowers again appear and form cushion-like shrubs beneath the trees; golden wattle, too, reappears again. Then, at the head of the gully, where it opens on to the plateau mentioned above, the blue and pink gum is again observed.

Taking another track, this portion of the area may be investigated with interest. Going immediately north of Long Gully Station, the hill may be climbed to its highest point. In the lower part the manna gum occurs plentifully and is seen with a few stringybarks mixed with it. The native cherry is also here and a few blackwoods, while the honeysuckle and Christmas bush are seen in flower. The shrub that dominates this slope, from the bottom to the top, is the bundled ground heath, and this is its typical habitat. It is a remarkable plant in that it bears its flowers in bundles which surround the stem *from ground level* for a length of about one foot, and it flowers in July (winter). This species is endemic in our State and has a preference for shady slopes, as it is not found on the opposite side of the gully, where the hillside faces north and is exposed to the direct rays of the sun. The blue gum comes in with the stringybark near and to the top of the hill, and the manna gum is now displaced by the stringybark. Proceeding northerly at the

top of the ridge, the stringybark still dominates the flora but, when a northern slope is traversed, more pink gum is seen than of the other species. When the slope gives way to a flat, which is the source of Workanda Creek, the manna gum predominates, but the stringybark is still present and it also continues up the next slope, with a southern aspect, and here the golden wattle, two guinea flowers, bundled ground heath, wallflower, and *Acrotriche serrulata* are met with. On the last rise, which terminates at the boundary road, the pink gum again holds sway.

Returning from this point and proceeding south-westerly, we find that the stringybark is developed on this first slope. Reaching the first gully or flat, the pink gum is present, but manna gum is the dominant species here with the prickly teatree (*Leptospermum scoparium*) accompanying it and revelling in the moister situation. Approaching the second rise along this ridge, the pink gum replaces the manna gum and is practically dominant now and has some golden wattle with it; this gum is also found on the ridge itself. Leaving this ridge now and taking the slope (facing south), which leads down close to Long Gully Station, the stringybark and manna gum are met with and, in a small depression near the line, the bundled ground heath is very plentiful.



FIG. 11.—Long Gully Road.



### C. The Queen Victoria Drive

As this drive is destined to become one of the most popular close to the city on account of its natural (and practically unknown) beauty, it deserves a special description.

The approach is by train via Long Gully Station and climbing the hill to the north; by road, through Crafrers to Waverley Ridge, and towards Belair by the old road.

The first gully beyond the station is entered and a track is followed right to the top. In the lower part of the gully, stringybarks are seen, and above them is the manna gum, of which there are also many saplings. This picturesque, gorge-like gully is a beautiful introduction to the views beyond. The call of numerous birds and the flash of their wings through the trees add further enchantment to the scene. Mossy rocks, set among ferns and mat-like plants, form a natural rock garden, and can give ideas for rockery designs. The steepness of the gully precludes any hurrying and so gives the visitor ample time to take in the surrounding beauty. Getting over a shoulder of the gully, the track opens out into a delightful glade with a shady pathway beneath many trees, young and old, consisting mostly of manna gum. As the head of the gully is approached, the manna gum is replaced by the stringybark, which shelters shrubs of *Acrotriche fasciculiflora*, which practically covers the ground.



FIG. 12.—Workanda Creek below Lower Waterfall, where Stringybark and Manna Gums mingle.

At the head of the gully there is a cross track which, if now followed to the left (*i.e.*, westerly) joins the Queen Victoria Drive at about one hundred yards from the north-east entrance to the park. It is to be regretted that there are a few plants of the dreaded St. John's Wort here, which can easily spread to the detriment of the native flora. Stringybark is plentiful here and some of the native cherry is seen and, where there is deeper soil, the blackwood is present. *Hibbertia acicularis* var. *sessiliflora* is found here and forms low, spreading bushes, which are a blaze of golden yellow in the spring. Proceeding along the drive, the golden wattle is seen and the manna gum also comes into view. From this point there are glimpses of distant ranges to the south towards Willunga, where the hills are silhouetted against the sky in a blue haze. The ridge here has manna and blue gum, and on a small flat the blue gum is now associated with the stringybark. On the next rise the pink gum is the main tree, while a rare heath shrub (*Lissanthe strigosa*) occurs with it. The flowers of this latter plant are white and waxy, and the small berries are also whitish. Plants observed here are: *Pultenaea daphnoides*; the cranberry; *Bursaria spinosa*; and a number of orchids. Another rise is now reached, and from it a fine view to the south and west opens up, and to the north plains can be seen stretching away in the distance. The westerly view takes in the sea and at a chosen vantage point the green of the hills can be seen to be separated from the blue waters of the



FIG. 13.—*Hakea ulicina* with Grass-tree (*Xanthorrhoea*) and Peppermint and Blue Gums.

gulf by a platform of brown plain. At this point of the drive there is an abundance of *Hibbertia sericea* growing between many loose and outcropping stones; other plants are: heather; *Leptospermum myrsinoides*; *Acrotriche serrulata*; *Dianella revoluta* and *Pultenaea daphnoides*. A bend in the tree-lined vista gives a better view to the north where there is a gap in the ridge across Workanda Creek. The drive now leaves the ridge and, following the north slope, more distant views are to be obtained on the right hand. The pink gum is the chief tree here, and at one place they form an arch over the track while, on a small rise to the left, is a fine specimen about three feet in diameter at the base. The road now bears away to the right and passes through more pink gums and stringybarks. The visitor may now be thrilled by looking to the east across Workanda Creek and observing Mount Lofty summit standing out in bold relief. A fine sample of the pink gum is situated on the left hand and may be recognized by its massive spreading tortuous branches. Beyond this tree to the west is a wonderful panorama of many miles of scenery, including a long stretch of sea. The road now swings to the left in a semicircle, and at this spot the views to the west and east are very fine indeed, and one could stay a long time at this place and enjoy the fare which nature provides. It seems certain that this spot is destined to be one of the greatest value to the park, as it also has two other attractions, *viz.*, the top waterfall a little distance away on the right and an extraordinary plateau (not far ahead) which forms a relief to the mass of hills and gullies which are encountered at this end of the park.

#### *The Plateau.*

The country now opens out and on the plateau there are pink gums with an undergrowth of *Lissanthe strigosa*, *Hibbertia sericea*, and a few blue gums. At the further edge of the plateau there is an edging of large boulders which forms the top of the gully running below. This is a very attractive feature and there is nothing like it in any other part of the park. Nature has been generous in providing interesting and diversified scenery here, but on account of its comparative inaccessibility and being practically unknown to the general public, it is rarely visited. One can rest here on the rampart of rocks and, in quiet contemplation, absorb the scenery and listen to the gentle aeolian whispers through the trees combining with the carolling of the magpie and the kookaburra's strident hilarity. Surrounded by these many expressions of nature, from the hurried steps of the busy ants to the floating of the intangible tracery of clouds across the azure dome, one may very easily feel in tune with the Infinite.



FIG. 14.—Long Gully Oval. Manna Gums  
(*Eucalyptus viminalis*).

On the western side of the plateau, the blue gum is very dense and there is a vigorous grove of young saplings which exclude all other species. Returning upstream from this point, the gum varieties are mostly pink and blue and a few stringybarks.

After this diversion to visit the plateau, the drive can now be followed around the steep hillside and round one or two small gullies on the right. Blue gums make their appearance and one large specimen is seen on the left, while in the lower parts the manna gum thrives, as also does the stringybark. A still larger blue gum is met with on the left, and they are followed by some red gums. The drive now turns to the west and, passing over a saddle, it follows around the hill through which there is a railway tunnel. This is where the last stringybarks are seen and red and blue gums now dominate the area. The drive enters a small gully as it descends the tunnel hill and, passing by a departmental nursery, it enters the western end of the park.

## 2. The Two Ridges Running into Long Gully

**STARTING** from Long Gully Station and taking the slope facing north, the first trees seen are the pink gum and the stringybark, with some golden wattle. Just near the tunnel there is to be seen a dense growth of the pest St. John's Wort and, unfortunately, it is spreading, to the detriment of the native flora.

Traversing the ridge now which runs westerly from this point, is the pink gum, golden wattle, a prickly-leaved guinea flower, mistletoe (*Loranthus pendulus*) on the pink gum, bundled ground heath, and the cranberry (rare), Miquel's mistletoe on the pink gum, *Acacia obliqua* (rare), and isolated specimens of the stringybark. On coming to a little dip in this ridge, the blue gum becomes the dominant tree, but is tolerant of a few specimens of the pink gum. Then, where the ridge rises and reaches a height of 1,350 feet, the blue gum is replaced by stringybark, which extends down the eastern slope, on the lower parts of which is fairly abundant bundled ground heath, but higher up the prickly guinea flower is more at home. Coming back to the ridge the blue gums mix with the stringybark here, and there are also some examples of the native cherry. The manna gum is rare on the higher parts of the ridge, but it is fairly abundant in the dips, where an occasional blackwood is seen and a rare pink gum. Then, to the second rise (1,300 feet), there is blue gum and stringybark with honeysuckle. Here the stringybark keeps mostly to the south side and face of this ridge, and the blue gum to the north side and face or slope. On this rise also is the Christmas bush and the silky guinea flower. At the tongue of this ridge, which leads into Long Gully itself, the blue gums dominate, although an occasional manna gum is to be seen; the little harebell is also here in flower (April 29, 1933). Traversing the northern slope of this ridge, starting from the western end, the manna gum is found on the lower and the blue gum on the



FIG. 15.—Long Gully. Manna Gums.

higher parts. A white daisy (*Olearia ramulosa*) is found in flower and other plants occurring are the drooping sheoak, golden wattle, and native cherry. Proceeding in the same direction and then into the gully itself, the manna gum takes charge of the situation. One grass tree seems to be out of place here, as it is a denizen of higher parts than this. On these lower sites is seen also the kangaroo grass, native cranberry, native lilac (*Hardenbergia monophylla*), century, prickly guinea flower, and a yellow, button-type daisy (*Calocephalus citreus*). Crossing the gully now and taking the slope facing south, just below the railway line, the stringybark is the only species of note, and an odd tree of blackwood is seen in this part where the soil is finer and the water content is much higher. Where a small creeklet occurs, the manna gum takes advantage of the extra supply of water to flourish in it; the bundled ground heath is also much at home here.

One is particularly struck with the influence of altitude or position of the slopes on the occurrence of the different species of the Eucalypts or other plants. This is well exemplified in the ridge which we have just examined, and it obtains as a general rule throughout the reserve.



FIG. 16.—Main Drive. Avenue of Planted Sugar Gums (*Eucalyptus cladocalyx*).



FIG. 18.—Upper Waterfall on Workanda Creek.

### 3. Long Gully and the Two Slopes Leading into It

#### A. The Slope Facing South

CONTINUING the route taken in Trail No. 1, we leave the lower portion of the park, and at 1,000 feet the first hill is reached just above and north of the reservoir. Here the manna and red gum are found with the native cherry and a few blackwoods. These plants continue round the hill and near the south end of the tunnel a yellow daisy (*Senecio hypoleucus*) is found. The manna gum still dominates the tree association on the slope going up Long Gully, and not until the last fork of the gully is passed do we find the stringybarks coming in. The manna gum is now replaced by the latter species. Other plants seen here include the native raspberry (*Rubus parviflorus*), cranesbill (*Geranium pilosum*), and the fan-leaved spleenwort fern (*Asplenium flabellifolium*).

#### B. The Slope Facing North

Approaching the rising ground along the southern boundary of the park and south of the reservoir, the big trees are the red gum with a few peppermint. The native convolvulus is seen here, also a large patch of the pest St. John's Wort. Some manna gum comes in here, and as it increases the red gum and



FIG. 17.—Workanda Creek. A large Red Gum with Sheoak (*Casuarina stricta*) on the left and Native Cherry (*Exocarpus cupressiformis*) in the foreground.

peppermint decrease, and finally give way to its dominance. This slope, on the southern boundary, takes the form of ridges and gullies alternating and all leading into Long Gully. The second ridge is opposite the tunnel at sixteen miles, and here Miquel's mistletoe is seen on the manna gum; native cherry and blackwood are also seen. A few red gums are again observed and an occasional blue gum on which the above mistletoe is growing. On the third ridge the blue gum now is abundant on the lower part with very few manna gum, but higher up the red and manna gum again take charge and displace the blue gum. Here, too, are a few blackwoods, native cherry, golden wattle, and *Olearia ramulosa* (a white daisy). However, at the top the blue gum is again the abundant species and has associated with it the pink gum and stringybark. The pink gum trunk and branches are here usually bent and crooked. On this higher ground we have other plants coming in for the first time, such as native wallflower, heather, scrub wattle (*Acacia myrtifolia*), and Miquel's mistletoe on the pink gum.



FIG. 19. —Pink Gums (*Eucalyptus fasciculosa*). Queen Victoria Drive.

# The Orchids of the National Park

By Harold Goldsack

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SO universal is the interest in orchids that no apology is needed for including a section devoted solely to this fascinating family, many members of which are found in the National Park.

Owing to the National Park having been greatly favoured as a collecting ground in the past by botanists and others interested in our native flora, quite a large number of species of orchids have been found in that locality. It remained for Dr. R. S. Rogers, of Adelaide, with his untiring enthusiasm for these beautiful plants, to make a complete collection of all the species found in the park, and incorporate them in his tables of the Orchidaceae in Black's *Flora of South Australia*. In this book the student and nature lover will find excellent descriptions of all our orchids, together with the names of the localities where they are to be found.

Popular names for flowers are by no means as helpful as one would expect. If we try to describe members of the genus *Caladenia* by the name of Spider Orchids we may form in our minds a picture which, while fairly correct for some of the species, gives us no help at all in determining other species of the genus.

We find eight species of *Caladenia* at the National Park, but of these four only are definitely spider-like. The very beautiful *C. dilatata*, with its large green and maroon labellum, is quite common and is a favourite with all. Also very common is the small blue *C. deformis*, with the densely hairy tongue. It is the earliest of our *Caladenias* to flower and shows little resemblance to a spider. Occasionally we will come across a flower of the White Spider Orchid, *C. Patersonii*. Even in protected areas, such as the National Park, this very beautiful species shows little inclination to grow in any large numbers.

*Glossodia major*, the Waxlip or Cockatoo Orchid as it is sometimes called, is another showy plant. Its bright purple flower, with purple and white lip, is often present in large numbers and adds a touch of brightness to many parts of the park.

Two kinds of Mosquito Orchid are found here, often forming large colonies at the butts of trees. The large one is named *Acianthus reniformis* and the small *A. exsertus*. Both species are winter flowering.

Should we be energetic enough to take a scramble through the higher levels of the park in summer, we may be fortunate enough to find the leafless Wild Hyacinth. *Dipodium punctatum*, as its name suggests, is a plant with spotted flowers. Quite a tall orchid, it makes a fine picture at a season of the year when wildflowers are rather scarce.

If we visited these upper regions during the winter and searched in the gullies among the moss and maidenhair fern, we would probably find the quaint little Helmet Orchids. Fragile little flowers, almost too delicate to face the sun, they nestle away in the damp and very often elude the eye of the seeker. The botanist would call them either *Corysanthes dilatata* or *C. dimenica*, for both species are found there.

In similar situations we will find many of the Greenhoods. *Pterostylis curta* and *P. robusta* are both large-flowered species, the former preferring the moister situations. If we are very lucky we may discover the handsome *P. cucullata*. This species has beautiful chocolate markings on the hood, but is found only in some of the less frequented parts of the park. The Dwarf Greenhood, *P. nana*, grows everywhere, even in the most inhospitable situations. Most people have seen the Banded Greenhood, *P. vittata*, and amused themselves with its sensitive tongue. We can often find the small cluster of reddish-brown flowers peeping out from the protection of a small, prickly bush.

When next you find a Red Beard, *Calochilus Robertsonii*, at the National Park, take a small hand lens and inspect the hairs on its labellum. You will be amazed at the beauty you will see there.

Another quaint orchid is *Lyperanthus nigricans*. Usually it is known as the Red Beak orchid, but I have heard it called Little Red Riding Hood, and looking at the flower in fancy one could readily recognize the description. Unless the locality you are searching has been burnt recently by a bush fire, you will find many more of the thick, fleshy leaves than flowers.

Even in autumn you will find there some representatives of this family. The dainty Parson's Bands, *Eriochilus cucullatus*, delights in hard, dry conditions, and in its company you will find the dwarf *Prasophyllum nigricans*. Several species of *Prasophyllum* have large flower spikes growing up to two or three feet high. You will recognize the plants by their leek-like leaves and the flowers which are turned upside down with the tongue, or labellum as it properly called, uppermost. *P. elatum* and *P. odoratum* are two large species which you will find regularly in the park. The latter is strongly fragrant.

Another group of orchids having leek-like leaves are the rather plain-looking *Microtis* species. All have small, greenish flowers in a spike and some, such as *M. porrifolia*, are distributed abundantly throughout the park. Like the preceding genus *Prasophyllum*, they are often called Leek Orchids, and in Western Australia, Mignonette Orchids. though I must confess I have heard them called weeds.

A very queer hot-weather orchid is *Orthoceras strictum*, the Horned Orchid. Usually coloured a dull brownish-green, it evades detection by growing among wiry grasses or rushes.

Well known and loved by all, the brown and yellow Donkey Orchid, *Diuris longifolia*, and the Cowslip, *D. pedunculata*, are two worthy representatives of their genus in the park. Another yellow and brown spotted form, also called a Donkey Orchid, is *D. maculata*. A smaller, though very sweetly-scented, plant, *D. palustris*, deserves the name of Spice Orchid.

Beautiful as many of these orchids are, few excel some of the Sun Orchids. Yellow and sweet-scented, the dainty little Rabbit-Ears is named *Thelymitra antennifera*. The Giant Sun Orchid, *T. grandiflora*, needs a warm, sunny day to show its purple blue beauty to perfection. Not so fastidious over the weather is the sweet-scented, mauve *T. aristata*. Even this species is seen at its best in bright sunshine. If we prefer pink shades we can find them also in the Sun Orchids. *T. Macmillanii* is a very beautiful salmon-red species. Two or three smaller-flowered species are also to be found in the pink shades.

Including many species which have not been mentioned, fifty-six species have been found at the National Park. Many, of course, are rare and others are becoming rare, even though human depredations are restricted in this area. Perhaps the grazing of cattle and the rabbits can be held responsible for much of the damage done to the orchid flora. We must not forget the very disturbing influence that the introduction of alien plants has on our native terrestrial herbs. When we see the vivid Sparaxis and the tall Cape Tulip spreading so rapidly, we feel very concerned about the fate of our native plants before the onset of these vigorous invaders. Whatever the cause, it must be admitted and regretted that our orchids in the National Park are decreasing in numbers and variety, though the commoner species will most likely remain plentiful for some years yet.

# *Birds of the National Park.*

By Edwin Ashby, F.L.S., M.B.O.U.

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THE Painted Quail may be met with in the undergrowth, through which when disturbed it prefers to run rather than fly. It nests in the Park and is present throughout the year. The Peaceful Dove and the Common and Brush Bronzewing Pigeons all occur, the two latter rising with a whirr from the ground when they have been collecting fallen seeds, and being recognisable by the metallic colouring of the wings.

As the dam near the Curator's residence is the only sheet of water available, water-birds are few. The Little Grebe, the Little Pied Cormorant, and the White-faced Heron (popularly called "blue crane") have been noticed. The Banded Plover has been recorded. Many years ago the Southern Stone-Plover, commonly called the Curlew, was common, and its mournful notes were often heard at night; the fox and feral cats are, doubtless, responsible for the extermination of this ground-nesting bird, whose method of escaping observation was to sit still and assimilate with its surroundings.

Five birds of prey may be met with, *viz.*, the Wedge-tailed Eagle, readily recognised by its large size and wedge-shaped tail; the Whistling Eagle, whose whistling call helps in its recognition; the Brown Hawk; the small Nankeen Kestrel, whose other name of "Wind-Hover" is so appropriate; and the Boobook Owl, whose note of "mo-poke" is normally attributed to an unrelated species, the Tawny Frogmouth, which, with its relative the Owlet Nightjar, occur in the district, though they have not actually been noted for the Park.

Of the seed-eating Parrots, the Adelaide Rosella and the beautiful Red-rumped Parrot are practically always present in the Park, but the little Elegant Parrot is a casual visitor. The brilliant Swift Parrot only visits the Park during its winter immigration, and then its occurrence is influenced largely by the flowering of the Eucalypts.

When the red gums are in full flower or other honey is present in quantity, the four Lorikeets make an appearance. The Blue Mountain or Rainbow and the Musk Lorikeet sometimes come in large numbers; both also visit the adjoining orchards during the fruit season. The Purple-crowned Lorikeet and the Little Lorikeet both come for the honey harvest, the former in large numbers and the last-named only at intervals, and then is never numerous. The former is commonly called "squeaker"; the note of the Little Lorikeet is a little less shrill and seemingly husky.

The Kookaburra or Laughing Jackass is frequently seen and heard, but the much smaller Sacred Kingfisher, of greenish-blue plumage, though not uncommon, is less often recognized.

Five species of Cuckoo occur. The Pallid Cuckoo has often been called "the harbinger of spring." In August and September its melancholy whistle, which ascends in half-tones, is constantly heard; the call is made both when perched in some exposed position or when flying overhead; usually the Cuckoo's call is emitted when at rest, and is followed by angry and warning cries from many of the small birds, as also takes place when hawks fly overhead. The Fan-tailed Cuckoo comes sometimes in numbers in the autumn, but by the end of June, except for a few stragglers, it has disappeared. Its call, when heard here, is a short series of soft whistles with a downwards inflection, but in the forests of the eastern States it has several loud calls that are rarely heard with us. Of the two Bronze Cuckoos, the Horsfield Bronze Cuckoo is much the more numerous; its short, whistly call ends with an almost wheezy note, much to the discomfort of all the small birds. The other, the Golden Bronze Cuckoo, is most often found in the deep gullies. The Black-eared Cuckoo is a rare visitant to the Park. It must be remembered that all these cuckoos foist the responsibilities of the rearing of their young entirely on various insect-eating birds. It may be that the incessant loud calls of most of the Cuckoos are intended to cause anxiety in the small nesting birds, which are thereby rendered fussy and excited and by their actions enable the Cuckoos to locate their nests.

Of the Swallows, the Welcome Swallow and the Tree Martin are present throughout the warm weather. The Fairy Martin used to be much more numerous than it is now, its bottle-shaped nests hanging under railway culverts and in rock caverns.

The Australian Robins really belong to the large group of Flycatchers and are only distantly connected with the Robin Red-breast of England, or the Robin of America, which is a true Thrush. Two of the Australian Robins are always to be found in the park. The Scarlet Robin, of which the male has a brilliant scarlet breast, black head and large white frontal patch, trim plumage and friendly habits, is one of the most familiar and popular birds in the State. The very much plainer and larger Hooded Robin has the male with neat white and grey-black plumage. In the autumn and early winter the handsome Flame-breasted Robin may pay a short visit. Instead of the black head-plumage of the Scarlet Robin, this one has a pleasing grey upper plumage, and the flame colour of the breast is carried right up to the chin. The fourth species is only an occasional

visitor to the Park; it is smaller than any other member of the genus, and, as the name Red-capped Robin implies, has a large frontal patch of the same scarlet as the breast.

Another still smaller and equally brilliant fairy-like creature, the Mistletoe Bird, is numerous in the neighbourhood of the Park. It is a close ally of the Pardalotes, but, unlike them, the male bird has a satin blue-black upper plumage, scarlet shirt-front, and pink undertail coverts. Its call note, once heard, is easily remembered. It is quite tame and is not scared by an intruder into its domain. It is a restless hunter for insects, except when the mistletoes (*Loranthus*) are in fruit. Then it spends more of its time eating the sweet, sticky fruits or carrying them to its young in the nest. This is the only Australian bird that makes a nest of felted wool-like material, which is like a tiny soft cloth bag, or a fairy basket, whose handle passes over the branch from which it hangs.

The Spotted Quail-Thrush is sometimes disturbed in open or heathy portions. While it loves to make its way out of a danger zone by short runs, if startled it rises with a whirr of wings and soon drops to the ground again. Although rarer than it used to be, it still nests either in or nearby the Park; the nest is a well-made grass cup nest placed on the ground, often at the foot of a tree trunk; the eggs are two, often with a dark zone near the larger end.

Three Diamond Birds are found in the Park. The Spotted Pardalote and Yellow-rumped Pardalote both have black caps studded with little circular white dots (thus Diamond Birds), and both have yellow shirt fronts, but the former has a chestnut-brown and red rump and the latter a yellow and red rump; the latter is in spring almost only to be found near or actually on a patch of sand, into which it makes its shallow nesting burrow. The Red-tipped Pardalote is to be heard everywhere as it picks scale insects off the eucalyptus leaves, both high overhead or on saplings near the ground. In it the black crown has streaks of white.

Another group of small insectivorous birds is well represented in the Park. Four species of Thornbills are present in considerable numbers, the Yellow-tailed Thornbill feeding on the ground in the open grassy portions, the Buff-rumped Thornbill keeping more to the stringybark forest but also both on the ground and in the trees, the Striated Thornbill with much the same habit as the last-named, and the Brown Thornbill which prefers teatree bordering the creeks.

to be seen climbing the trunks searching for insects; they are both best located by their shrill whistles. Of the Wood-Swallows the Dusky is always in the Park but the Masked and White-browed Wood Swallows come together in large numbers at irregular intervals, usually in later spring, and then breed in numbers.

The Superb Blue-Wren, the male well earning the name by his wondrous pale blue and deep blue colouring, may often be seen in a company of sombre-hued hen birds or immature males.

Of larger birds, the Magpie-Lark in black and white, with its peculiar call and nest made of mud, is a characteristically Australian species. The Black-faced Cuckoo-shrike, grey with a black head, may be heard calling as it passes with undulating flight from tree to tree. A rarer bird, silently running through the undergrowth, is the Ground Thrush.

Passing to the Honeyeaters, the genus *Melithreptus* is represented by three species. The White-naped Honeyeater, often called by boys the "Black-cap," is present in the Park throughout the year; not only does it take its toll of honey when the gum trees are in flower, but it is also a most industrious insect-feeder, working both in the saplings and in the tops of gum trees. The Black-chinned Honeyeater is almost as common and, owing to its extremely loud call-note, is more in evidence than its smaller relative, the "White-naped." The Brown-headed is more of an irregular visitor, although coming to the Park in numbers when the red gums are in flower.

Probably the Yellow-winged Honeyeater is more numerous or, at any rate, more noticeable, than any of the genus *Melithreptus*. The brilliant yellow in its wings, the streaked chin markings and long curved black bill make this friendly bird more conspicuous. Its near relative, the Crescent Honeyeater, although occurring in the Park, keeps almost entirely to the stringybark zone; its loud liquid notes quickly make its presence known in the spring season, but it is never numerous, and keeps to the highest levels. It also has the conspicuous yellow colouration in its wings, but is easily distinguished from the preceding by the dark crescent mark on its breast. The Noisy Miner, even when not seen, can be heard amongst the big red gums in the more open parts of the Park.

The largest of our South Australian Honeyeaters, the Red Wattle-Bird, and its smaller relative, the Little Wattle-Bird, both pay periodic visits to the Park in large numbers, although they do not arrive at exactly the same time. The loud, guttural

One of the most interesting of the residents is the Eastern Shrike-Tit, a most striking bird with its large black and white crest and yellow breast, and exceptionally strong black bill which has a small hook at its tip.

Both the Golden and the Rufous Whistlers are frequenters of the Park, the former all the time and the latter a little irregularly—both have an extensive repertoire of soft and mellow whistles with several notes similar and equal to some of the notes of the European Nightingale. The familiar Grey Shrike-Thrush is a bird that competes with the White-backed Magpie for *prima donna* of the Australian bush. Another most interesting bird represented in the Park by a single species is the White-browed Babbler. It used to be extremely numerous throughout the district, and is still present in reduced numbers. In some parts of this State the bird is called "The Twelve Apostles" because of the habit of feeding in companies. The first of a company will fly to the ground a few yards away, say from a sheoak, and commence to reach the tree by huge hops, and then fly into the branches and begin a spiral ascent, flitting from branch to branch. Each of the company will follow the procedure of the first bird, but long before the full complement had reached that particular tree the first-comer has passed on. Some of the call-notes of this bird are a pleasing whistle, but on the other hand other expressions suggest raucous swear words. The long legs, long and strong curved beak, and long white stripe above the eye easily distinguish this from all our other birds.

The black and white plumage of the Willie Wagtail is seen everywhere and its small relative, the Grey Fantail, is ever present, and in spring its nest may be noted on some bare stringy-bark bough, always with a strip of bark hanging down below the branch, seemingly nothing more than a hapless piece that has lodged there. The Restless Flycatcher rather resembles the Willie Wagtail, but has the white of the abdomen and neck carried right up to the beak and a satin black cap which it can elevate as a partial crest; it also has the unusual vocal distinction of making a sound like grinding teeth or grinding scissors. The White-winged Triller is another white and black bird, often called the Caterpillar-Eater because of the efficient manner it hovers just above the grass and pounces down gathering caterpillars. The familiar little Jacky Winter is a friendly little grey bird. The Black-capped Sittella, which loves to creep about the boughs of a sheoak, like any mouse, searching for insects in the crannies of the bark, now and again visits the Park in companies. The two Tree Creepers, the Brown and the White-throated, both are

notes of the first-named, which has red wattles, and the extraordinary, almost speaking cries of the Little Wattle Bird, which is without wattles, echo through the Park on the occasions of these periodic visits, and both nest there.

The White-plumed Honeyeater, usually called "The Greenie" by boys, is everywhere in the big timber. Its little relative, the Yellow-faced Honeyeater, is a much quieter bird, and not often identified, although if it is a hot, dry day it may be seen at the edge of the water quenching its thirst; if the red gums are in flower it may be noticed working in the flowering branches, and is at these times a graceful and friendly little creature.

The Eastern Spinebill, with its long slender bill, outwardly resembles the Humming Birds of America, and will sometimes gather its honey while on the wing. At irregular intervals the large and handsome Regent Honeyeater comes and nests in the lower timber. Its spangled yellow and black plumage is most conspicuous. As a vocalist it is one of the poorest; it seems to have only two notes, which cannot ever be called loud, and yet if one watches the bird it appears to make a great effort in producing this comparatively meagre result.

The attractive notes and loud whistle of the Tawny-crowned Honeyeater are to be heard almost exclusively in the open heathy patches; the bird is never in great numbers; it nests often within six inches of the ground in low shrubs.

Two finches may be met with, the Diamond Firetail, often called Diamond Sparrow, and the Red-browed.

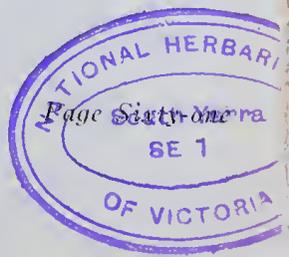
The Australian Raven occasionally visits the park. In conclusion, the White-backed Magpie, represented with outspread wings as an emblem for the State, is one of the most characteristic of our birds, and its powerful liquid notes are always a delight to hear.

# List of Birds of the National Park.

By J. Sutton

The following eighty-one birds were seen during sixty-six visits between August, 1919, and March, 1933.

- Painted Quail (*Turnix varia*)
- Peaceful Dove (*Geopelia placida*)
- Common Bronzewing (*Phaps chalcoptera*)
- Brush Bronzewing (*Phaps elegans*)
- Little Grebe (*Podiceps ruficollis*)
- Little Pied Cormorant (*Microcarbo melanoleucus*)
- Banded Plover (*Zonifer tricolor*)
- White-faced Heron (*Notophoxyx novae-hollandiae*)
- Australian Goshawk (*Astur fasciatus*)
- Wedge-tailed Eagle (*Uroaetus audax*)
- Whistling Eagle (*Haliastur sphenurus*)
- Brown Hawk (*Falco berigora*)
- Nankeen Kestrel (*Falco cenchroides*)
- Boobook Owl (*Ninox boobook*)
- Rainbow Lorikeet (*Trichoglossus moluccanus*)
- Musk Lorikeet (*Glossopsitta concinna*)
- Purple-crowned Lorikeet (*Glossopsitta porphyrocephala*)
- Adelaide Rosella (*Platycercus adalaidae*)
- Eastern Rosella (*Platycercus eximius*)
- Red-rumped Parrot (*Psephotus haematonotus*)
- Swift Parrot (*Lathamus discolor*)
- Kookaburra (*Dacelo gigas*)
- Sacred Kingfisher (*Halcyon sanctus*)
- Pallid Cuckoo (*Cuculus pallidus*)
- Fan-tailed Cuckoo (*Cacomantis flabelliformis*)
- Black-eared Cuckoo (*Owenavis osculans*)
- Horsfield Bronze-Cuckoo (*Chalcites basalis*)
- Golden Bronze-Cuckoo (*Lamprococcyx plagosus*)
- Welcome Swallow (*Hirundo neoxena*)
- Tree Martin (*Hylochelidon nigricans*)
- Grey Fantail (*Rhipidura flabellifera*)
- Willie Wagtail (*Rhipidura leucophrys*)
- Restless Flycatcher (*Seisura inquieta*)
- Jacky Winter (*Microeca fascinans*)
- Scarlet Robin (*Petroica multicolor*)
- Red-capped Robin (*Petroica goodenovii*)



Hooded Robin (*Melanodryas cucullata*)  
 Golden Whistler (*Pachycephala pectoralis*)  
 Rufous Whistler (*Pachycephala rufiventris*)  
 Grey Shrike-Thrush (*Colluricincla harmonica*)  
 Magpie-Lark (*Grallina cyanoleuca*)  
 Eastern Shrike-Tit (*Falcunculus frontatus*)  
 Black-faced Cuckoo-shrike (*Coracina novae-hollandiae*)  
 White-winged Triller (*Lalage tricolor*)  
 Spotted Quail-Thrush (*Cinclosoma punctatum*)  
 White-browed Babbler (*Pomatostomus superciliosus*)  
 Ground-Thrush (*Oreocincla lunulata*)  
 Striated Thornbill (*Acanthiza lineata*)  
 Brown Thornbill (*Acanthiza pusilla*)  
 Buff-rumped Thornbill (*Acanthiza reguloides*)  
 Yellow-rumped Thornbill (*Acanthiza chrysorrhoa*)  
 White-browed Scrub-Wren (*Sericornis frontalis*)  
 Superb Blue-Wren (*Malurus cyaneus*)  
 Masked Wood-Swallow (*Artamus personatus*)  
 White-browed Wood-Swallow (*Artamus superciliosus*)  
 Dusky Wood-Swallow (*Artamus cyanopterus*)  
 Black-capped Sittella (*Neositta pileata*)  
 Brown Tree-Creeper (*Climacteris picumnus*)  
 White-throated Tree-Creeper (*Climacteris leucophaea*)  
 Mistletoe-Bird (*Dicaeum hirundinaceum*)  
 Spotted Pardalote (*Pardalotus punctatus*)  
 Yellow-tailed Pardalote (*Pardalotus xanthopygus*)  
 Red-tipped Pardalote (*Pardalotus ornatus*)  
 Grey-backed Silvereye (*Zosterops halmaturina*)  
 White-naped Honeyeater (*Melithreptus lunatus*)  
 Black-chinned Honeyeater (*Melithreptus gularis*)  
 Brown-headed Honeyeater (*Melithreptus brevirostris*)  
 Eastern Spinebill (*Acanthorhynchus tenuirostris*)  
 Tawny-crowned Honeyeater (*Gliciphila melanops*)  
 Regent Honeyeater (*Zanthoniza phrygia*)  
 Yellow-faced Honeyeater (*Meliphaga chrysops*)  
 White-plumed Honeyeater (*Meliphaga penicillata*)  
 Crescent Honeyeater (*Phylidonyris pyrrhoptera*)  
 Yellow-winged Honeyeater (*Meliornis novae-hollandiae*)  
 Noisy Miner (*Myzantha melanocephala*)  
 Little Wattle-Bird (*Anthochaera chrysoptera*)  
 Red Wattle-Bird (*Anthochaera carunculata*)  
 Diamond Firetail (*Zonaeginthus guttatus*)  
 Red-browed Finch (*Aegintha temporalis*)  
 Australian Raven (*Corvus coronoides*)  
 White-backed Magpie (*Gymnorhina hypoleuca*)

# The Reptiles of the National Park.

By Herbert M. Hale

THE reptiles are by no means the most conspicuous denizens of our national parks. Although their presence is usually unsuspected, however, we find that representatives of most of the groups known to occur in South Australia are found on these reserves.

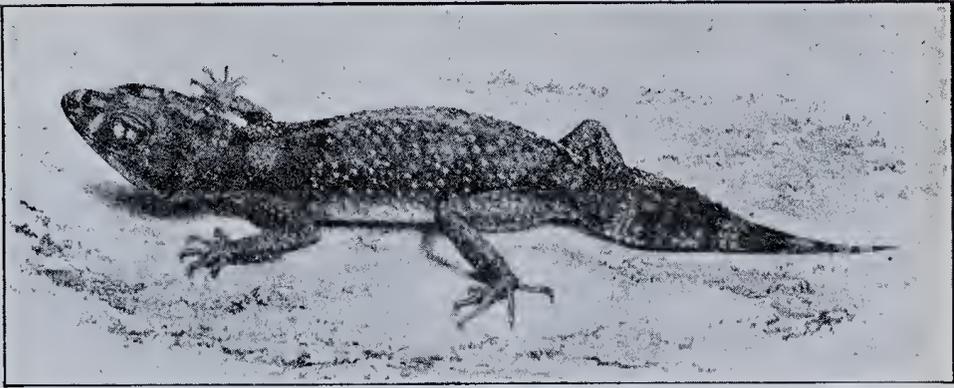


FIG. 21.—The Barking Lizard (*Gymnodactylus miliosii*).

The soft-bodied, harmless little lizards, known as Geckoes, spend most of the daylight in hiding, although a beautifully marked species, the large-eyed "Barking-gecko" (*Gymnodactylus miliosii*) is occasionally seen wandering about during the day, particularly near water. The tail of this gecko is wide and leaf-like. Another common species is the Mottled-gecko (*Peropus variegatus*). This little lizard does not exceed five inches in length and is often found under the bark of our big gums; another small gecko found under bark is the Marbled-gecko (*Phyllodactylus marmoratus*). Most geckoes are able to throw off their fat tails at will when alarmed or attacked by enemies; the detached tail wriggles and jerks actively for some minutes, thus attracting the attention of an aggressor, while the rest of the lizard creeps quietly away. Apart from protecting its owner in such times of stress, the large tail apparently serves as a reserve larder during lean periods, for when food is abundant the tail becomes very fat, but shrinks when times are bad.



FIG. 22.—A Gecko found under bark of Gum trees (*Phyllodactylus marmoratus*).

“Snake-lizards” are found under stones or burrowing in soft earth. As the name implies, they are exceedingly snake-like in form, and, indeed, are often mistaken for snakes. The front legs have entirely disappeared, and the hind legs are represented by a pair of little flaps, one on each side of the vent. Unlike most of our snakes, however, the belly scales are not enlarged, and the tail is relatively very much longer. One of these lizards

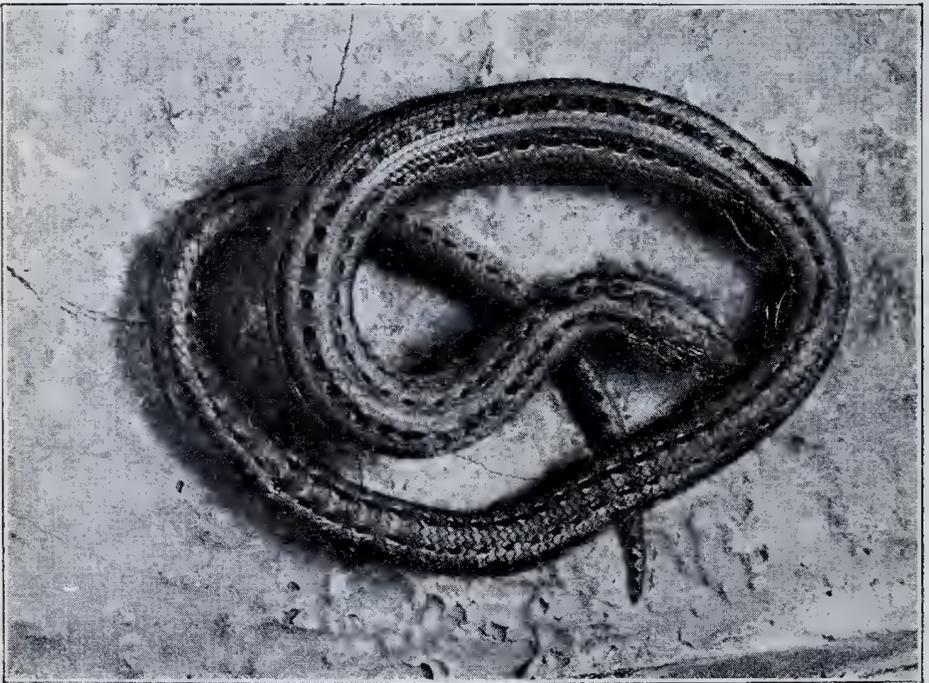


FIG. 23.—A snake-like but harmless lizard (*Pygopus lepidopus*).

(*Delma fraseri*) superficially resembles the young of the Brown Snake, and is known as the Mimicking Snake-lizard. Other Snake-lizards which occur fairly commonly are the Scaly-foot (*Pygopus lepidopus*), the Pretty Snake-lizard (*Aprasia pulchella*), and, lastly, the commonest member of the family in South Australia, the Spinifex-lizard (*Pseudodelma impar*).

The Agamas or "Dragons," unlike those previously mentioned, are not of a retiring disposition, although some of them are not generally observed owing to their habit of remaining motionless for long periods. The Jew-lizard or Bearded-lizard (*Amphibolurus barbatus*) is by far the largest and most often seen species. When alarmed it assumes a threatening attitude, with mouth wide open and exposing the bright colour inside, while a prickly frill around the throat is distended to the utmost, and by deep inspirations the body assumes an almost circular form. A far commoner species is the Tree-dragon (*A. muricatus*), a quite harmless little lizard, which, for some obscure reason, is popularly known as a "Blood-sucker"; though sometimes found on the ground, it is more often seen on trees and



FIG. 24.—The Tree dragon (*Amphibolurus muricatus*) (After C. Barrett).

dead stems, where it remains pressed closely and without movement against the bark when alarmed. Other relatively common species are the beautifully coloured Painted-dragon (*A. pictus*) and the Tawny-dragon (*A. decresii*); the last-named is known only from South Australia.

The Scinks include the lizards most familiar to the layman. The most notable South Australian Scink is the Stumpy-tail, Bob-tail, Shingle-back or Sleepy-lizard, as it is variously known. This lizard (*Trachysaurus rugosus*) has large, rough scales, and possesses some primitive characters, including the remnant of a



FIG. 25.—The Jew-lizard is alarmed (*Amphibolurus barbatus*).  
(After C. Barrett.)

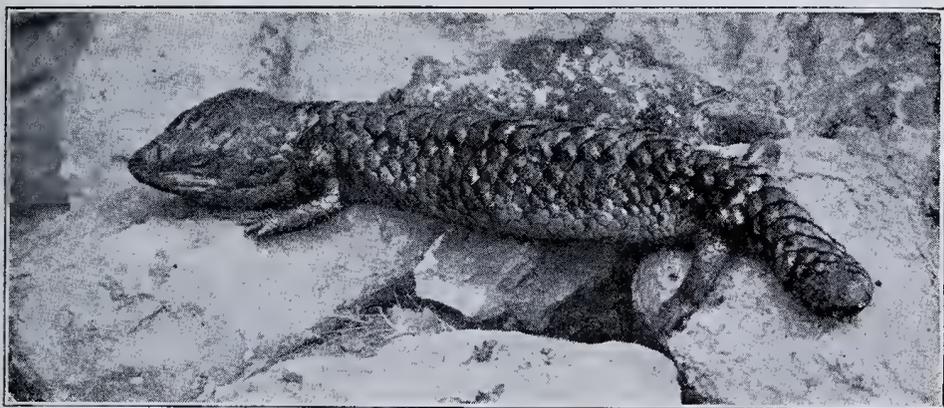


FIG. 26.—The Stumpy-tail or Shingle-back (*Trachysaurus rugosus*).

third eye on the top of the head. The Stumpy-tail produces living young, and as a general rule gives birth to twins. Complaints have been received of the damage which it does to strawberries and other crops, but there is no doubt that in its destruction of insects its usefulness far outweighs the harm it does. Two introductions are assisting to destroy the Stumpy-tail—wire-netting fences and the motor car. On encountering wire-netting the lizard endeavours to push its way through the mesh, or to climb over it; owing to the shape of the head and the well-defined

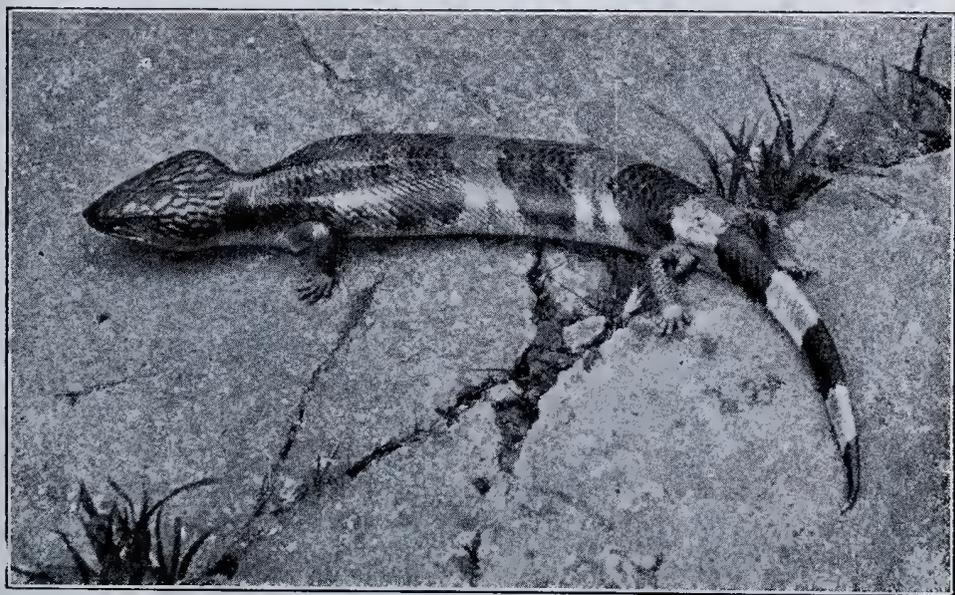


FIG. 27.—Banded Skink, miscalled “Puff-adder” but harmless (*Tiliqua scincoides*).

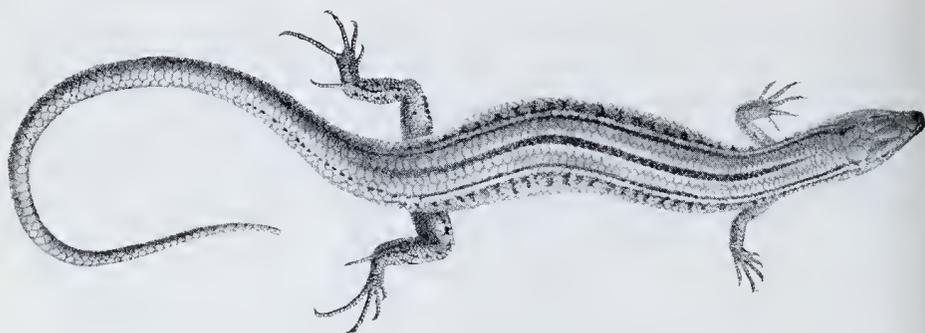


FIG. 28.—Copper-tailed Scink (*Lygosoma taeniolata*).

neck, it quite often becomes trapped in the mesh; large numbers, too, are killed by cars as they attempt to cross roads. The Blue-tongue (*Tiliqua scincoides*) is as large as the sleepy lizard, but is not so often seen. It is greyish in colour with a series of broad, blackish bands, and is quite harmless, although, owing to its habit of puffing out the body and hissing when alarmed, it is often thought to be a "Puff-adder," and an exceedingly dangerous reptile. The Blue-tongue owes its name to the colour of the tongue, which is protruded when it is alarmed by man. Two of the smaller Scinks which have been found in our parks are the Copper-tailed Scink (*Lygosoma taeniolata*) and the Three-toed Scink (*L. decresiensis*). Both are active little lizards with metallic colouring, and readily discard the tail when one attempts to capture them. The Three-toed Scink is a very elongated,

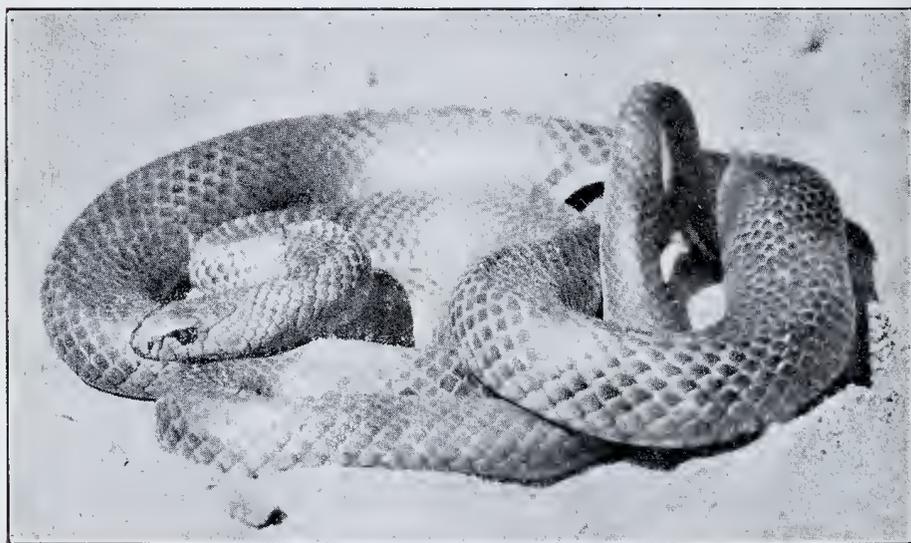


FIG. 29.—Brown Snake (*Demansia textilis*).

somewhat snake-like form, with toes of each of the fore and hind legs reduced to three in number; three related species also occur. Amongst rock outcrops we find the long-tailed Spiny Scink (*Egernia cunninghami*), a prickly lizard, fond of basking on the sun-heated stones; although it may be approached quite closely before becoming alarmed, it is very difficult to capture, as it makes its way into crevices of rocks, from which, owing to its spiny coat, it is practically impossible to withdraw it.

The "Goanas" are now rarely seen in our parks, but the Lace lizard or common goana (*Varanus varius*) has been seen there. It reaches a length of more than six feet, and climbs trees in search of eggs and nestling birds.

Snakes are not very often encountered, but the Black Snake (*Pseudechis porphyriacus*) is occasionally seen near water, and the quickly moving Brown Snake (*Demansia textilis*) in the timber and open country. The Black Snake produces living young, and the Brown Snake lays eggs, which are left amongst bush debris, a score to over thirty being deposited at a time. Baby Brown Snakes have a black marking on the head and another across the neck, and, as before mentioned, one of our Snake-lizards imitates this phase in colour, and is often mistaken for the more dangerous reptile. The Black-naped Snake

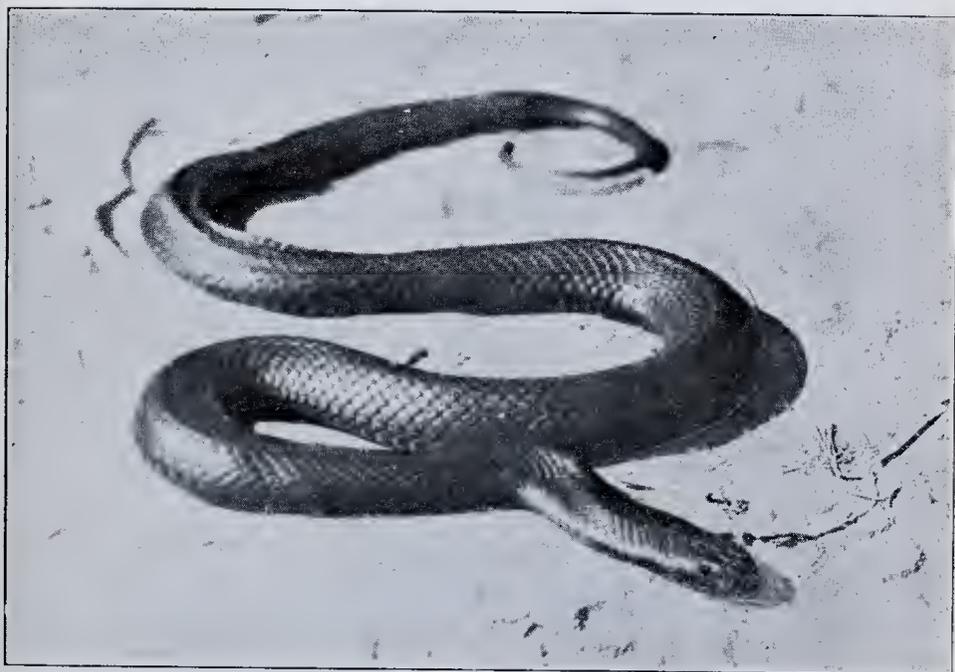


FIG. 30.—Black Snake (*Pseudechis porphyriacus*).

(*Denisonia gouldii*) is also sometimes mistaken for the young of the Brown Snake; a comparison shows that this reptile differs from the latter in having the head black, but no black marking on the nape.

Inconspicuous and scarcely ever noticed are the Blind Snakes, which spend their lives underground, or in nests of termites. In these harmless little reptiles, the scales are smooth and of equal size right around the body, for, unlike all our other snakes, the belly scales are not enlarged; the mouth is very small, and the tail exceedingly short and ending in a spine. The commonest species is the southern Blind Snake (*Typhlops australis*).

During the spring one finds in every creek the frothy egg-masses of two Australian Bull-frogs (*Limnodynastes dorsalis* and *L. tasmaniensis*). The first-named is our largest species, and, like many other frogs, puffs out its body when attacked, a faculty alluded to by Æsop. A little Tree-frog (*Hyla ewingii*) may be found sitting on leaves and twigs in warm, moist weather, but retires beneath the bark of trees and other sheltered places



FIG. 31.—The Australian Bull Frog (*Limnodynastes dorsalis*).

during the cold periods. Its eggs are laid in the water and are attached to submerged vegetation in small bunches which encircle the stems of the plants; unlike the eggs of the Bull-frogs, they may be found at almost any time. The smallest of our amphibians, the Brown Froglet (*Crinia signifera*) is found under stones and logs; after heavy rain, from June to December, it makes to water and lays its eggs in small masses attached to plants, in much the same way as those of the Tree-frog.

The one Toad occurring in our hills is a small and inconspicuous species sometimes found in the same situations as the Brown Froglet. Unlike the last-named, however, it does not attempt to escape by jumping when disturbed. Our Toadlet is not a swimmer, and does not make its way to pools and streams, even for breeding purposes. The eggs are laid after rain in depressions or holes, under stones or pieces of old tin, or in grass or weeds near the margin of water. The hatching of the eggs is postponed until they find their way into water, which may only occur with the next heavy shower of rain. The eggs will survive desiccation for at least three months.

## *Introduced Trees and Shrubs.*

By the late Dr. R. H. Pulleine, W. H. Bagot,  
and H. Greaves

THE planting of trees and shrubs introduced from other countries is not strictly in accord with the preservation of the natural flora, which must always be a primary function of a national park. Nevertheless, the grouping of familiar flowering and other shady deciduous trees, such as those surrounding the Long Gully Oval, adds to the amenities of the park as a place of public enjoyment. Where such planting has been confined to the borders of watercourses and grassy flats, it has proved most successful, both in the welfare of the individual tree and from a landscape aspect. Introduced verdure does not merge very well with the native in colour or texture and, beautiful as it is, often its contrast is not always favourable to its surroundings. The most recent systematic planting was that undertaken at the instance and the expense of the late Mr. Francis H. Snow in 1922 near the top of Spark's Gully. Here are massed along the watercourse a large number of the Japanese Flowering Cherry among other trees such as the Birch, the Japanese Maple, and the Liquidambar. September and October are the blossoming months, and from April to May the autumnal tints are to be seen at their brightest. Lower down the same gully are effective



FIG. 20.—Native and Introduced Trees in the National Park.

groups of *Prunus pissardi* (Persia) and a grove of *Eugenia* and flowering Laurels. In the upper gullies are to be found occasional fine specimens of the Lime (*Tilia europaea*), the Horse Chestnut (*Aesculus hippocastanum*), Oaks and Willows of several varieties, and some large and shapely Hawthorns and Planes. The Common Ash (*Fraxinus excelsior*) and the Lombardy Poplar (*Populus fastigiata*) thrive near the water and are distributed accordingly. Near the stables is a good specimen of the Tulip Tree (*Liriodendron Tulipifera*).

Amongst conifers the handsomest specimens are groups of *Sequoia*, near the Joseph Fisher Pavilion. Both species are represented, *S. gigantea* and *S. sempervirens* or the Red Wood. There are also a few isolated specimens of the Cedar (*Cedrus atlantica*). The Cypress family has not acclimatized well in the dry localities selected for it, and of the pines only *Pinus canariensis* makes a conspicuous tree in good situations. Near the railway station *P. radiata* (*P. insignis*) has been afforested and *P. halepensis* freely planted, but, although the massed effect is good, these trees are individually poor in comparison with their growth at other altitudes. Amongst the conifers native to Australia are several fine specimens of the Bunya Bunya (*Araucaria Bidwillii*) and the Hoop Pine (*Araucaria Cunninghamii*). In the area controlled by the Forest Department are well-grown specimens of the Oak from which cork is obtained (*Quercus suber*).

## LIST OF TREES AND SHRUBS ACCLIMATIZED IN THE NATIONAL PARK

### Conifers

- Pinus halepensis*, Aleppo pine.
- P. radiata* (*P. insignis*).
- P. canariensis*, Canary Island Pine.
- Cupressus macrocarpa*, Monterey Cypress, S. California.
- C. sempervirens*, Europe.
- C. torulosa*.
- Cedrus deodara*, Deodar Cedar, Himalayan Mountains.
- C. atlantica*.
- Libocedrus decurrens*.
- Thuja* (*Biota*) *orientalis*, Chinese Arbor-Vitae, China.
- Araucaria Bidwillii*, Bunya Bunya Pine, Queensland.
- A. excelsa*, Norfolk Island Pine.
- A. Cunninghamii*, Hoop Pine, New South Wales and Queensland.
- Sequoia sempervirens*, Californian Red Wood.
- S. gigantea*, Californian Big Tree.

## Deciduous Trees

**SALICACEAE:** *Populus alba* var. *Bolleana*, White Poplar; *P. nigra* var. *pyramidalis*, Italian Black Poplar; *Salix babylonica*, Weeping Willow, Levant; *S. sp.*, Upright Willow.

**JUGLANDACEAE:** *Juglans nigra*, Black Walnut, United States; *J. regia*, Common Walnut.

**BETULACEAE:** *Betula alba*, Birch.

**FAGACEAE:** *Quercus robur*, Oak; *Q. suber*, Cork Oak; *Castanea vulgaris*, Spanish Chestnut.

**MAGNOLIACEAE:** *Liriodendron tulipifera*, Tulip Tree.

**PLATANACEAE:** *Platanus orientalis*, European Plane.

**ROSACEAE:** *Crataegus*, Flowering Hawthorn; *Spiraea cantoniensis*, China and Japan; *Pyrus communis*, Common Pear, Europe; *Cydonia vulgaris*, Common Quince, S. Europe; *Prunus Pissardi* (*P. cerasifera* var. *atro-purpurea*), the Persian Copper-leaved Cherry-plum; *Prunus pseudocerasus*, Japanese Flowering Cherry.

**LEGUMINOSAE:** *Cercis siliquastrum*, Judas Tree; *Robinia pseudacacia*, Mock Acacia, N. America.

**MELIACEAE:** *Melia azedarach*, White Cedar or Bead Tree, Tropical Asia and Eastern Australia.

**ACERACEAE:** *Acer*, Japanese Maple.

**HIPPOCASTANACEAE:** *Aesculus hippocastanum*, Flowering Horse Chestnut, red and white, S. Europe.

**TILIACEAE:** *Tilia europea*, Lime.

**OLEACEAE:** *Fraxinus excelsior*, Common Ash.

## Other Trees and Shrubs

**PALMACEAE:** *Chamaerops macrocarpa*, North Africa.

**AMARYLLIDACEAE:** *Agave americana*, American Aloe, S. America.

**FAGACEAE:** *Quercus virens*, Live Oak, N. America.

**MORACEAE:** *Ficus pendula*.

**PROTEACEAE:** *Hakea laurina*, Pin-cushion Flower, Western Australia; *Hakea sp.*

**BERBERIDACEAE:** *Mahonia aquifolium*.

**MAGNOLIACEAE:** *Magnolia grandiflora*, Bull Bay, N. America.

**LAURACEAE:** *Cinnamomum camphora*, Camphor-laurel, China and Japan; *Oreodaphne Sieberi*.

**PITTOSPORACEAE:** *Pittosporum undulatum*, Mock Orange, Eastern Australia and Tasmania.

*HAMAMELIDACEAE*: *Liquidambar styraciflua*, Sweet Gum, N. America.

*LEGUMINOSAE*: *Virgilia capensis*, S. Africa; *Spartium junceum*, Spanish Broom, S. Europe; *Cytisus proliferus*, Tagasaste, Teneriffe; *Albizia lophantha*, Green-crested Wattle, W. Australia; *Acacia farnesiana*, Sponge Tree, East Indies and Northern Australia.

*ANACARDIACEAE*: *Schinus Molle*, Pepper Tree, Brazil and Peru.

*RHAMNACEAE*: *Rhamnus*.

*MALVACEAE*: *Lagunaria Patersonii*.

*STERCULIACEAE*: *Brachychiton acerifolia*, Flame Tree, New South Wales and Queensland; *B. diversifolia* (*populnea*), Kurrajong, Western Australia and New South Wales.

*BIXACEAE*: *Doryalis* (*Aberia*) *caffra*, Kaffir Apple.

*MYRTACEAE*: *Eucalyptus calophylla*, Marri or W.A. Red Gum, Western Australia; *E. ficifolia*, Red Flowering Gum of Western Australia; *E. cinerea*, Argyle Apple, Goulbourn district in New South Wales; *E. cornuta*, Yate, Western Australia; *E. cladocalyx*, South Australia; *Callistemon lanceolatus*, Bottlebrush, New South Wales; *C. rugulosus*, South Australia; *C. brachyandra* var. *acerosa*, inland New South Wales; *Melaleuca hypericifolia*, New South Wales; *M. ternifolia*, *M. hamulosa*, *M. adnata* var. *aspera*, Western Australia; *Eugenia Smithii*, Lilly Pilly, New South Wales; *Leptospermum laevigatum*, Teatree, New South Wales coast; *Agonis flexuosa*, Willow Myrtle, W.A.

*ARALIACEAE*: *Hedera helix*, Common Ivy, Europe, Africa and Asia.

*OLEACEAE*: *Olea europea*, Common Olive; *Ligustrum japonicum*, Japanese Privet, Japan.

*LOGANIACEAE*: *Buddleia madagascariensis*, Madagascar.

*APOCYNACEAE*: *Nerium oleander*, Common Oleander, Mediterranean Region.

*SOLANACEAE*: *Cestrum aurantiacum*, Guatemala.

*BIGNONIACEAE*: *Tecoma Smithii*.

*RUBIACEAE*: *Coprosma Baueri*, Naupata of the Maoris, a hedge plant, N. Zealand.

*CAPRIFOLIACEAE*: *Lonicera ciliata*, Honeysuckle, N. America; *Viburnum tinus*, Lauristinus.

#### Pests.

St. John's Wort (*Hypericum perforatum*), the Blackberries (*Rubus fruticosus* and *R. laciniatus*), and Sweet Briar (*Rosa rubiginosa*) have naturally acclimatized themselves and present great difficulties in eradication.

# *Insects of the National Park.*

By H. Womersley, F.R.E.S., A.L.S.

IN the space available we can take a glimpse only at the more obvious of the insects and spiders, etc., that the visitor to our National Park and Reserves might see.



FIG. 32.—Life History of the Wild Australian Silkworm  
(*Antheraea helena*).

## Cicadas

IN the summer, especially as evening approaches, the visitor is often welcomed by the love-song of those interesting but elusive creatures — the Cicadas. Seated high up on the tops of the gum trees, the males shrill their peculiar call to the voiceless females — a call which, on the approach of something unusual, instantly ceases as though by signal. It is rarely that the ordinary person sees the adults, but search on the trunks of the trees will frequently reveal numbers of their last change of clothing. The young stages are spent in the ground, sucking the sap of the tree roots. When ready to assume the mature form, they burrow out and climb a short distance up the boles of the trees. After resting a while, their skins split along the back of the head and thorax and the adults crawl out, soon to dry their wings and legs in readiness to fly and join their fellows.

A number of species of Cicadas may be met with in the reserves, from the small ones in the low scrub and about half an inch long, to the large, noisy fellows in the tree tops, up to two inches across the wings. The latter are blackish with bright red eyes, from which they get the popular name of "Red Eyes." The Latin name is *Psaltoda moerens*. We know very little of the length of time that our Australian Cicadas pass in the ground, but it is probably several years in some cases. In America there is a well-known species which takes seventeen years over this stage, the adults appearing in numbers only periodically.

## Dragon-flies

IN the spring and early summer, many forms of these graceful denizens of the air may be seen hawking their prey in the open spaces and over the ponds and streams. The very delicate species of Zygopterids (Damsel-flies), with their thin bodies coloured blue and white, sometimes with some red, are very numerous and many different varieties will be recognized by the nature lover. Several kinds of Aeschnidae, with their wings measuring four or five inches across, wend their way to and fro through the air at enormous speeds. Over the ponds and streams the more medium-sized but stouter-bodied Libellulids are numerous and of varied colour from yellow to almost entirely blue or red. In many of these there is a marked colour difference in the two sexes, as, for example, in the common *Orthetrum caledonicum*, in which the male has a blue body while the female is dingy yellow. Some of the smaller species, as *Diplacodes*, are brilliantly red.

The larvae of dragon-flies are aquatic and may be found in the ponds and streams among the weeds and mud. The careful observer may sometimes see the adults flying low over the water

and continually dipping the tip of the body into the water; these are busy laying their eggs in the habitat best suited for the young. Others will crawl beneath the water and deposit their eggs in the stems of weeds.

### Lace-wings and Ant-lions

RARELY, in the early evening, we may encounter some of the larger lace-wings or ant-lions hawking in a similar manner to dragon-flies. It is to the larvae of these insects that the name of "ant-lion" more strictly applies, for they have the habit of constructing an inverted cone in the sand, at the bottom of which they lie buried but on the look-out for any unwary insects which may fall into the trap. These pits may be found by careful search. In the day-time the adults of some of these may be observed resting on palings and so on. One fairly common one, *Acanthaclisis fundata*, is about three inches long, greyish, and rests with its long wings folded roof-wise.

Their lesser relatives, the true lace-wings (species of *Chrysopa*) are abundant on the shrubs and can easily be recognized by their roof-like green gauzy wings and golden eyes. The grubs of these do not make pits but forage freely on the bushes for aphides and other small insect prey. The cast skins of the larvae are carried about on their backs and thus serve as a protection against their enemies.

### Beetles

THESE are common almost anywhere, in the herbage, under loose eucalypt bark and stones, and in many other places. Under the bark, examples of the Longicorns (*Phoracantha* and allies) with their very long antennae are sure to be discovered. Similarly will be found some of the Click Beetles (Elaterids), so called because of their habit of leaping up with a clicking noise when placed upon their backs. Ground beetles (*Carabidae*, *Tenebrionidae*) of quite a variety of species occur, while on warm, damp evenings large numbers of Chafer fly about, some of the larger ones, Christmas Beetles, being of a beautiful golden colour. Sweeping of the herbage and teatree flowers with a net is sure to yield many of the fine and varied coloured Jewel Beetles (*Buprestidae*), the grubs of which are largely timber borers with a very much larger head and thorax than body. Lastly, the careful searching of ants' nests under stones will produce some very curiously built species, although mostly rather small in size.

## Ants, Bees and Wasps

**PICNICKERS** in the reserves need to look carefully where they propose to sit, so as to avoid proximity to any nest of the large Bull-dog Ant (*Myrmecia*). These do not construct very big nests, the population being usually not more than one or two hundred, but they make up for this by their viciousness and large size. Some of the commoner species measure up to an inch or more in length and can both bite and sting. If a nest be disturbed, these have the nasty habit of coming out by a back entrance and taking the inquisitive person by surprise from the rear. Other species, generally smaller, have the power of jumping, and as they ramble up the trees are given to dropping down on the unwary. Under stones and in old stumps other kinds of ants abound, usually in very large numbers. Some of these, such as the sugar ants (*Campanotus*), have very big queens and are incapable of stinging. On the gravel paths, immense mounds of the common meat ant (*Iridomyrmex detectus*) are sure to be seen and need to be avoided. Their populations are enormous and the attack of the ants wicked.

A large variety of bees and wasps will be seen, many frequenting the gum and teatree blossom. Wasps, belonging to the family *Thynnidae*, with their large size and yellowish banded or black bodies, may be seen in this situation, often the winged males with the smaller wingless females attached while pairing. Much more hairy and winged in both sexes are the Hairy Flower-wasps, *Scolytidae*. Both these families in their larval stages are parasitic on the grubs of ground beetles.

Attached to the walls of buildings will be located some of the mud cells of the Eumenid Wasps, which have very long, narrow waists and store the cells with paralyzed spiders for their young. The so-called "hornets" — true hornets are social wasps and do not occur here — may be seen hunting for spiders with which they provision their underground cells. If fortunate, the observer may chance upon an unfortunate spider being dragged off to the burrow of the wasp. These wasps, *Salix* and its allies, are usually large, stout fellows with yellow and black bands and very long hind legs. Others of the same family, but smaller and more slender, will be seen on the paths, hunting for caterpillars instead of spiders.

## Scorpion-flies

**THESE** insects, which are not true flies for they have four instead of two wings, belong to the order *Mecoptera*. They are represented in our reserves by the common *Harpobittacus*, a curious, elongate, brownish insect with two pairs of long,

narrow wings, and in the male sex with a strongly-clubbed apex to the abdomen. It measures about one and a half inches in expanse. Its flight is somewhat slow and it can be easily caught. The food consists of other insects, such as bees, which it sucks dry.

### True Flies (*Diptera*)

MANY interesting examples of this group of insects are to be seen in the park and reserves by the careful observer. Over the blossoms, species of small, yellow-banded hoverers, some exceptionally common, will be found. The larvae of these are small, greenish, slug-like caterpillars, which devour a great number of aphides and such pests.

More striking, however, are the large and hairy Robber-flies (*Asilidae*), of which species of *Blepharotes*, large, blackish fellows with red body, may occasionally be seen but rarely caught. Smaller greyish species may often be observed on the paths or resting on trunks in a manner simulating death but actually on the look-out for some unwary insect, upon which they feed.

Hovering over low-growing flowers or sandy paths may be seen some of the very hairy *Bombyliidae* of various genera. Some of these are parasites in the nests of bees and wasps, others on the larvae and pupae of moths.

### Butterflies and Moths

COMPARATIVELY few varieties of Butterflies occur in our State, and of these the visitor to our reserves will meet with but a small proportion. Some, however, will be in large numbers and the visitor cannot help being impressed when, on a fine day in Morialta Gorge or Waterfall Gully, he sees the Wanderer Butterfly (*Danaus plexippus*) flying about in hundreds. This graceful insect, which measures almost six inches across the wings, is really an introduction from America, where it is popularly known as the Storm Butterfly. Its caterpillars are banded yellow, white and black, and carry a pair of horns at the head and tail. They feed on the common milkweed or cotton-bush (*Asclepias*), which grows plentifully on our foot-hills. The beautiful green chrysalides, with belts of golden spots, may be found suspended from the leaves and stems.

In the gullies, the brownish and smaller Butterfly (*Xenica klugi*) will be seen frequently flitting about, and specimens of the Painted Lady (*Pyrameis cardui kershawi*) and the Admiral (*Vanessa itea*) are not uncommon. The Blues (*Lycaenidae*) are represented by a number of species, but the Whites

(*Pieridae*) are scarce, although the Caper White may occasionally be seen in gardens. Hovering over flowers and flying in short, jerky skips is the typical flight of Skippers or *Hesperiidae*. In the glades and open spaces, the Common Brown (*Heteronympha merope*) with its differently marked male and female, and the Orange Butterfly (*Papilio anactus*) are abundant.



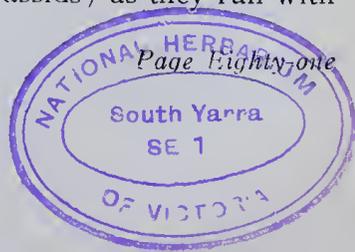
FIG. 33.—Nymphal case and adult of Bright-eyed Cicada (*Psaltocla moerens*).

Amongst the moths, the day-time visitors will not notice many, although careful searching of the tree trunks may show specimens of some of the Boarmids, with their grey, expanded wings merging into the colouring of the bark. If fortunate, a caterpillar or two of the large native silk-worm (*Antheraea helena*), which feeds on the young gum-tips, may be found. This caterpillar, when fully fed, measures three inches or so in length and is much thicker than one's thumb; its cocoon of brown silk is hard and somewhat smaller.

### Scorpions and Spiders

SEVERAL varieties of the former occur in the reserves, under bark, stones, and similar situations. Accordingly, care must be exercised when stripping bark off trees, for many of the smaller scorpions are so much like the bark in colour as to be hardly seen at first. The larger species, up to three inches in length, are more likely to be found under stones and logs.

Spiders of infinite variety abound in all manner of places. The Orb-weavers (*Araneidae*) spin their cart-wheel webs among the bushes, while under bark the visitor may be alarmed at the large size of the giant crab-spiders (*Sparassids*) as they run with



a sideways gait; they are, however, harmless. Trap-door spiders are unlikely to be seen, although careful search reveals the closed lids of their burrows in the low wayside banks. In the gully streams, a large, blackish spider lurks beneath stones by the water's edge. This Spider (*Dolomedes instabilis*), which carries its egg cocoon in its jaws, feeds on small fish and probably tadpoles, and has been known to kill fish many times its own weight and size. It is quite as much at home in the water as out of it.

Even if it were possible to speak of the many interesting forms known to the specialist, many more will in time be discovered, as these reserves are more intensively worked.

# Shells of the National Park.

By B. C. Cotton

THE molluscan fauna of the National Park is of two types: the land and the freshwater. The land forms consist of native snails, slugs, and introduced species. The largest of the native species is *Rhytida gazleri*, distinguished by a depressed, unbilicated, shining, horny brown shell, of about an inch in diameter, with dark, reddish, oblique streaks. It is found beneath stones and in the shelter of close, low vegetation. Bednall's Snail, *Badistes bednalli*, is nearly as large, and is widely distributed about the Mount Lofty Ranges; it is readily distinguished by the reddish ring surrounding the umbilicus on the base. The Southern Amber Snail, *Succinea australis*, is a thin, transparent,

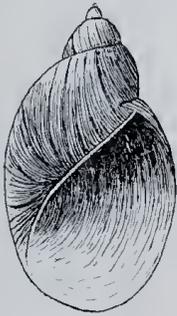


FIG. 34.  
*Succinea australis*.



FIG. 35.  
*Rhytida gazleri*.

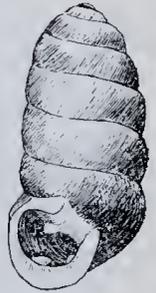


FIG. 36.  
*Pupilla australis*.

spirally-conical shell of about half an inch in length, and may be found in low vegetation and sometimes climbing up vertical posts and trees to a height of several feet. Easily distinguished from the former species by its minute size, cylindrical form, and



FIG. 37.  
*Ameria tenuistriatus*



FIG. 38.  
*Ameria aliciae*



FIG. 39.  
*Myxas papyracea*

toothed aperture, the Southern Pupilla, *Pupilla australis*, is found under stones and in the crevices of rocks. All these native snails are rare in the National Park and the surrounding districts, and are not in any way a nuisance.

This cannot be said of the imported snails, which are found only in the cultivated portions of the park. The common European garden snail, *Helix aspersa*, is there in plenty, as it is in many parts of the world. Another introduction is the English Sandhill Snail, *Euparypha pisana*, a yellowish, depressed shell decorated with spiral, brown bands and measuring from one-quarter to half an inch in diameter. Quite different from the preceding is the Swollen Snail, *Cochlicella ventricosa*, with its small, cylindrical shell measuring a little over a third of an inch, yellowish white, streaked across the whorls with brown and sometimes with one or two spiral bands of dark brown.

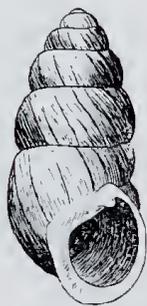


FIG. 40.

*Pupoides adelaidae*



FIG. 41.

*Ancylus australicus*



FIG. 42.

*Gundlachia petterdi*

Slugs are plentiful, particularly the introduced *Limax maximus* and the cream-coloured, carnivorous slug, *Testacella haliotidea* which, unlike the first, tapers anteriorly, and has the internal shell situated posteriorly. This slug feeds principally on earth worms, but will also eat other slugs, snails, and centipedes, and is therefore worth preserving.

About nine species of freshwater snails occur in and about the National Park. Two of the commoner are *Ameria tenuistriatus*, which is finely spirally striated, and *Ameria aliciae*, a spirally-ribbed species, both about half an inch long and in the form of a "left-hand" spiral. The small freshwater limpets, *Ancylus australicus* and the much rarer *Gundlachia petterdi*, may be found adhering to smooth river pebbles. Another minute shell is the Rams'-horn Snail, *Planorbis isingi*, a flat shell of a quarter-inch diameter. This and the much rarer Trumpet Snail.



FIG. 43.

*Planorbis isingi*, side view.

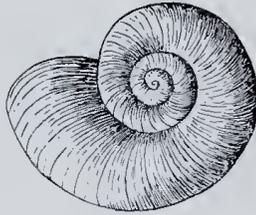


FIG. 44.

*Planorbis isingi*, top view.



FIG. 45.

*Segmentina victoriae*

*Segmentina victoriae*, are found in slow-running streams and stagnant water. Two snails, both "right-hand" twisted, are occasionally found; they are the Paper Shell, *Myxas papyracea*, about three-quarters of an inch in length, and the more slender subaquatic Pond-snail, *Limnaea subaquatilis*, measuring about half an inch long.

Another "left-handed" snail is the Red Pond-snail, *Isodorella rubida*, readily distinguished by its dark, reddish-brown colour and swollen shape. Three freshwater bivalves are found: Angas' Freshwater Cockle, *Corbicula angasi*, Macgillivray's Orb Shell, *Sphaerium macgillivrayi*, and Etheridge's Pea Shell, *Pisidium etheridgi*. The first may measure one inch in length whereas the others rarely measure a quarter of an inch. It is



FIG. 46.

*Corbicula angasi*.



FIG. 47.

*Pisidium etheridgi*.



FIG. 48.

*Sphaerium macgillivrayi*.

quite probable that many more kinds of mollusca, both native and introduced, may be discovered when a thorough, systematic search is made.

# *Morialta Falls Reserve.*

## *Its Attractions.*

By V. H. Ryan, O.B.E.

THE Morialta Falls Reserve, which was originally part of the Rostrevor estate of Mr. J. S. Reid, came into the possession of the Government in 1913, partly by purchase and partly by deed of gift. Mr. Reid, in presenting the Morialta Gorge to the Government, stipulated that it should be dedicated as a public recreation reserve for the use of the residents of the State for all time. The Government, to add to the value of the gift as a national pleasure resort, purchased an additional area at the entrance to the valley leading to the gorge on both sides of Fourth Creek, which flows through the property. The result is that Adelaide possesses in the Morialta Falls Reserve one of the most beautiful, as well as one of the most conveniently situated, mountain national pleasure resorts in the Commonwealth. The reserve, which is situated in a deep gorge on the western side of the Mount Lofty Ranges, seven miles from Adelaide, is connected to the city by electric tramway and an excellent bitumen road. Containing 525 acres, Morialta Falls Reserve is the largest of the national pleasure resorts under the control of the Government Tourist Bureau, by which it has been administered since 1915. The electric car runs to the entrance, where well grassed, practically level fields on both sides of the picturesque creek constitute one of the most attractive of the many excellent picnic grounds in the Adelaide metropolitan area. All the necessary facilities for cooking are available, as well as swings and other sporting apparatus for children. The locality, with its magnificent gum trees bordering the creek and dotted about the fields, is a very popular one for school and similar picnics.

From the terminus of the car line, a motor road follows the bottom of the valley until the entrance to the gorge proper is reached. There a parking area has been provided in the vicinity of a refreshment kiosk, where meals can be obtained at practically all hours, as the proprietor resides on the premises. There is an excellent dancing floor at the kiosk, which is becomingly increasingly popular for private parties and similar entertainments.

From the kiosk, well-graded, winding paths lead all over the reserve, enabling its many beautiful and interesting spots to be explored without undue fatigue. The gorge itself contains

some of the most rugged and impressive scenery in the Mount Lofty Ranges, including three waterfalls, from which the resort takes its name. A feature of the reserve is that, although excellent facilities have been provided for tourists and picnickers in the shape of paths, fire places, seats, shelter sheds, etc., the natural and impressive beauty of the scenery has not been interfered with.

# Historical Account of Morialta Reserve.

By W. H. Selway

THIS reserve is situated about seven miles north-east of Adelaide, and is reached by an electric tramway which extends to the entrance to the gully. The actual length of the tram line from Currie Street is slightly over six and a half miles (6.53), and the site of the kiosk, which is the furthest point available at present for other vehicular traffic, is close upon seven and a half miles from the G.P.O. The tramway was opened on March 31, 1915. For picturesque beauty and rugged grandeur, this reserve is probably the most noteworthy in the Mount Lofty Ranges.

It comprises about 537 acres, made up as follows: Section 823 and part Sections 810, 822, 854, and 855, Hundred of Adelaide, containing about 315 acres, which were presented to the Crown by Mr. James Smith Reid, and Sections 850, 852, 853, 857, and part 810, containing about 221 acres and four perches, which were purchased by the Crown from the same gentleman. The transfer is dated March 20, 1913, and the reserve was proclaimed a public pleasure resort in 1915 (*vide Government Gazette*, of July 15, 1915).

Prior to the passing of the National Pleasure Resorts Act 1173 of 1914, this reserve was controlled by the Advisory Board of National Pleasure Resorts.

The earliest owners of any of this land were Thomas Hodgson (September 24, 1839) and William Glegg Gover (December 31, 1839). The whole of it later came into the possession of Mr. Price Maurice on various dates between January 16, 1872, and September 25, 1891. Ten years later it became the property of Mr. J. S. Reid from whom, as already stated, it was acquired by the Government in 1913.

Within a few years of the proclamation of the Province, the beauty of this part of the hills arrested the attention of the artist, George French Angas, who, in his book, *South Australia Illustrated*, published in London in 1847, delineated in colour two views of the waterfalls in this reserve. These are given the title of "Falls of Glen Stuart." In the description of the plate, Mr. Angas writes: "The Morialta rivulet, during its course through the rocky ravines of Glen Stuart, presents three successive falls, all of which are exceedingly beautiful and picturesque. During the months of spring this charming and romantic glen abounds with wildflowers, many of them of great

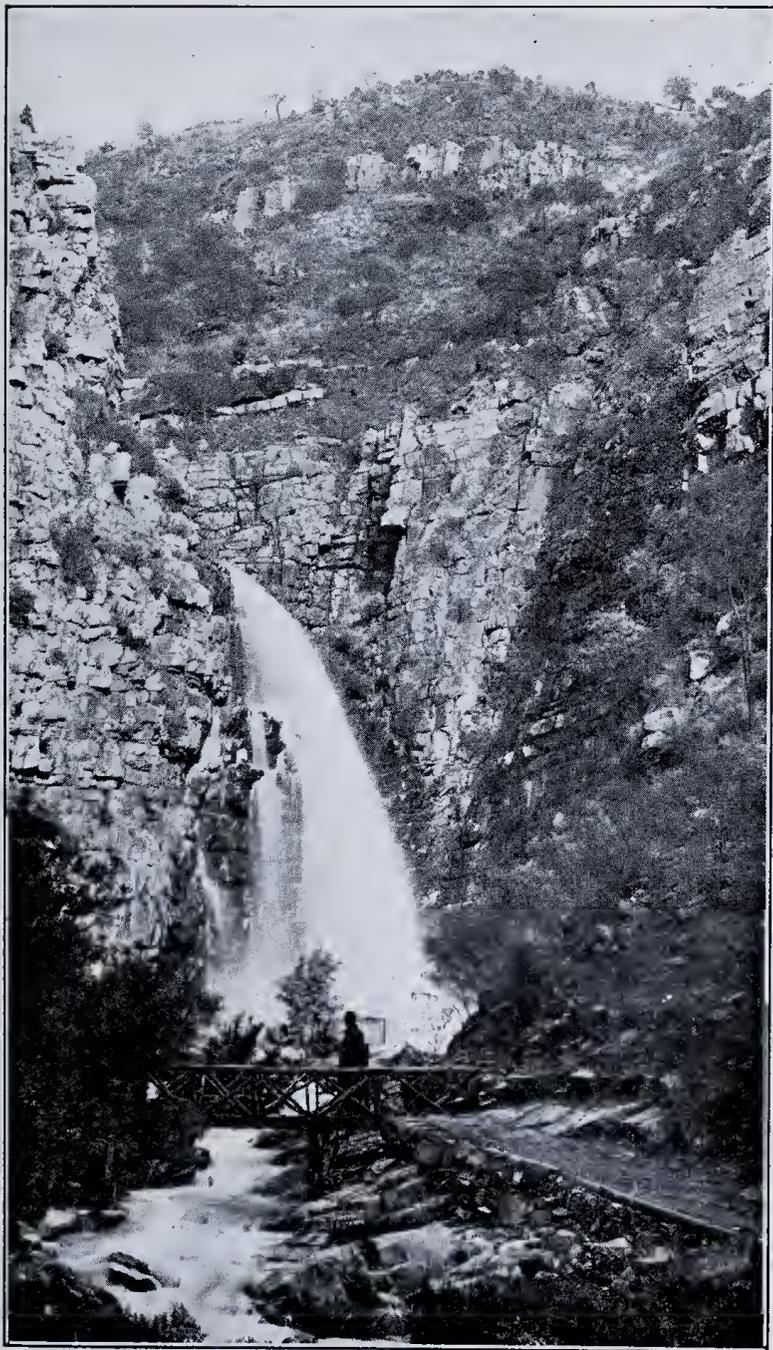


FIG. 49.—The First Waterfall, Morialta Reserve.

beauty. The rivulet murmurs along in some places beneath a canopy of the native lilac and *Leptospermum* (tea plant), and amongst the orchidae that gem the hillsides is the singular *Pterostylis grandiflora*."

It would appear that Mr. Angas used the name "Morialta" (which is a native word meaning "ever flowing") to apply to the stream only, and the name "Glen Stuart" to the waterfalls formed by that stream, as well as to the gap in the hills in this part of the Mount Lofty Ranges. While on this point, it may be interesting to mention that the writer has been informed that the creek is shown as "Anstey Rivulet" on Arrowsmith's plan of the State published in London in 1839. Since that date the creek appears on all official plans at Adelaide as "Fourth Creek."

Perhaps it should be explained that the name "Morialta" was first given to the estate at Norton's Summit owned by the late Hon. John Baker, M.L.C., who was one of our very early pioneers, having arrived here in the year 1838.

In the preface to his book, Mr. Angas, after only ten years of colonization in South Australia, looks forward to the not distant disappearance of the native inhabitants and to the changed aspect of the country. Hence his desire to preserve by pictorial representation true and life-like records of men and scenes so that later generations might have a correct impression of this fair country as it smiled on its early pioneers.

Amongst those through whose hands the Morialta Reserve has passed, particular interest attaches to the action of Mr. Price Maurice in introducing the pure Angora goat to South Australia on a scale sufficient to prove their adaptability to this climate. Fifty of these animals were imported from Castambul in Asia Minor in 1870, and the flock increased greatly. The locality on which they were run was also known as Castambul, which, though not a part of the Morialta Reserve, is not far distant. While the experiment showed that the Angora goat would thrive here, it was found that the sheep was a more profitable investment.

Flocks of sheep grazed on the hillsides of the Morialta Reserve, as was witnessed by members of the Field Naturalists' Section of the Royal Society, who paid two visits there as long ago as the year 1886. In the newspaper report of the first of these (held April 3, 1886), it is mentioned that "a vote of thanks was passed to Mr. Clement Sabine (agent for Mr. Price Maurice, to whom the property belongs) for kindly granting permission to the Section to go over the estate and take any specimens, and, as a sort of guarantee, the Section paid the nominal sum of 2/6

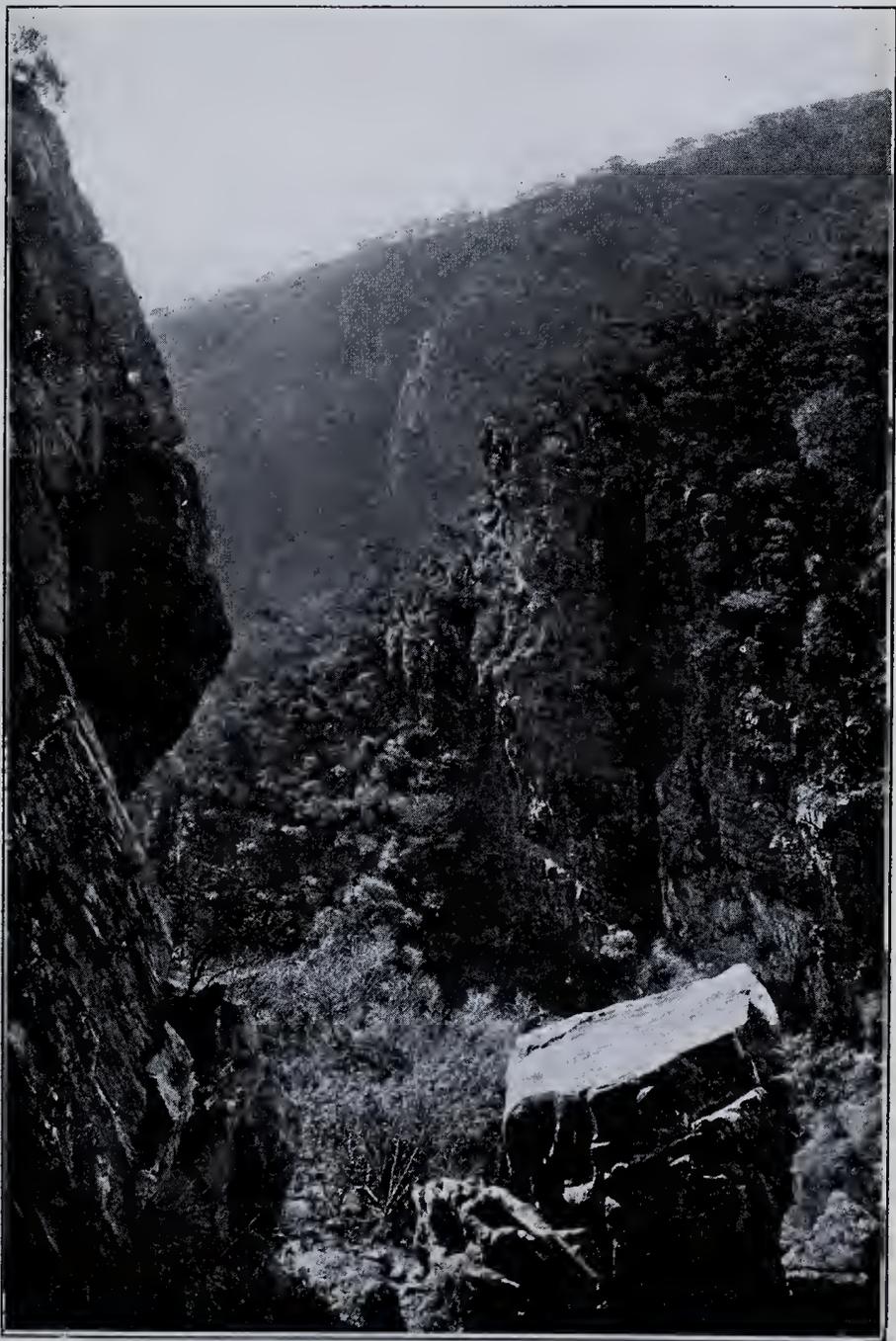


FIG. 50.—The Gorge, Morialta Reserve.

for this privilege on condition that the sheep were not disturbed and that no dogs were taken with the party."

Mr. Maurice died in England in May, 1894, in his seventy-sixth year.

Since this reserve became the property of the Government in 1915, much has been done to make its attractions more easily accessible to the public. The erstwhile narrow and almost impassable tracks bordering the stream have been cleared and widened; paths of not too steep a gradient made round the faces of the hillsides; a substantial stairway constructed to reach the top of the first fall, while trees and shrubs, both native and introduced, have been planted and greet the visitor with their beauty and perfume. Shadehouses and restful seats, usually of a rustic pattern, help to make the journey a light one as, until the first fall is reached, the gradient is very easy. Beyond that stage the climb calls for more exertion, but visitors can accommodate themselves to their physical capabilities.

So close do the bases of the hills on either side of the creek approximate each other that there is insufficient room for games, which, to the true lover of nature, may be considered an advantage as tending to keep the reserve more nearly in its pristine beauty.

One of the features of this reserve is the bold, outstanding masses of rock terracing the hillsides, their structure and precipitous faces suggesting the appearance of ancient castles. The terms "deep gorges" and "rugged mountain scenery" have been fittingly applied to the reserve at its higher elevations.

A small kiosk, which for some years provided refreshments for visitors, was completely destroyed by fire on January 17, 1935, but a new building of modern design has since been erected. As the number of visitors on week-ends and public holidays has been estimated at 126,000, the need for such accommodation can be readily recognized. These figures show the popularity of this reserve.

# *Botany of the Morialta Reserve.*

By Professor J. G. Wood, D.Sc., Ph.D.

THIS short article is intended to serve as a guide to the chief types of vegetation which occur in the Morialta Reserve. Only those plants which characterize the different plant communities are mentioned; however, these are sufficient to enable one to recognize the different types. A complete list of the flora is appended to these articles.

To understand the vegetation of Morialta, it is necessary to gain some insight into the physiographic history of the Adelaide district. In Early Tertiary times the whole of what is now the Gulf Region of South Australia was probably an area of low-lying land, composed almost entirely of ancient rocks of Cambrian and Pre-cambrian age. During Middle Tertiary times this area was submerged and formed part of a shallow sea of great extent. At the beginning of the Pleistocene period (approximately one million years ago) great changes occurred in eastern and southern Australia. In particular, the Gulf Region as a whole was uplifted and at the same time, in the more unstable areas, great faults occurred and large blocks of land became depressed. These movements resulted in the Mount Lofty Ranges as we know them to-day, with their characteristic, step-like ranges, and also in sunklands which form the gulfs.

The evidence indicates that the eastern portions of the Mount Lofty Ranges were uplifted earlier than the more western portions, for in the eastern areas rivers like the Torrens and Onkaparinga have wide, mature valleys, which suggests a period of comparative stability following the initial uplift. When the western portions of the range were slowly elevated, these rivers must necessarily cut steep gorges through the hills in order to preserve their valleys. When equilibrium was again reached, a drainage system gradually evolved and tributaries to the main stream developed. These are typical scarp-face streams with high grades, waterfalls, and steep-sided valleys.

There are five such characteristic fault-face tributaries to the River Torrens. Where they join the Torrens on the plains, they are known as First, Second, Third, Fourth, and Fifth Creeks respectively; in the hills corresponding names are Waterfall Gully, Slape's Gully, Horsnell's Gully, Morialta, and Montacute Creek. Each of these gullies shows considerable differences, due in large measure to the nature and bedding of the rocks. The rocks themselves are slates and limestones and highly metamorphized schists and quartzites.

The rainfall gradually increases as one proceeds from the plains to the higher points of the ranges from about twenty-five inches to over forty inches per annum. This variation in rainfall determines in part the nature of the vegetation. But it is the water-retaining capacity of the soil rather than the amount of rainfall which is the decisive factor in determining distribution of vegetation, and in the Mount Lofty Ranges the geological origin of the soil plays a large part. Generally speaking, the lower foothills (or fault blocks), such as those which form the entrance of the gorge at Morialta, are composed of slates and limestones; these give rise to a somewhat clayey soil. The main mass of the ranges, and including the upper portions of the Morialta Gorge, is composed mainly of quartzites, which weather to a coarse-grained, highly siliceous, sandy soil.

Generally speaking, on the slates and limestones with a lower rainfall, a savannah woodland is found, whilst on the siliceous soils with a somewhat higher rainfall sclerophyll forest occurs. A savannah woodland is one in which the trees are scattered, giving a park-like effect, tall shrubs are rare, and the ground flora is essentially herbaceous. The sclerophyll forest is one in which practically all the plants have tough leaves, often small and spinv; there is a dense assemblage of undershrubs with leaves of this type and the trees are closer together than in the savannah woodlands.

The Morialta Reserve presents us simply with a sample of the Mount Lofty Ranges as a whole, but shows especially the nature of sclerophyll communities on steep hills, which cannot support true sclerophyll forest. Briefly, we can consider the vegetation of this area under four headings:

1. Savannah woodlands on the low foothills.
2. Sclerophyll forests on the crests of the high hills.
3. Sclerophyll communities on the slopes.
4. The vegetation of the gully bottoms.

### 1. Savannah Woodland

**T**HE dominant trees in the savannah woodlands of the Mount Lofty Ranges as a whole are *Eucalyptus odorata* (peppermint) and *E. leucoxylon* (blue gum), the former occurring in drier areas than the latter. Apart from the dominant trees, which are generally mutually exclusive, the associated plants are the same in both woodland types. At Morialta there is no extensive area of *E. odorata* woodland, although isolated trees do occur and there are indications that formerly a woodland dominated by this tree occupied the upper portions of the plain

adjoining the foothills of Morialta. On the lower slopes of the hills in the gullies in the blue-gum zone *E. viminalis* (manna gum) is common. These three eucalypt species are distinguished botanically by the nature of their capsules, but *E. odorata* can be determined by its brown-grey furrowed bark and dingy foliage, *E. leucoxyton* by its straight stems and deciduous bark, and *E. viminalis* by its greener and more pendant foliage.

In the blue-gum woodland at Morialta, the golden wattle, *Acacia pycnantha*, occurs only occasionally as a tall shrub; the commonest undershrubs are *Hibbertia acicularis*, *H. sericea*, and *Olearia tubuliflora*. Herbaceous plants, especially small composites and geophytic bulbous plants, chiefly belonging to the *Liliaceae* and *Orchidaceae*, are also a feature of this plant community. Originally many native grasses were common, but these have practically disappeared before aggressive introduced grasses which have captured the habitat. The chief of these at Morialta is the wild-oat, *Avena fatua*, but other aliens belonging to the genera *Briza*, *Bromus*, and *Festuca*, are also common. The parasitic flowering plant *Loranthus Miquelii* (mistletoe) is only too common on these blue gums and it is rare to find a tree not infested by it.

As a general rule the savannah forests have been much changed by alien plants since the settlement of the State. This is due to their open nature, grass-like flora, and also to the fact that they are near to the chief ports of the State from whence dissemination of aliens has taken place. The olive (*Olea europaea*) and cotton bush (*Asclepias rotundifolia*) are to-day the commonest shrubs in the woodlands at Morialta, whilst briar (*Rosa rubiginosa*) and the South African composite *Osteospermum moniliferum* are also common. The extent of introduced aliens, which are chiefly found in the savannah woodlands, can be gauged from the fact that of the 307 plants listed for the reserve, seventy-seven, that is, one-quarter of the total, are aliens. An interesting result of the large numbers of cotton bushes found at Morialta is the presence, during the summer, of thousands of "Wanderer" butterflies (*Danaus plexippus*), for which *Asclepias* forms the main feeding plant.

## 2. Sclerophyll Forest

THE sclerophyll forest on the tops of the high hills is dominated by the stringybark, *E. obliqua*. Its bark is greyish and peels off in long strips and the leaves are unsymmetrical. It is resistant to bush fires to a high degree, chiefly owing to its fibrous bark, and after fires dormant buds sprout along the whole length of the trunk. Under the trees there is a great wealth of under-

shrubs, both in numbers of species and of individuals. *Acacia myrtifolia* (scrub acacia) and *Pultenaea daphnoides* (native broom) are the most abundant and serve as indicator plants to this community. Grasses and herbaceous plants are practically absent in this dense community, which also suffers little from colonization by introduced alien plants.

This forest is not obvious in the gorge itself, since it occurs on the hill tops in the wetter areas of the reserve. The bulk of the vegetation of the gorge, which occurs on the steep slopes, is, however, related to this forest type. The latter is the climax and the slope communities are intermediaries which may pass into this climax type.

### 3. Vegetation of the Hill Slopes

THE vegetation of the slopes varies with the degree of the slope, or, more accurately, with the depth of soil. Broadly, three vegetation communities can be distinguished; these communities are related to one another and to the stringybark sclerophyll forest. Where the slope is so steep that it becomes practically a cliff, and little soil is present, eucalypt forest is absent. The dominant plants are *Casuarina stricta* (sheoak), with its characteristic pendant, leafless, thin branches and woody cones, and the grotesque grass tree *Xanthorrhoea quadrangulata*, with its twisted branched trunks and growth of wire-like leaves which are square in section. Herbaceous plants are common in the shallow soil and in rock pockets, especially *Goodenia*, *Scaevola*, *Lomandra*, and *Halorrhagis*, and ferns such as *Gymnogramme* and *Pleurosorus*. Where the slope is less steep, but still rocky and with a shallow soil, the sheoak community is replaced by a stunted forest dominated by the pink gum (*E. fasciculosa*) — this is a straggling tree and takes its name from the colour of its wood. Much of the upper slopes of the hills in the Morialta gorge are covered with this tree. The undergrowth is open and consists mainly of *Hibbertia sericea*, *Olearia tubuliflora*, *Hakea rostrata*, and *Tetratheca pilosa*.

On less steep slopes again, but still with a shallow soil, *E. fasciculosa* is replaced by the brown stringybark, *E. Baxteri*. The undershrubs are sclerophyllous, though not so dense as in the *E. obliqua* forests. *Hakea ulicina*, *Daviesia ulicina*, *Astroloma humifusum*, and *Astroloma conostephioides* are common undershrubs and *Halorrhagis* and *Helichrysum scorpioides* are frequent. As the soil becomes deeper this community gradually passes into the climax stringybark forest of *E. obliqua*, with its associated undershrubs.

#### 4. Vegetation of the Gully Bottoms

THE commonest aquatic plants are *Phragmites communis* (reed) and *Typha angustifolia* (bulrush). Along streams the most characteristic plant is a tea-tree, *Leptospermum pubescens*, and occasionally a bottle brush, *Callistemon salignus*. *Acacia rhotinodes* and *A. rupicola* (wattles) are also present. Here also is found an alien in great quantities, *Verbena bonariensis*, a plant from South America. Away from the stream proper the maidenhair fern, *Adiantum aethiopicum*, is found. The most characteristic gully flora is found, however, on wet rocks and at the bases of the hillslopes, especially on south-facing slopes which get little sun. Here the characteristic plants are *Senecio hypoleucus*, *Logania recurva*, the rare *Anthocercis angustifolia* (practically restricted to Morialta), *Correa rubra*, and the native hyacinth, *Calostemma purpureum*.

# *Waterfall Gully Reserve.*

## *Its Attractions.*

By V. H. Ryan, O.B.E.

**W**ATERFALL Gully, which has for many years been a popular resort for Adelaide residents, has been administered by the Government Tourist Bureau since 1911. The reserve is situated at the head of the gully and contains 103 acres of rugged and picturesque mountain scenery, a feature of which is the brilliant display of red and white heath on the hillsides above the first fall at certain seasons of the year. It is situated in the Mount Lofty Ranges, about seven miles from the city, and may be reached by following the Burnside electric car line to the terminus and continuing along an excellent bitumen road for about two and three-quarter miles. Between the car terminus and the refreshment kiosk at the entrance to the reserve, the road passes through a valley of great natural beauty, the creek which flows through it being flanked on both sides by some of the finest flower gardens in the foothills. A walk or drive through the valley in spring when the fruit trees and wattles are in bloom is a delight long to be remembered.

From the picturesque refreshment kiosk facing the first fall and built on the style of a Swiss chalet, which harmonizes perfectly with its surroundings, winding paths lead to the waterfalls, of which there are three, and to the head of the gully, where a look-out has been constructed, from which an extensive panorama of the Adelaide Plains as far as the Outer Harbour can usually be obtained. There are several other look-outs as well, all of which are easily accessible by well-graded paths, from which excellent views of the reserve itself can be obtained. After inspecting the waterfalls, visitors to the reserve are recommended to explore its other attractions by climbing the path on the right leading to the Mount Barker Road, from which many other picturesque views are available. Refreshments can be obtained at the kiosk at moderate prices at all hours, and the excellent dance floor there, combined with the romantic and picturesque surroundings, make it a popular rendezvous for dances and private parties.

# *Historical Account of Waterfall Gully.*

By W. H. Selway

IN the days before Adelaide had its electric, or even its horse-drawn, tramways, and when Cartwright's buses plied between Adelaide and its suburbs, the principal holiday resort in the nearby hills was the Waterfall Gully at Burnside. True, there were spacious sections of land, such as "Piles's Paddocks," in the vicinity of the present Kensington Gardens, where Sunday schools were wont to hold their picnics, and "Watts's Paddocks," of park-like appearance, between Marryatville and Knightsbridge, used largely as a short cut to the waterfalls by those journeying from the west. Either of these open areas was a tempting resort for a quiet picnic, but to the active walker, and more especially to the youth of both sexes, the waterfalls presented a greater inducement. In the earlier days there was little in the way of paths up the gully, and the road was bad. The stream had to be crossed many times, sometimes on water-worn boulders or pebbles, sometimes on narrow planks. There was, indeed, at that time a touch of adventure in the walk, especially when the stream was swollen with heavy rains and the gallants of the party, as in duty bound, helped the fair maidens to negotiate safely the turbulent waters.

Probably to-day the chief element of adventure is to avoid the numerous motor vehicles and push bicycles which frequent this resort. Here and there paths for pedestrians have been made, but a fenced-off track for the walkers, all the way, seems essential to safety nowadays.

These falls are situated in the Mount Lofty Ranges about seven miles south-east of Adelaide. The reserve consists of Section 920 in the Hundred of Adelaide, and the area is ninety-six acres. It was gazetted as a recreation reserve on February 14, 1884, and placed under the control of the District Council of Burnside, but was resumed from that control in April, 1911 (*vide Government Gazette* of April 6, 1911). Nothing further was done in the matter until it was gazetted a public pleasure resort in 1915 (*vide Government Gazette* of July 15, 1915).

The reserve is reached from the city by an electric tramway approximately four and a half miles in length from the corner of King William Street and Grenfell Streets to the terminus at Burnside, after which a journey of about two and three-quarter miles along the gully is necessary to reach the reserve itself.



FIG. 51.—Waterfall Gully Reserve.

It is interesting to learn that on Arrowsmith's plan of the State, published in 1839 in London, the creek from this gully is shown as the "Green Hill Rivulet." Since that date it has been shown on official plans as "First Creek."

The first waterfall and its immediate neighbourhood have usually been regarded as the chief attraction in this reserve. This fall is much higher than the second, having a sheer drop to the pool below. At the foot of the fall is a dam affording a cool, refreshing-looking sheet of water, at the outer end of which steps forming a cascade when the water overflows have recently been constructed and terraced with rock beds, in which flowers and shrubs have been planted. Beyond this, and extending to the parking ground for motor vehicles, are many tall, umbrageous trees which furnish a pleasing shade in hot weather. Tree ferns and flowering shrubs deck the ascending path to the top of the first fall, whence the track leads to the second fall which, though not so high as the first, has a beauty of its own.

It should be mentioned that quite near the first fall an attractive-looking kiosk, after the style of a Swiss chalet, was built in 1912.

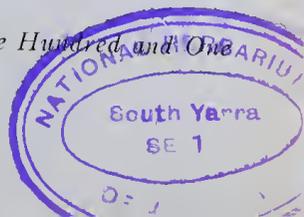
At intervals in the climb up-hill from the first fall are brush-wood shelter or rest-houses, from which very fine views are obtainable. That down the main gully, taken from near the Mount Lofty road, is especially fine, and has formed the subject of the painter's art. It is much admired by travellers to and from the city.

There is very little space for games on this reserve, but by dint of some manipulation two tennis courts have been recently prepared for the lovers of this popular pastime.

The chief danger to this and other metropolitan reserves is from bush fires, but in November, 1934, disastrous floods occurred, to repair the damage from which a grant of £800 was made from the Soldiers Relief Fund, which gave much-needed employment to a number of unemployed returned soldiers.

To combat the menace from fires, the men on the reserves have been supplied with fire-fighting appliances, so as to co-operate with the voluntary organizations connected with this laudable though strenuous enterprise.

Before this reserve was proclaimed a public pleasure resort (in 1915), there was probably little in the way of protection for plant life, and consequently its natural beauty may have suffered; but now, fortunately, it is well looked after. By means of patrols of officials and by printed notices posted in the reserve, it is sought to protect plant life, etc., against damage, and it is stated that little trouble is now experienced in this direction.



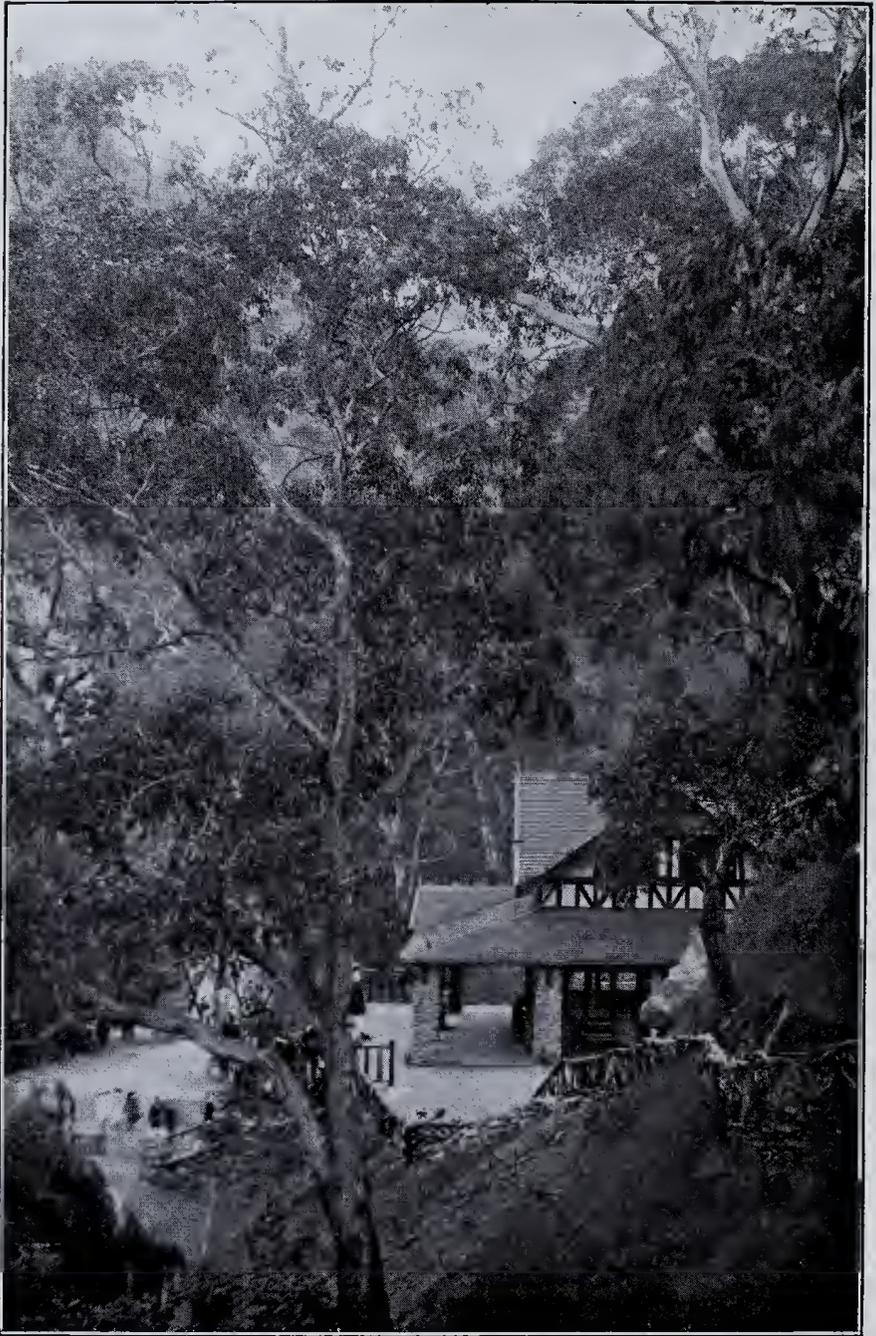


FIG. 52.—The Kiosk, Waterfall Gully Reserve.

The records show that there were about 17,000 visitors to this reserve for the year ending June 30, 1935, at week-ends and on holidays.

Some of the houses bordering the roadway leading to this reserve, or in its vicinity, are of considerable interest historically as being the home of prominent or well-known pioneers. For instance, on a commanding position on the left-hand side soon after entering the gully stands "Kurralta" (meaning "on the hill"), which was the home of Dr. William Wyatt. He arrived in South Australia in February, 1837, in the ship *John Renwick*, and held several important positions, including those of First Colonial Surgeon, Inspector of Schools, Chairman of the Adelaide Hospital Board, and Protector of Aborigines. He has also been described as a friend of the aborigines and he certainly secured more humane treatment for them. "Kurralta," which was bought by Dr. Wyatt in 1843, consisted of ninety acres, and the house, which has been occupied since 1916 by Mr. P. Ifould, must be one of the oldest in the State — nearly ninety years is an estimate. Dr. Wyatt conferred a great benefit on the community by leaving valuable city property to form the Wyatt Benevolent Trust. It is said that it was after Colonel Light had walked to the top of the Green Hill (which overlooks Waterfall Gully and from which there is a magnificent view) that he decided on the present site as the capital of South Australia.

Then there was the Hon. Boyle Travers Finniss, who arrived in the *Cygnets* in 1836, and who was Premier of the first Parliament, Treasurer of the Province, and Acting Administrator of the Government. He occupied the property (eighty acres) known as "Finniss Brook," on the opposite side of the gully to Dr. Wyatt. It is stated that prior to Mr. Finniss acquiring this property in December, 1840, there was a sawmill on it, which Mr. John Cannan wished to have worked by water power, and that Mr. Thos. Cain secured the contract for making the wheel, which was made of red-gum timber, and had a diameter of eighteen feet. It was operated by a race from Waterfall Gully Creek. Mr. Finniss had the sawmill turned into a flour mill, making it into a four-storey building and fitting it with machinery and stones.

"Finniss Brook" was sold by Mr. Finniss to Mr. George Soward, who lived there from 1859 to 1876. Besides being one of the first two aldermen of the Municipality of Kensington and Norwood (1853), he was later Chairman of the Burnside District Council.

It was during his residence at "Finniss Brook" that the Vitoria Regia Lily was discovered by Sir Robert Schomburgk on the River Amazon in Brazil and sent to his brother in Adelaide, Dr. Richard Schomburgk, then Director of the Adelaide Botanic Garden and a friend of Mr. Soward. It happened that the mill dam on the latter's property was at that time empty on account of a leak, so it was arranged that the soil therefrom should be conveyed to the Botanic Garden to form the first home in South Australia (and probably in Australia) of the rare and beautiful lily of sweet perfume and gigantic leaf, which has ever since delighted the citizens of Adelaide.

Another item of interest is that Dr. Schomburgk gave to Mr. Soward some cuttings of the first sultana vine received in the colony, and these were planted and grew well at "Finniss Brook."

One other name must not be omitted, *viz.*, that of Sir Samuel Davenport, who arrived here in 1842, was a member of the Legislative Council both under the nominee and elective systems, was a Minister of the Crown, represented South Australia in international exhibitions, including those of London and Philadelphia, was one of the first Trustees of the Savings Bank, promoted pastoral and industrial pursuits, and took much interest in exploration. He is said to have been the first to introduce the olive to this State.

That he was interested in Waterfall Gully is shown by his having constructed a road around the hillsides from Beaumont to the gully not far from its junction with Chambers Gully. This road afforded a means of access to the very large area of land which Sir Samuel Davenport owned in and adjacent to Waterfall Gully.

# Botany of Waterfall Gully.

By Professor J. B. Cleland, M.D.

WATERFALL Gully is situated on what was at one time called, and is still officially called, First Creek. This creek, emerging from the Waterfall Gully, runs through Burnside, Norwood, Prince Alfred College grounds, and the Botanic Gardens. The Burnside tram terminates at the entrance to the Waterfall Gully itself. Passing along the road, one soon passes the house at one time occupied by Dr. William Wyatt, and now by Mr. Percy Ifould, high up on the left, hidden by trees. Dr. Wyatt planted a number of Australian trees and shrubs, as well as exotic ones, in his garden. These included *Callitris* (Native Pine), *Acacia salicina* (Broughton Willow), Native Peaches, and others. From this source, apparently, spread the Wild Lavender, *Lavandula Stoechas*, which now covers so much of the Green Hill, above the old house and the Greenhill Road, to such an extent as almost to require a change in name to the Grey-Green Hill. The Cape Tulip (*Homeria*) has established itself extensively just below this road as it passes round the hill. In the valley below, the introduced composite *Osteospermum moniliferum* had already established itself over thirty years ago. On the hillslope from Beaumont, descending into the gully on the right from behind the Frew's old house, Sheep's Burnet (*Poterium sanguisorba*) has made itself at home. Along the dray road, made by Sir Samuel Davenport from Beaumont House round the shoulder of the hills to reach Waterfall Gully, a little beyond the entrance to J. Dunstan and Son Quarries, the whitish *Goodenia albiflora* and the trifid-awned grass *Aristida Behriana* are both to be found on the travertine limestone. On the hill beyond Woolshed Gully, the second gully on the left, the introduced Cotton Bush, *Asclepias fruticosa*, at one time flourished but for many years has quite disappeared, apparently having been destroyed by the caterpillars of the Wanderer Butterfly, probably introduced soon after it. Its relative, *A. rotundifolia*, now so common on our hills and also a food-plant for the caterpillar, whose green chrysalids with golden spots may often be found on it, took longer to establish itself, but has been able to maintain its existence. The Euphorbiaceous shrub *Adriana Klotzschii*, as well as the introduced Castor-oil Plant, *Ricinus communis*, may be found by the roadside just beyond Dr. Wyatt's house. An introduced shrubby, soft-leaved *Solanum* (near *S. verbascifolium* and *S. auriculatum*) grows just outside the entrance to the reserve. The red gum (*Eucalyptus rostrata*), of which such magnificent examples are to be seen in the reserve at Burnside near the tram

terminus, does not, now at least, extend up the valley beyond the turn-off to the quarries. As the Waterfall Gully is cultivated almost throughout its extent below the reservoir, few of the indigenous plants remain. *Acacia rhotinodes*, one bearing the mistletoe *Loranthus Precissii*, appears as a few small trees beyond the hotel, where are also to be seen a few shrubs of *Senecio hypoleucus*. The Common Reed (*Phragmites communis*) remains in suitable wet places. The introduced Water-cress occurs in abundance in the creek bed. A few clumps of another introduction, the Rice Grass (*Oryzopsis miliacea*) have established themselves by the roadside.

The hills bordering the valley on either side as far as the reserve are, and probably always have been, mostly grassy, with scattered trees of *Eucalyptus leucoxylon*, on which the mistletoe *Loranthus Miquellii* is now very abundant. The seeds of the cultivated olive have been widely distributed by the English Starling (*Sturnus vulgaris*) and the small trees cover many parts of the hills, yielding a small supply of fruit. The manna gum (*E. viminalis*) grows on the heights as the reserve is approached, gradually descending to the bottom of the valley in the reserve itself. A few sheoaks (*Casuarina stricta*) grow amongst rocks and some examples of *Acacia rhotinodes* dot the slopes. The undershrub *Lotus australis* is also found on the slopes.

Waterfall Gully rapidly narrows as one passes up it and, by the time the reserve is reached, the hills on either side close up so as to produce a gorge. Looking towards the reserve as one approaches it, a striking difference is seen between the vegetation on the higher quartzite portions of the hills, consisting essentially of stringybark, mostly *Eucalyptus obliqua*, with a dense undergrowth of shrubs, and the lower portions of the hills with widely-spaced blue gums (*E. leucoxylon*) and manna gums (*E. viminalis*) and grass. The bed of the creek below the first waterfall contains few of the original trees or shrubs, having been planted with various exotics. Some fine manna gums are amongst the survivors. The same applies to the edge of the reservoir basin. The tree ferns here are, of course, exotics, though the tree fern, *Dicksonia antarctica*, was at one time an inhabitant of this gully.

The steep hill-slope on the right or south side, leading up to the Eagle-on-the-Hill, is more or less grassy. Its western end shows scattered blue gums (*E. leucoxylon*), mixed with manna gums at the summit; there are also a few olives and small trees of *Acacia rhotinodes* and shrubs of *Asclepias rotundifolia*, and bracken just above the creek. Easterly, the slope becomes rockier, and sheoaks take the place of the eucalypts. Here also

occur shrubs of *Dodonaea viscosa*, many of them galled, and occasional examples of the olive, *Asclepias*, *Olearia ramulosa*, and the pea *Psoralea patens*. Undershubs and herbaceous plants include the grass *Poa caespitosa*, carrot fern, *Lomandra filiformis*, *Dianella*, the amaryllid *Calostemma purpureum*, *Geranium pilosum*, *Halorrhagis*, *Convolvulus erubescens*, *Galium*, *Scaevola*, and various annuals. The grass-tree, commonly often called "yacca" (*Xanthorrhoea quadrangulata*), *Logania vaginalis*, and the *Dodonaea* can be seen scattered on the steep slope above the water of the reservoir. Following the same hill-slope in an easterly direction so as to be on the south of the creek between the first and second waterfalls, we find the addition of such other species as *Banksia* (galled), *Solanum aviculare*, *Bursaria*, the carrot fern, the Australian bluebell (*Wahlenbergia vinciflora*), *Senecio hypoleucus*, and more of the *Logania* and grass-tree. In the upper parts *E. leucoxyton* and *E. viminalis* again replace the sheoaks. As the hill sweeps round in an easterly direction, presenting a view straight down the gorge towards Adelaide, the stringybark (*E. obliqua*) association comes in on the quartzite, and still further round, just at the edge of the reserve, the mallee-like *Eucalyptus cosmophylla* presents a feature of its own. Amongst the rough stones near the bottom of the quartzite slope, just above the second waterfall, the underscrub is thick, consisting of *Hakea rostrata*, *H. ulicina*, *Eucalyptus cosmophylla*, *Dodonaea viscosa*, *Olearia ramulosa*, *Calythrix tetragona*, *Casuarina Muelleriana*, *Acacia myrtifolia*, *Pultenaea daphnoides*, *Solanum aviculare*, *Clematis*, bracken, the sedge *Lepidosperma laterale*, and an occasional *Exocarpus cupressiformis* with scattered *E. obliqua*. More lowly plants are *Hibbertia sericea*, *Dianella*, *Astroloma humifusum*, *Epacris impressa*, *Acrotriche fasciculiflora* and *A. serrulata*, *Ixodia achilleoides*, and *Lomandra dura*. The underscrub gets less as one ascends and the stringybarks more numerous. Here *Hibbertia acicularis* var. *sessiliflora*, *Leptospermum myrsinoides*, and *Pimelea* may be met with. Near the Mount Barker road on top, *Xanthorrhoea semiplana* comes in, and there are a few golden wattles and sheoaks where the stringybarks mix with the manna and blue gums.

The slope on the northern side of the creek is very steep with much scree. On the westerly end, some bold rocks project and sheoaks are prominent. These pass into scattered stringybarks and underscrub on the easterly portion.

Some swampy, peaty soil abuts on both sides of the second waterfall. Here flourish the cutting grass (a sedge, *Gahnia psittacorum*), species of *Carex* and *Scirpus*, rushes such as *Juncus pallidus*, *J. pauciflorus* and others, bracken, the coral fern and

*Blechnum capense*, the common reed (*Phragmites*), the grass Yorkshire fog (*Holcus lanatus*), blackberries, tea-tree (*Leptospermum*), *Polygonum serrulatum*, *Stellaria palustris*, watercress, *Acaena*, *Acacia*, *Goodenia ovata*, *Lobelia anceps*, and the composites *Siegesbeckia*, *Erechthites*, and *Sonchus asper*.

# Terms of Office of Commissioners of the National Park

- Sir E. T. Smith**  
Appointed Chairman January 28, 1892, Foundation Chairman, which position he retained till his death in 1920.
- J. C. F. Johnson**  
Foundation member, 1892, till his death in 1904.
- A. McDonald**  
Foundation member, 1892, till his death in 1922. Deputy Chairman, 1919.
- Walter Gooch**  
Foundation member, 1892, till his death in 1919. Chairman, 1907.
- Samuel Dixon**  
Foundation member, 1892, till 1905.
- F. W. Bullock**  
Mayor of Adelaide ex officio member, 1892. Appointed member, 1904 till 1931. Chairman from 1921 to 1931.
- Dr. T. K. Hamilton**  
Appointed 1905 to 1912. Resigned.
- G. R. Laffer**  
Appointed 1912 to 1921. Resigned upon receiving appointment as Commissioner of Crown Lands.
- R. H. Crawford**  
Appointed 1919 till death in 1931.
- C. R. J. Glover**  
Appointed 1920 to 1924, re-appointed 1928, still in office. Lord Mayor, 1924-25. Resigned as member during office as Lord Mayor. Appointed Deputy Chairman, 1922-1931. Chairman, 1931, still holding office. Lord Mayor, 1931 to 1933.
- Sir J. C. Verco**  
Appointed 1921 till 1923. Resigned.
- J. D. Harper**  
Appointed 1922 till 1924. Resigned.
- J. Wallace Sandford**  
Appointed 1924 till 1928. Resigned.
- R. E. P. Osborne**  
Appointed 1923 till 1932. Deceased.
- W. Gill**  
Appointed 1924 till 1929. Deceased.
- Dr. J. B. Cleland**  
Appointed 1929, still holding office. President Royal Society, 1928. Appointed Deputy Chairman, 1931, still holding office.
- F. N. Simpson**  
Appointed 1931 till 1934. Prevented by ill-health from continuing in office.
- Dr. R. H. Pulleine**  
Appointed 1931 till 1935. Deceased.
- W. H. Bagot**  
Appointed 1932, still holding office.
- Geo. McEwin**  
Appointed 1934, still holding office.
- C. V. T. Wells**  
Appointed 1935, still holding office.

## EX OFFICIO MEMBERS OF THE BOARD

M. Holtze	Director Botanic Gardens	1892 to 1917
J. F. Bailey	Director Botanic Gardens	1917 to 1932
H. Greaves	Director Botanic Gardens	1932, still in office
A. C. Minchin	Director Zoological Gardens	1892 to 1934
R. Minchin	Director Zoological Gardens	1934, still in office
Walter Gill	Conservator of Forests	1892 to 1924
E. Julius	Conservator of Forests	1924 to 1935
R. G. Rodger	Conservator of Forests	1935, still in office

### Mayors of Adelaide

1892	-	-	F. W. Bullock
1893-1894	-	-	C. Wilcox
1895-1898	-	-	Charles Tucker
1899-1901	-	-	A. W. Ware
1902-1904	-	-	Lewis Cohen
1905-1907	-	-	Theodore Bruce
1908-1909	-	-	F. Johnson
1910-1911	-	-	Lewis Cohen
1912-1913	-	-	J. L. Bonython
1914-1915	-	-	A. A. Simpson
1916-1917	-	-	Isaac Isaacs
1918	-	-	C. R. J. Glover
1919	-	-	C. R. J. Glover, Lord Mayor
1920-1921	-	-	F. B. Moulden
1922-1923	-	-	Lewis Cohen
1924-1925	-	-	C. R. J. Glover
1926-1927	-	-	Sir Wallace Bruce
1928-1930	-	-	J. Lavington Bonython
1931-1933	-	-	C. R. J. Glover
1934	-	-	J. R. Cain, still in office

## Commissioners of Crown Lands

1892-1936

James Henderson Howe	October 15, 1892, to June 16, 1893
Peter Paul Gillen	June 21 to October 15, 1892 June 16, 1893, to September 22, 1896
Laurence O'Loughlin	September 28, 1896, to December 1, 1899 December 8, 1899, to March 31, 1902 July 26, 1905, to June 5, 1909
Alexander Poynton	December 1 to 8, 1909
Richard Butler	April 1, 1902, to July 25, 1905 November 19, 1914, to April 3, 1915
Ephraim Henry Coombe	June 5, 1909, to December 22, 1909
Archibald Henry Peake	December 22, 1909, to June 3, 1910
Crawford Vaughan	June 3, 1910, to February 17, 1912
Fredrick Wm. Young	February 17, 1912, to November 19, 1914
Clarence Goode	April 3, 1915, to July 13, 1917
George Ritchie	July 14, 1917, to August 26, 1917
Harry Jackson	August 27, 1917, to April 28, 1918
Edward Alfred Anstey	April 29, 1918, to April 8, 1920
George Richards Laffer	April 8, 1920, to April 16, 1924
Thomas Butterfield	April 16, 1924, to April 8, 1927
George Frederick Jenkins	April 8, 1927, to April 17, 1930
Robert Stanley Richards	April 17, 1930, to April 18, 1933
Malcolm McIntosh	April 18, 1933, still in office

## Presidents of the Royal Agricultural and Horticultural Society

1892	-	-	Hon. J. Lancelot Stirling
1893-1894	-	-	Mr. John Robertson
1895-1897	-	-	Gilbert William
1898-1899	-	-	A. M. Simpson
1900-1901	-	-	Samuel Goode
1902-1903	-	-	John Murray
1904	-	-	Thomas Hardy
1905-1906	-	-	John Hill
1907-1908	-	-	Alick J. Murray
1909-1910	-	-	Col. Jas. Rowell
1911-1912	-	-	Hon. W. B. Rounsevell
1913-1918	-	-	R. H. Crawford
1919-1920	-	-	R. L. Melrose
1921-1923	-	-	Wallace Sandford
1924-1925	-	-	Hon. W. G. Duncan
1926-24/5/32	-	-	Sir Lancelot Stirling
1932	-	-	Hon. W. G. Duncan, still in office

# List of Plants in the National Park and Morialta and Waterfall Gully Reserves.

By Professor J. Burton Cleland, M.D., and E. H. Ising.

THE abbreviations used are as follows: Morialta, M.; Waterfall Gully, W.G.; National Park, N.P.; where a species occurs in all three reserves no locality is shown, but if in less the necessary particular abbreviation is used. The botanical sequence and authorities quoted are those employed by J. M. Black in his *Flora of South Australia*, 1922-1929. An asterisk \* indicates that the species is an introduced one.

A total of 545 species of plants and two varieties in addition are now recorded for these three reserves, of which 385 are native species and 157 are introduced.

## FILICALES

*POLYPODIACEAE*: *Lindsaya linearis* Swartz.

*Adiantum aethiopicum* L., Maidenhair.

*Cheilanthes tenuifolia* Swartz, Rock Fern.

*Pteridium aquilinum* (L.) Kuhn., Bracken.

*Blechnum capense* (L.) Schlecht. W.G.

*Asplenium flabellifolium* Cav., Fan-leaved Spleenwort.

*Gymnogramme leptophylla* (L.) Desv.

*Pleurosorus rutifolius* (R.Br.) Fee.

*GLEICHENIACEAE*: *Gleichenia circinata* Swartz, Coral Fern. W.G.

## *OPHIOGLOSSACEAE*

*Ophioglossum coriaceum* A. Cunn. Adder's-tongue. N.P.

## LYCOPODIALES

*LYCOPODIACEAE*: *Phylloglossum Drummondii* Kunze. N.P.

*ISOETACEAE*: *Isoetes Drummondii* A.Br. N.P.

## MONOCOTYLEDONS

*TYPHACEAE*: *Typha angustifolia* L., Bulrush.

## *SCHEUCHZERIACEAE*

*Triglochin centrocarpa* Hook. M. N.P.

*T. procera* R.Br. M. N.P.

## GRAMINEAE

- Imperata cylindrica* (L.) Beauv., Blady Grass. M. W.G.  
*Andropogon bombycinus* R.Br., Silky Heads. M.  
*Themeda triandra* Forsk, Kangaroo Grass.  
*Neurachne alopecuroides* R.Br. M. N.P.  
*Paspalum distichum* L. M. W.G.  
 \**Echinochloa crus-galli* (L.) Beauv., Cocksfoot Grass. N.P.  
 \**Stenotaphrum dimidiatum* (L.) Brongn., Buffalo Grass. M.  
 \**Ehrharta longiflora* Sm. M. W.G.  
*Microlaena stipoides* (Labill) R.Br.  
 \**Phalaris minor* Retz. W.G. N.P.  
 \**Anthoxanthum odoratum* L., Scented Vernal Grass. N.P.  
*Amphipogon strictus* R.Br. M.  
*Aristida Behriana* F.v.M. M.  
*Stipa elegantissima* Labill. N.P.  
*S. pubescens* R.Br. M. October.  
*S. semibarbata* R.Br. October.  
*S. congesta* S. et H. M.  
*S. variabilis* Hughes. October.  
*S. setacea* R.Br. var. *latiglumis*. N.P.  
*S. sp.* (affinity with *S. tenuiglumis* Hughes). M. October.  
*Echinopogon ovatus* (Forst.) Beauv. M.  
 \**Agrostis verticillata* Vill. M. W.G.  
*Calamagrostis fliformis* (Forst.) Pilger, Blown Grass.  
 \**Gastridium lendigerum* (L.) Gaudin, Nitgrass. N.P.  
*Dichelachne sciurea* (R.Br.) Hook. f. M. N.P.  
 \**Aira caryophyllea* L., Silvery Hairgrass.  
 \**A. minuta* L. N.P.  
 \**Avena fatua* L., Wild Oat.  
 \**A. barbata* Brot., Bearded Oat. M. N.P.  
 \**Holcus lanatus* L., Yorkshire Fog.  
*Amphibromus nervosus* (R.Br.) Hook. f. N.P.  
*Danthonia semiannularis* (Labill.), R.Br., Wallaby Grass. M. N.P.  
*D. auriculata* J.M. Black. M. N.P.  
*D. penicillata* (Labill.) F.v.M. N.P.  
*D. setacea* R.Br. N.P.  
 \**Pentaschistis airoides* (Nees) Stapf. M.  
*Pappophorum nigricans* R.Br., Blackheads. M. W.G.  
*Phragmites communis* Trin., Common Reed. M. W.G.  
 \**Koeleria phleoides* Pers. W.G. N.P.  
 \**Briza maxima* L., Large Quaking Grass.

- \**B. minor* L., Lesser Quaking Grass.  
 \**Dactylis glomerata* L., Cocksfoot. M. N.P.  
*Eragrostis Brownii* Nees. M.  
 \**Poa annua* L., Annual Meadow-grass.  
*P. caespitosa* Forst.  
*Glyceria fluitans* (L.) R.Br., Manna Grass. W.G.  
 January, October.  
 \**Festuca Myuros* L., Rat's tail Fescue.  
 \**F. bromoides* L.  
 \**F. rigida* (L.) Kunth., Hard Fescue. M. W.G.  
 \**Bromus villosus* Forsk., Great Brome.  
 \**B. madritensis* L., Madrid Brome.  
 \**B. unioloides* H.B. et K., Prairie-grass.  
 \**B. hordeaceus* L., Soft Brome.  
 \**Brachypodium distachyum* R. et S.  
*Cynodon dactylon* Rich., Couch-grass. M. W.G.  
 \**Lolium temulentum*, Darnel, Drake. N.P.  
 \**L. perenne* L., Rye-grass. N.P.  
 \**L. subulatum* Vis.  
*Lepturus incurvatus* Trin. N.P.  
*Agropyrum scabrum* (Labill.) Beauv. W.G. N.P.

## CYPERACEAE

- Cyperus tenellus* L.f. M. N.P.  
*C. vaginatus* R.Br.  
*Schoenus apogon* Roem. et Sch.  
*S. Tepperi* F.v.M. M. N.P.  
*Heleocharis multicaulis* Sm. W.G.  
*Scirpus fluitans* L. M.  
*S. setaceus* L. M. N.P.  
*S. cernuus* Vahl. W.G. N.P.  
*S. antarcticus* L. W.G. N.P.  
*S. inundatus* (R.Br.) Poir. W.G.  
*S. nodosus* Rottb. M.  
*Cladium junceum* R.Br. M. W.G.  
*C. Gunnii* Hook. f. W.G. (in swamp at second water-fall).  
*C. Mariscus* (L.) Pohl. M.  
*C. tetragonum* (Labill.) J. M. Black. W.G.  
*Gahnia trifida* Labill., Cutting-grass. M.  
*G. psittacorum* Labill. W.G.  
*Lepidosperma laterale* R.Br.  
*L. lineare* R.Br. N.P.  
*L. viscidum* R.Br. M.  
*L. semiteres* F.v.M.  
*L. carphoides* F.v.M. M.  
*Carex appressa* R.Br. W.G. N.P.

- C. tereticaulis* F.v.M. M. N.P.  
*C. breviculmis* R.Br. October. M.  
*C. pumila* Thunb. N.P.  
*C. pumila* var. *Bichenoviana* Kükenth. W.G.  
*C. pseudocyperus* L. W.G.

#### CENTROLEPIDACEAE

- Brizula gracilis* (Sond.) Hieron. N.P.  
*B. pumilio* (F.v.M.) Hieron. M. N.P.  
*Centrolepis aristata* (R.Br.) Roem. et Schlt.  
*C. strigosa* (R.Br.) Roem. et Schlt.

#### JUNCACEAE

- \**Juncus capitatus* Weig.  
*J. bufonius* L., Toad Rush.  
*J. planifolius* R.Br. W.G.  
*J. caespiticius* E. Mey. W.G. N.P.  
*J. holoschoenus* R.Br. W.G.  
*J. lamprocarpus* Ehrh. M. N.P.  
*J. maritimus* Lamk. var. *australiensis* Buch. A dwarf  
 form at W.G.  
*J. pallidus* R.Br. N.P.  
*J. polyanthemus* Buch. M. W.G.  
*J. pauciflorus* R.Br.  
*Luzula campestris* DC., Field Woodrush.

#### LILIACEAE

- Dianella revoluta* R.Br.  
*D. laevis* R.Br. N.P.  
*Burchardia umbellata* R.Br.  
*Anguillaria dioica* R.Br.  
*Lomandra dura* (F.v.M.) Ewart.  
*L. multiflora* (R.Br.) J. Britten. M.  
*L. micrantha* (Endl.) Ewart. M. W.G.  
*L. filiformis* (Thunb.) J. Britten.  
*L. glauca* (R.Br.) Ewart.  
*L. caespitosa* (Benth.) Ewart. M.  
*Thysanotus Patersonii* R.Br., Fringe Lily. September.  
 M. N.P.  
*Caesia vittata* R.Br.  
*Chamaescilla corymbosa* (R.Br.) F.v.M. September.  
 M. N.P.  
*Tricoryne elatior* R.Br. M. N.P.  
*Bulbine bulbosa* (R.Br.) Haw.  
*Dichopogon strictus* (R.Br.) J. G. Bak. September.  
*D. fimbriatus* (R.Br.) J. M. Black.  
*Xanthorrhoea quadrangulata* F.v.M., Grass-tree, Black-  
 boy. M. W.G.

- X. semiplana* F.v.M.  
 \**Asphodelus fistulosus* L. M.  
 \**Smilax* sp. N.P.

AMARYLLIDACEAE

- Hypoxis glabella* R.Br. M. N.P.  
*Calostemma purpureum* R.Br., Native Hyacinth.

IRIDACEAE

- \**Moraea xerospatha* Mac Owan var. *monophylla* Black.  
 M. N.P.  
 \**Romulea rosea* (L.) Eckl., Onion grass. M.  
 \**R. Columnae* Seb. et M. W.G. N.P.  
 \**Homeria collina* (Thunb.) Vent., Cape Tulip. N.P.  
 \**Sparaxis* sp. N.P.

ORCHIDACEAE

- Dipodium punctatum* R.Br. N.P.  
*Calochilus Robertsonii* Benth. N.P.  
*Thelymitra ixioides* Sw. N.P.  
*T. luteociliata* Fitzg. N.P.  
*T. grandiflora* Fitzg. M. N.P.  
*T. aristata* Lindl. M. N.P.  
*T. longifolia* Forst.  
*T. pauciflora* R.Br. N.P.  
*T. urnalis* Fitzg. N.P.  
*T. carnea* R.Br. N.P.  
*T. flexuosa* Endl. N.P.  
*T. antennifera* Hook. f. N.P.  
*T. Macmillanii* F.v.M. N.P.  
*Microtis porrifolia* Spreng. N.P.  
*M. parviflora* R.Br. N.P.  
*M. atrata* Lindl. M.  
*Prasophyllum elatum* R.Br. N.P.  
*P. odoratum* Rogers. N.P.  
*P. patens* R.Br. N.P.  
*P. fuscum* R.Br. N.P.  
*P. Fitzgeraldii* Rogers et Maid. N.P.  
*P. nigricans* R.Br.  
*Corysanthes dilatata* Rupp et Nicholls. N.P.  
*C. diemenica* Lindl. N.P.  
*Acianthus exsertus* R.Br.  
*A. reniformis* (R.Br.) Schl.  
*Lyperanthus nigricans* R.Br. N.P.  
*Eriochilus cucullatus* (Labill.) Reichb. f. N.P.  
*Caladenia cardiochila* Tate. M.  
*C. leptochila* Fitzg. M. N.P.  
*C. reticulata* Fitzg. M. N.P.

*C. Patersonii* R.Br. N.P.  
*C. dilatata* R.Br. M. N.P.  
*C. Menziesii* R.Br. M. N.P.  
*C. deformis* R.Br. N.P.  
*C. latifolia* R.Br. N.P.  
*C. carnea* R.Br. N.P.  
*Glossodia major* R.Br. M. N.P.  
*Diuris pedunculata* R.Br. M. N.P.  
*D. palustris* Lindl.  
*D. maculata* Sm.  
*D. longifolia* R.Br. N.P.  
*D. palachila* Rogers. N.P.  
*Orthoceras strictum* R.Br. N.P.  
*Pterostylis curta* R.Br. M. N.P.  
*P. nutans* R.Br. M.  
*P. nana* R.Br.  
*P. pedunculata* R.Br. N.P.  
*P. cucullata* R.Br. N.P.  
*P. robusta* Rogers. N.P.  
*P. barbata* Lindl. N.P.  
*P. rufa* R.Br. N.P.  
*P. longifolia* R.Br. N.P.  
*P. vittata* Lindl. N.P.

## DICOTYLEDONS

### CASUARINACEAE

*Casuarina stricta* Ait., Drooping Sheoak.  
*C. striata* Macklin. N.P.  
*C. Muelleriana* Miq.

### URTICACEAE

*Parietaria debilis* G. Forst. M. N.P.  
 \**Urtica urens* L., Small Nettle. N.P.

### PROTEACEAE

*Isopogon ceratophyllus* R.Br.  
*Persoonia juniperina* Labill.  
*Hakea rostrata* F.v.M.  
*H. rugosa* R.Br. W.G. N.P.  
*H. ulicina* R.Br.  
*Banksia marginata* Cav.  
*Grevillea lavandulacea* Schlecht.

### SANTALACEAE

*Exocarpus cupressiformis* Labill., Native Cherry.

## LORANTHACEAE

- Loranthus Exocarpi* Behr. on *L. Miquelii* (on *Eucalyptus odorata* and on *E. rostrata*), on *Casuarina stricta* (M.), on *Exocarpus cupressiformis* (N.P.).  
*L. Miquelii* Lehm., on *E. fasciculosa* (M.), on *E. odorata*, on *E. leucoxyton* (M. W.G. N.P.), on *E. viminalis*, on *E. cornuta* (Yate) (N.P.), on *Casuarina stricta* (M.), on *Acacia melanoxylon* (N.P.).  
*L. pendulus* Sieb., on *E. fasciculosa* (M.), on *E. viminalis* (N.P.), on *Crataegus monogyna* (N.P.), on *Acacia melanoxylon* (N.P.).

## POLYGONACEAE

- Rumex Brownii* Campd.  
\**R. obtusifolius* L., Broad Dock. M. N.P.  
\**R. crispus* L., Curled Dock.  
\**R. conglomeratus* Murray, Clustered Dock.  
\**R. Acetosella* L., Sheep Sorrel.  
*Polygonum serrulatum* Lag.  
\**P. aviculare* L., Wireweed.

## CHENOPODIACEAE

- Rhagodia nutans* R.Br. M.  
\**Chenopodium murale* L., Nettle-leaved Goosefoot.  
\**Ch. album* L., White Goosefoot, Fat Hen. N.P.

## AMARANTHACEAE

- Trichinium erubescens* Moq. M. N.P.  
*Alternanthera denticulata* R.Br. N.P. (reservoir).

## AIZOACEAE

- Carpobrotus aequilaterus* (Haw.) N.E.Br., Angular Pigface. M.

## PORTULACACEAE

- Calandrinia volubilis* Benth. W.G.  
*C. calypttrata* Hook f. M.  
*Portulaca oleracea* L., Purslane. M. N.P.

## CARYOPHYLLACEAE

- Sagina apetala* Ard.  
\**Moenchia erecta* (L.) Gaertn. Mey. et Scherb. N.P.  
\**Cerastium glomeratum* Thuill., Mouse-ear Chickweed.  
*Stellaria palustris* Retz., Swamp Starwort.  
\**S. media* (L.) Vill., Chickweed. M. N.P.  
*Spergularia rubra* (L.) J. et C. Presl. M. N.P.  
*Polycarpon tetraphyllum* Loeff. M. W.G.  
\**Silene gallica* L., French Catchfly.

## RANUNCULACEAE

- Clematis microphylla* DC. W.G. N.P.  
*Ranunculus lappaceus* Sm., Buttercup.  
*R. parviflorus* L. W.G. N.P.  
\**R. muricatus* L.  
\**R. trachycarpus* Fisch. et Mey. M.

## LAURACEAE

- Cassytha pubescens* R.Br.  
*C. glabella* R.Br. M. N.P.

## PAPAVERACEAE

- \**Papaver dubium* L., Long-headed Poppy. N.P.  
\**P. Rhoeas* L., Corn Poppy. M.  
\**P. hybridum* L., Rough Poppy. M. N.P.  
\**Fumaria densiflora* DC. W.G.  
\**F. muralis* Sond.  
\**F. capreolata* L. M.

## CRUCIFERAE

- Cardamine hirsuta* L. September.  
\**Nasturtium officinale* R.Br., Watercress.  
\**Sisymbrium officinale* L., Hedge Mustard. M. N.P.  
\**S. orientale* L. W.G.  
\**Brassica Sinapistrum* Boiss., Charlock. M.  
\**Diplotaxis muralis* (L.) DC. M.  
*Lepidium hyssopifolium* Desv. M. W.G.  
\**Rapistrum rugosum* All., Wild Turnip. M.

## DROSERACEAE

- Drosera glanduligera* Lehm.  
*D. Whittakeri* Planch.  
*D. Planchonii* Hook f. M. W.G.  
*D. auriculata* Backh. September, October.  
*D. peltata* Sm. M. N.P.

## CRASSULACEAE

- Crassula Sieberiana* (Schultes) Ostenf.  
*C. bonariensis* (DC.) Cambess. M.  
*C. macrantha* (Hook. f.) Diels et Pritzel.  
*C. pedicellosa* (F.v.M.) Ostenf. M. W.G.  
*C. recurva* (Hook. f.) Ostenf. N.P.

## PITTOSPORACEAE

- Bursaria spinosa* Cav., Native Box.  
*Marianthus bignoniaceus* F.v.M. W.G.  
*Cheiranthra linearis* A. Cunn.

## ROSACEAE

- Rubus parvifolius* L., Native Raspberry.
- \**R. fruticosus* L., Blackberry.
- \**R. laciniatus* Willd., Blackberry.
- \**Rosa rubiginosa* L., Sweetbriar.
- \**R. canina* L., Dog Rose.
- \**Crataegus monogyna* Jacq., Hawthorn.
- \**Alchemilla arvensis* Scop.
- Acaena ovina* A. Cunn.
- A. Sanguisorbae* (L.f.) Vahl.

## LEGUMINOSAE

- Acacia continua* Benth. M.
- A. armata* R.Br., Kangaroo Thorn. W.G. N.P.
- A. obliqua* A. Cunn. N.P.
- A. rhetinodes* Schlecht., Swamp Wattle.
- A. myrtifolia* (Sm.) Willd., Scrub Wattle.
- A. pycnantha* Benth., Golden Wattle.
- A. rupicola* F.v.M. M.
- A. melanoxydon* R.Br., Blackwood.
- A. verticillata* (L'Her.) Willd. M.
- Daviesia corymbosa* Sm.
- D. ulicina* Sm.
- Eutaxia microphylla* (R.Br.) J. M. Black. M. N.P.
- Pultenaea daphnoides* Wendl.
- P. pedunculata* Hook. N.P.
- P. largiflorens* F.v.M. var. *latifolia* H. B. Williamson. N.P.
- P. acerosa* R.Br. var. *acicularis* H. B. Williamson. M. N.P.
- Dillwynia hispida* Lindl.
- Platylobium obtusangulum* Hook. M. W.G.
- Bossiaea prostrata* R.Br. M. N.P.
- \**Ulex europaeus* L., Furze. M. N.P.
- \**Cytisus scoparius* (L.) Link., Common Broom. M.
- \**C. canariensis* (L.) Steud., Canary Broom.
- \**C. prolifer* L.f., Tree Lucerne. M.
- \**Trifolium procumbens* L., Hop Clover.
- \**T. dubium* Sibth.
- \**T. tomentosum* L., Woolly Clover.
- \**T. repens* L., White Clover. N.P.
- \**T. glomeratum* L.
- \**T. subterraneum* L. W.G. N.P.
- \**T. arvense* L., Hare's-foot Clover.
- \**T. incarnatum* L., Crimson Clover. W.G.
- \**T. angustifolium* L.
- \**Melilotus indica* All., King Island Melilot.

- \**Medicago lupulina* L. W.G.  
 \**M. sativa* L., Lucerne. M.  
 \**M. denticulata* Willd., Toothed Medic.  
*Lotus australis* Andr.  
*Indigofera australis* Willd. M. N.P.  
*Swainsona Bkhriana* F.v.M. N.P.  
*Psoralea patens* Lindl. M. W.G.  
 \**Vicia sativa* L., Common Vetch.  
*Kennedya prostrata* R.Br., Scarlet Runner.  
*Hardenbergia monophylla* (Vent.), Benth., Native  
 Lilac.  
*Glycine clandestina* Wendl. M.

#### GERANIACEAE

- Geranium pilosum* Forst. var. *potentilloides* Benth.  
*G. molle* L. N.P.  
 \**Erodium botrys* (Cav.) Bertol. M. N.P.  
 \**E. moschatum* (L.) L'Her. M. N.P.  
 \**E. cicutarium* (L.) L'Her.  
*Pelargonium australe* Willd. var. *erodioides* Benth.  
 M. W.G.  
 \**P. graveolens* (Thunb.) L'Her. M.

#### OXALIDACEAE

- Oxalis corniculata* L., Native Soursop.  
 \**O. cernua* Thunb., Soursop.

#### LINACEAE

- Linum marginale*, A. Cunn., Native Flax.  
 \**L. gallicum* L. M. N.P.

#### RUTACEAE

- Correa rubra* Sm. M.  
*Phebalium bilobum* Lindl. W.G. (on feeding branch  
 of the creek above the reserve).

#### TREMANDRACEAE

- Tetratheca pilosa* Labill.

#### EUPHORBIACEAE

- Adriana Klotzschii* (F.v.M.) Muell. Arg. M.  
*Poranthera microphylla* Brongn.  
*P. microphylla* Brongn. var. *diffusa* Muell. Arg. W.G.  
 \**Euphorbia peplus* L., Petty Spurge. W.G.

#### STACKHOUSIACEAE

- Stackhousia monogyna* Labill.

#### SAPINDACEAE

- Dodonaea viscosa* L.



## RHAMNACEAE

- \**Rhamnus Alaternus* L., Buckthorn. M.
- Pomaderris racemosa* Hook. M.
- Spyridium parvifolium* (Hook.) F.v.M. M.
- S. spathulatum* F.v.M. M.
- S. vexilliferum* (Hook.) Reiss. W.G.
- Cryptandra tomentosa* Lindl. M.

## MALVACEAE

- Lavatera plebeja* Sims, Australian Hollyhock.
- \**Malva nicaeensis* All., Mallow. M.
- \**M. parviflora* L. M. N.P.

## DILLENACEAE

- Hibbertia sericea* (R.Br.) Benth.
- H. stricta* R.Br. W.G. N.P.
- H. acicularis* (Labill.) F.v.M. var. *sessiliflora* J. M. Black.

## GUTTIFERAE

- Hypericum gramineum* Forst. f. N.P.
- \**H. perforatum* L., St. John's Wort. N.P.
- H. japonicum* Thunb. N.P.

## VIOLACEAE

- Viola hederacea* Labill. N.P.
- V. Sieberiana* Spreng. M. W.G.
- Hybanthus floribundus* (Lindl.) F.v.M. M.

## THYMELAEACEAE

- Pimelea spathulata* Labill.
- P. curviflora* R.Br. N.P.
- P. humilis* R.Br.
- P. octophylla* R.Br. M. W.G.

## LYTHRACEAE

- Lythrum Hyssopifolia* L., Lesser Loosestrife.

## MYRTACEAE

- Leptospermum scoparium*, Forst. et f., Teatree.
- L. pubescens* Lamk., Silky Teatree.
- L. myrsinoides* Schlecht.
- Callistemon salignus* (Sm.) DC., var. *australis* Benth. M.
- Eucalyptus obliqua* L'Her., White Stringybark.
- E. odorata* Behr et Schlecht., Peppermint or Box. M. N.P.
- E. rostrata* Schlecht., River Red Gum. M. N.P. (*E. camaldulensis* Dehn).

*E. viminalis* Labill., Manna Gum.  
*E. leucoxyton* F.v.M., Yellow Gum.  
*E. fasciculosa* F.v.M., Pink Gum. M. N.P.  
*E. Baxteri* (Benth.) Maid. et Blak. M. W.G.  
*E. cosmophylla* F.v.M. W.G. N.P.  
*Calythrix tetragona* Labill.

#### OENOTHERACEAE

\**Oenothera odorata* Jacq., Evening Primrose. M.  
*Epilobium junceum* Sol.  
*E. glabellum* Forst. W.G. N.P.

#### HALORRHAGIDACEAE

*Halorrhagis tetragyna* (Labill.) Hook. f. M. N.P.  
*H. teucroides* DC.  
*H. heterophylla* Brongn. M. W.G.  
*H. Brownii* (Hook. f.) Schindler. M. W.G.

#### UMBELLIFERAE

*Hydrocotyle laxiflora* DC. M. W.G.  
*H. hirta* R.Br. W.G.  
*H. callicarpa* Bunge.  
*Eryngium rostratum* Cav. N.P.  
*Daucus glochidiatus* (Labill.) Fisch. Mey. et Avé-Lall.,  
Native Carrot. W.G. N.P.  
*Scandix pecten-Veneris* L., Venus's Comb. M.  
*Sium latifolium* L. var. *univittatum* J. M. Black, Water  
Parsnip. N.P.  
\**Apium australe* Pet-Thou.  
\**A. graveolens* L., Celery. M.  
\**Foeniculum vulgare* Mill., Fennel.

#### EPACRIDACEAE

*Astroloma conostephioides* (Sond.) F.v.M., Flame  
Heath.  
*A. humifusum* (Cav.) R.Br., Native Cranberry.  
*Lissanthe strigosa* (Sm.) R.Br. N.P.  
*Leucopogon australis* R.Br. M. W.G.  
*L. concurrens* F.v.M. M.  
*Acrotriche serrulata* (Labill.) R.Br.  
*A. fasciculiflora* (Regel.) Benth.  
*Epacris impressa* Labill., Heath.

#### PRIMULACEAE

\**Anagallis arvensis* L., Scarlet Pimpernel.  
\**A. femina* Mill., Blue Pimpernel.  
*Samolus repens* (Forst.) Pers.

## OLEACEAE

\**Olea europaea* L., Olive.

## LOGANIACEAE

*Mitrasacme paradoxa* R.Br.

*M. distylis* F.v.M. N.P.

*Logania recurva* J. M. Black. M.

*L. vaginalis* (Labill.) F.v.M. W.G.

## GENTIANACEAE

*Sebaea ovata* (Labill.) R.Br. W.G. N.P.

\**Erythraea Centaurium* Pers., Common Centaury.

\**Microcala quadrangularis* Griseb. N.P. November.

## APOCYNACEAE

\**Vinca major* L., Greater Periwinkle. N.P.

## ASCLEPIADACEAE

\**Asclepias fruticosa* L., Narrow-leaved Cotton-Bush.  
M.

\**A. rotundifolia* Mill., Broad-leaved Cotton-bush.

## CONVOLVULACEAE

*Convolvulus erubescens* Sims, Australian Bindweed.

*Dichondra repens* Forst. et f.

## BORRAGINACEAE

*Heliotropium europaeum* L. N.P.

*Cynoglossum suaveolens* R.Br.

*C. australe* R.Br. W.G. N.P.

*Myosotis australis* R.Br.

\**Lithospermum arvense* L. W.G. N.P.

\**Echinium plantagineum* L. W.G. N.P.

## VERBENACEAE

*Verbena officinalis* L., Common Vervain. N.P.

\**V. bonariensis* L. M.

## LABIATAE

*Ajuga australis* R.Br. W.G. N.P.

\**Mentha Pulegium* L., Pennyroyal. N.P.

\**M. spicata* Huds., Spearmint. N.P.

\**M. piperita* L., Peppermint.

*Lycopus australis* R.Br. N.P.

\**Lavendula Stoechas* L., French Lavender. W.G.

\**Marrubium vulgare* L., Horehound.

\**Salvia Verbenaca* L., Wild Sage.

*Prostanthera Behriana*, Schlecht. M.

\**Melissa officinalis* L., Balm. N.P.

## SOLANACEAE

- Solanum nigrum*, L., Black Nightshade.  
*S. aviculare* Forst. f., Kangaroo Apple. W.G.  
\**S. sodomaeum* L., Apple of Sodom. W.G.  
\**Physalis peruviana* L., Cape Gooseberry. W.G.  
\**Lycium ferocissimum* Miers, Boxthorn N.P.  
*Nicotiana maritima* Wheeler. W.G.  
\**N. glauca* Grah., Tobacco Tree. W.G.  
*Anthocercis angustifolia* F.v.M. M.

## SCROPHULARIACEAE

- \**Verbascum virgatum* With.  
\**Antirrhinum Orontium* L., Lesser Snapdragon.  
\**Linaria Elatine* (L.) Mill., Pointed Toadflax. W.G.  
N.P.  
\**Mimulus moschatus* Douglas, Musk Mimulus. W.G.  
*Gratiola peruviana* L.  
\**Veronica arvensis* L., Wall Speedwell. W.G. N.P.  
\**Bartschia latifolia* (L.) Sibth. et Sm. M. N.P.

## LENTIBULARIACEAE

- Polypompholyx tenella* (R.Br.) Lehm. N.P.

## MYOPORACEAE

- Myoporum viscosum* R.Br.

## PLANTAGINACEAE

- Plantago varia*. R.Br., Variable Plantain.  
\**P. lanceolata* L., Ribgrass.  
\**P. major* L., Greater Plantain.

## RUBIACEAE

- Opecularia varia* Hook. f.  
*O. ovata* Hook. f. N.P.  
*Asperula scoparia* Hook. f. M.  
\**Sherardia arvensis* L., Field Madder.  
*Galium Gaudichaudii* DC. N.P.  
*G. umbrosum* Sol. M. W.G.  
\**G. murale* (L.) All.

## VALERIANACEAE

- \**Valerianella truncata* Bet. M.  
\**Centranthus ruber* (L.) DC., Red Valerian. N.P.  
\**Fedia Cornucopiae* (L.) Gaertn. W.G.

## DIPSACACEAE

- \**Scabiosa maritima* L. N.P.

## CAMPANULACEAE

- Lobelia gibbosa* Labill. W.G. N.P.  
*L. anceps* Thunb.  
*Wahlenbergia Sieberi* A. DC. M. W.G.  
*W. vinciflora* (Vent.) Decaisne, Australian Bluebell.  
*W. multicaulis* Benth. M.  
*W. quadrifida* (R. Br.) A. DC. M. W.G.

## GOODENIACEAE

- Goodenia geniculata* R.Br.  
*G. primulacea* Schlechtd.  
*G. ovata* Sm. M. W.G.  
*G. albiflora* Schlechtd. M.  
*Vellea paradoxa* R.Br. N.P.  
*Scaevola microcarpa* Cav.

## BRUNONIACEAE

- Brunonia australis* Sm.

## STYLIDIACEAE

- Stylidium calcaratum* R.Br. N.P.  
*S. graminifolium* Swartz. M. W.G.  
*S. despectum* R. Br. N.P.  
*Levenhookia dubia* Sond.  
*L. pusilla* R.Br. N.P.

## COMPOSITAE

- Lagenophora Huegelii* Benth. N.P.  
*Brachycome diversifolia* (Grah.) Fisch. et Mey. N.P.  
(near Long Gully Station).  
*Vittadinia triloba* (Gaudich.) DC. M. N.P.  
*V. triloba* var. *lanuginosa* J. M. Black. N.P.  
*V. tenuissima* (Benth.) J. M. Black. M.  
*Olearia grandiflora* Hook. M. N.P.  
*O. ramulosa* (Labill.) Benth.  
*Siegesbeckia orientalis* L.  
*Cotula coronopifolia* L. M.  
*C. australis* (Less.) Hook. f.  
\**Soliva sessilis* Ruiz and Rav. October (has an un-  
pleasant burr). N.P.  
*Centipeda Cunninghamii* (DC.) A.Br. et Aschers. N.P.  
*Erechthites quadridentata* (Labill.) DC.  
*Senecio lautus* Soland. M. W.G.  
*S. hypoleucus* F.v.M.  
\**S. vulgaris* L., Common Groundsel. N.P.  
\**Osteospermum moniliferum* L. M. N.P.  
*Cymbonotus Lawsonianus* Gaudich.

- \**Cryptostemma calendulaceum* (L.) R.Br., Cape Dandelion.
- Stuartina Muelleri* Sond.
- Gnaphalium luteoalbum* L.
- Gn. japonicum* Thunb.
- Helipterum australe* (A. Gray) Druce. N.P.
- H. demissum* (A. Gray) Druce. N.P.
- Helichrysum Baxteri* A. Cunn. M. N.P.
- H. scorpioides* (Poir.) Labill. N.P.
- H. apiculatum* (Labill.) DC.
- H. semipapposum* (Labill.) DC. N.P.
- Leptorrhynchus squamatus* (Labill.) Less.
- Millotia tenuifolia* Cass.
- Rutidosia multiflora* (Nees) B. L. Robinson.
- Toxanthus Muelleri* (Sond.) Benth. W.G.
- Ixodia achilleoides* R.Br. M. W.G.
- \**Inula graveolens* (L.) Desf., Stinkwort.
- Calocephalus citreus* Less. N.P.
- Gnaphalodes uliginosum* A. Gray. M. W.G.
- Craspedia uniflora* Forst. f.
- \**Cynara Cardunculus* L., Wild Artichoke.
- \**Cirsium lanceolatum* (L.) Scop., Spear Thistle.  
W.G. N.P.
- \**Carduus tenuiflorus* Curtis, Slender Thistle.
- \**Silybum Marianum* (L.) Gaertn., Milk Thistle.
- \**Centaurea* sp. M.
- Microseris scapigera* (Forst. f.) Schultz-Bip.
- \**Hedypnois cretica* (L.) Willd. W.G. N.P.
- \**Hypochoeris radicata* L., Rooted Cat's-ear.
- \**H. glabra* L., Glabrous Cat's-ear.
- \**Urospermum picroides* (L.) Desf.
- \**Tragopogon porrifolius* L., Salsafy.
- \**Picris hieracioides* L., Hawkweed Picris.
- \**Taraxacum officinale* Weber, Dandelion. W.G. N.P.
- \**Sonchus oleraceus* L., Sow-thistle.
- \**S. asper* Hill, Prickly Sow-thistle.
- \**Tolpis barbata* Gaertn. M.

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