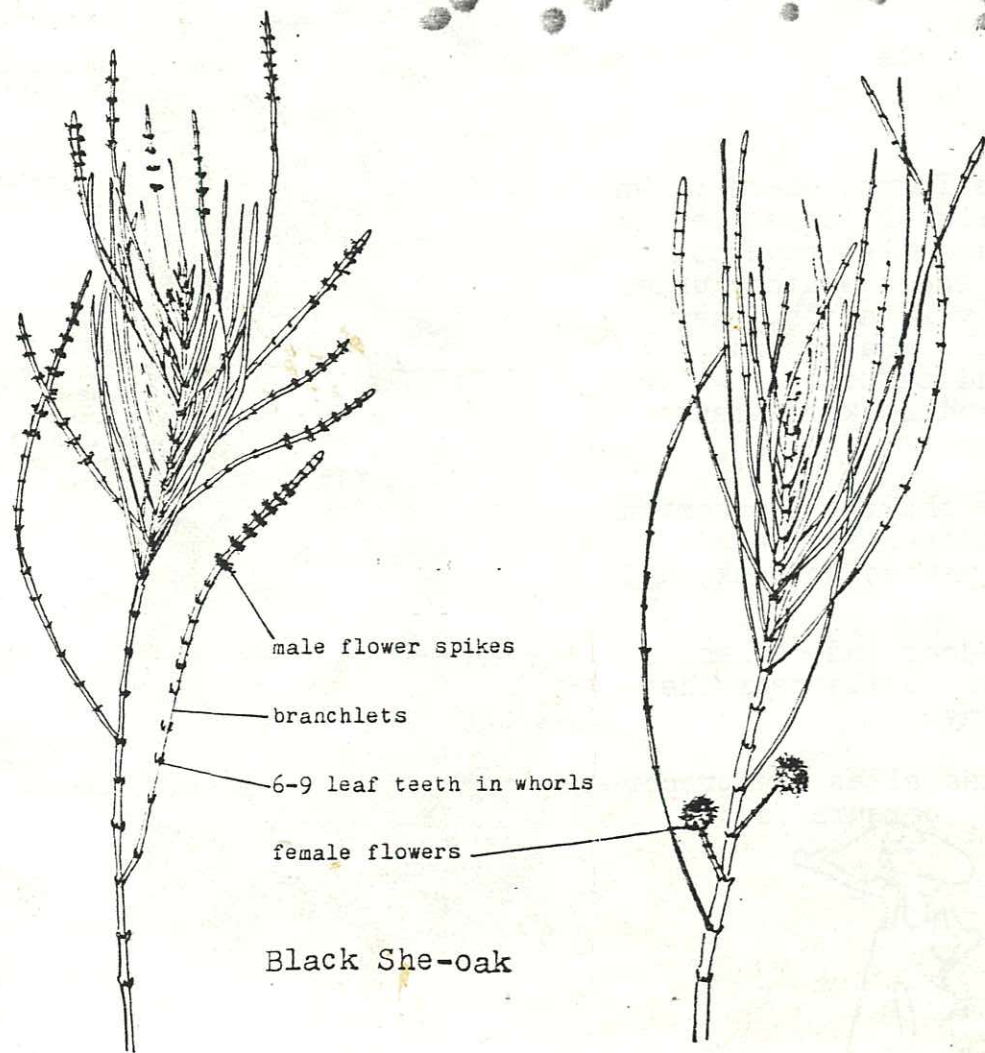


Bend of Islands Conservation Association

Newsletter No 17. April '87

What Native's Flowering?



Black She-oak

Botanical name: *Allocasuarina littoralis* (formerly *Casuarina littoralis*)
Common name : Black She-oak

A small tree 6-12 metres high with black, hard closely fissured bark. The tree consists of numerous leafless branchlets, (resembling pine needles) which are dark green with whorls of 6-9 leaf teeth at each joint. The whorls are 5-10 mm. apart.

The species is usually dioecious i.e. some plants bear male reproductive parts only and others bear female parts only. So if you are interested in propagating the black she-oak you would need two plants of different sex.

The male flower spikes are rusty brown in colour as is also the female flowers.

The species name refers to its occurrence on the coastal or littoral areas, however it has a wide geographical and ecological range. It's usual distribution in the Bend of Islands is along the river on rocky escarpments.

The black she-oak is a useful small tree, hardy in most soils.

Cec Harvey

Hang onto the dirty bits...

Soils of the Bend of Islands

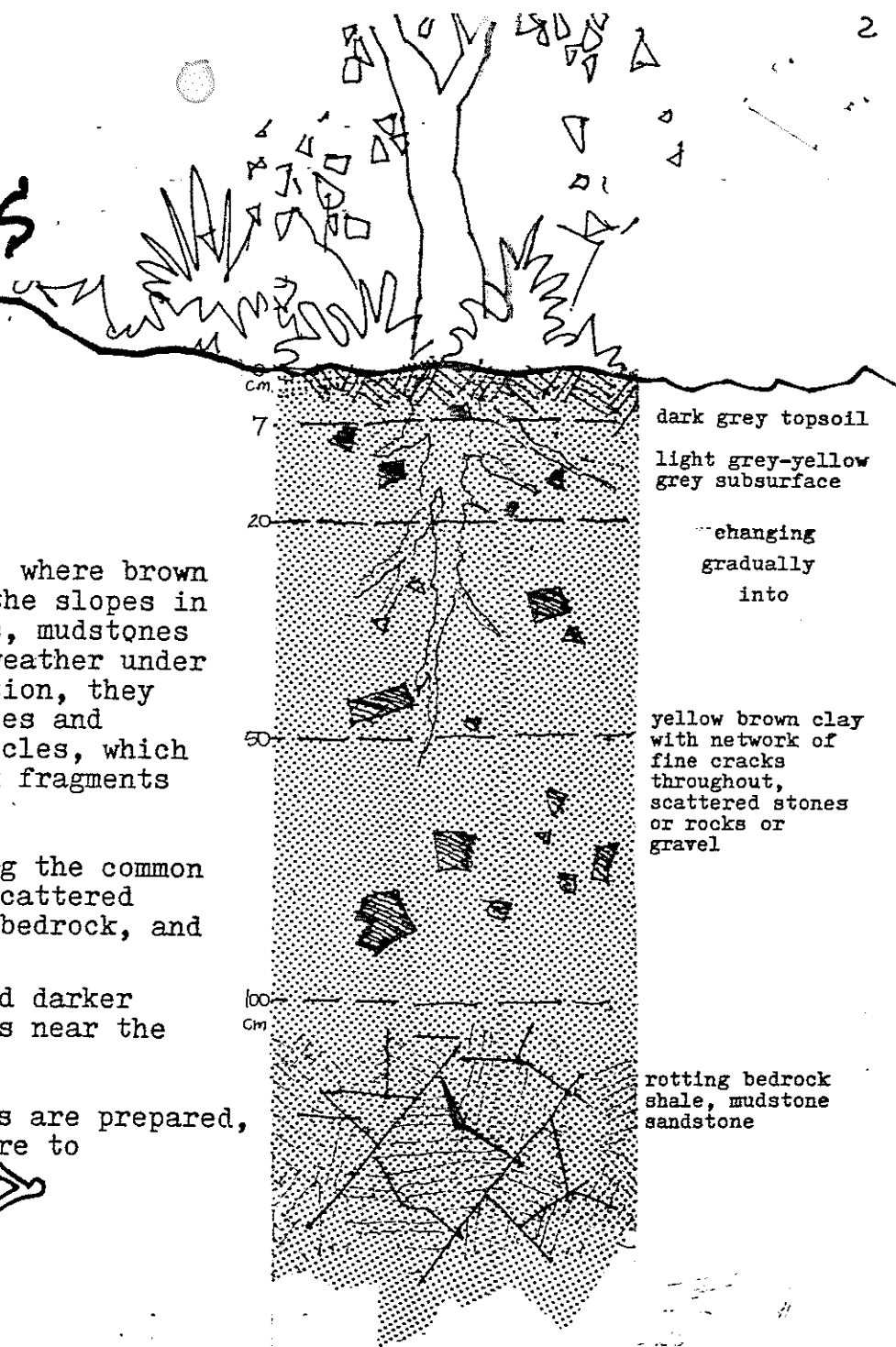
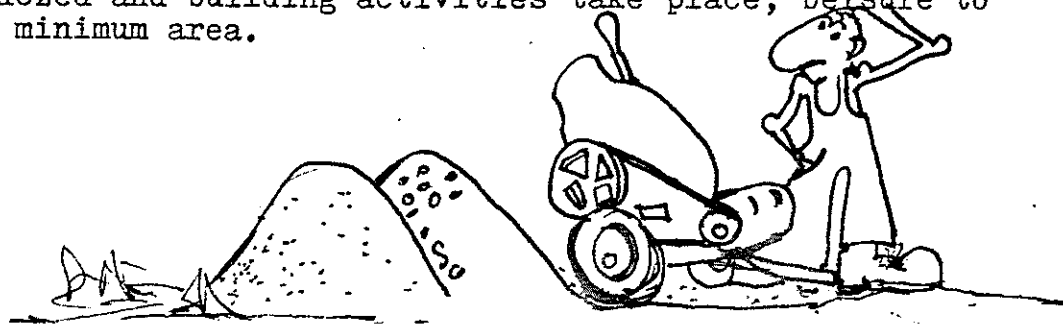
"Wooded slopes and rolling pasture make up the landscape that descends to the meandering Yarra River at the Bend of Isles. No wonder that people with an eye for scenic beauty, an ear for the sounds of the bush and a heart in search of peace are keen to live in the area. Yes, and how do they have to treat the soil?..."

Except in small areas immediately adjacent to the Yarra, where brown loamy and fine sandy alluvial soils occur, all the soils on the slopes in the ELZ have their origin in the folded Silurian mixed shales, mudstones and sandstone layers which make up the bedrock. When these weather under the influence of moisture, lichens, grasses and other vegetation, they turn into particles of clay, silt, sand and gravel. The shales and mudstones produce most of the clay, silt and finer sand particles, which the harder sandstone beds break up into coarser sand and rock fragments from angular gravels to large rocks.

We have all seen road cuttings in the ELZ clearly showing the common yellow, brown, clayey soils, with rock fragments and stones scattered throughout, usually less than one metre deep over fragmented bedrock, and capped with a thin grey to dark grey loamy top soil.

Cooler south-facing wooded slopes tend to have deeper and darker top soils than the hotter north and west-facing slopes. Soils near the sharper crests of spurs and ridges are shallow and stony.

Soils in the ELZ make good foundations. When house sites are prepared, driveways bulldozed and building activities take place, be sure to disturb only a minimum area.



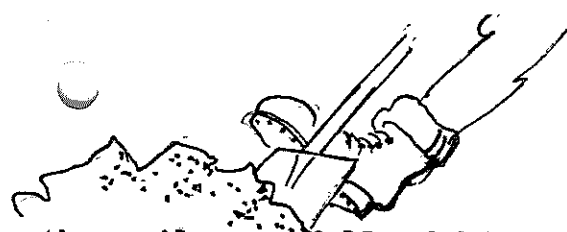
dark grey topsoil

light grey-yellow
grey subsurface

changing
gradually
into

yellow brown clay
with network of
fine cracks
throughout,
scattered stones
or rocks or
gravel

rotting bedrock
shale, mudstone
sandstone



In their undisturbed state, the soils are full of biological pores from old root channels, worm holes, etc., and conduct water easily. Thus, absorption trenches of septic effluent disposal systems tend to work efficiently, distributing the effluent throughout the soil and allowing its rapid purification.

Joost Brouwer's PhD study (LaTrobe 1982) generally showed that in disposal fields which are large enough not to be overloaded and saturated much of the time, adequate bacterial purification and phosphorous absorption may be expected to occur within one metre of the trench. Generally, in these soils, if virgin bush grows on them, 70 to 90 metres of disposal trench suffices for an average household of five people on a reticulated water supply (1000 litres per day waste water). Where soils have been compacted and pores filled with silt by disturbance, as much as 240 metres of disposal trench may be needed.

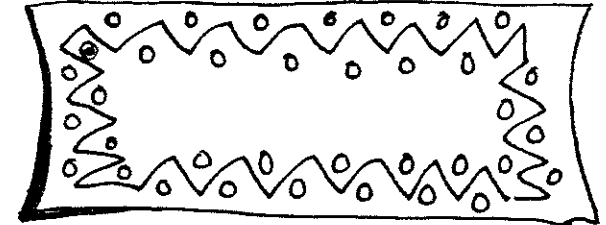
Soils in the ELZ tend to be acidic with pH values near 5, and are low in fertility. Vegie gardens will thrive if lime or dolomite is sprinkled on the surface at the rate of approximately 1 kg/sq metre and well dug in. Compost is excellent for both plant nutrition and soil structure. Apparently mushroom compost contains heaps of lime.

Soils have taken thousands of years to build up. They are the life support of plants. In Victoria millions of tons of soils have been washed away and poisoned through careless and insensitive activities and need to be considered.

Conserve the soil? It doesn't merely imply that you stop it from washing away down the Yarra. It means keeping it in good condition as well as keeping it on the block! It is definitely worth it. It means you can keep your life style!

Robert van de Graaff - Soil Scientist
(Franca helped)

BICA CALENDAR ACTIVITIES 87-88.



SATURDAY, 25th APRIL, 1987 - 2:00 P.M.

FIELD DAY - GEOLOGY OF THE AREA
B.Y.O. - B.B.Q. TO FOLLOW

SUNDAY, 24th MAY, 1987 - 2:00 P.M.

GENERAL MEETING

SATURDAY, 4th JULY, 1987 - 2:00 P.M.

CONSERVATION ISSUES DAY - FILM
B.Y.O. - B.B.Q. TO FOLLOW DISCUSSION

SUNDAY 23rd AUGUST, 1987 - 2:00 P.M.

GENERAL MEETING

SATURDAY, 12th SEPTEMBER, 1987-10:00 A.M.

WORKING BEE - WEED ERADICATION

SATURDAY, 24th OCTOBER, 1987 - 2:00 P.M.

FIELD DAY - FLORA STUDY
B.Y.O. - B.B.Q. TO FOLLOW

SUNDAY, 22nd NOVEMBER, 1987 - 2:00 P.M.

GENERAL MEETING

SATURDAY, 5th DECEMBER, 1987-10:00 A.M.

WORKING BEE - ROADSIDE TRIMMING
WILLOW ERADICATION

SUNDAY, 28th FEBRUARY, 1988 - 2:00 P.M.

ANNUAL GENERAL MEETING

BICA

Committee 1987



An enthusiastic committee have already begun work for the year -- having had two committee meetings and a number of sub-committee meetings.

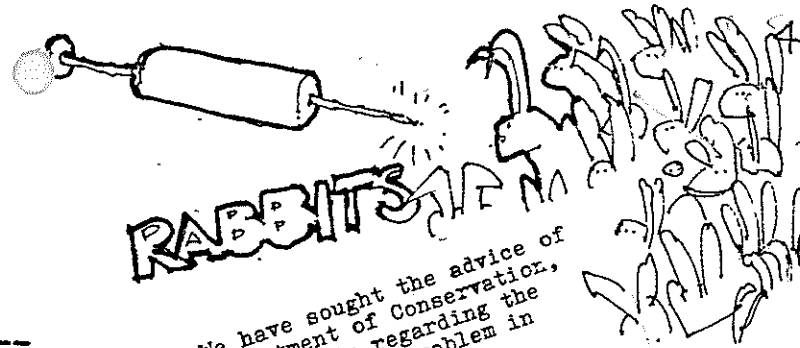
Committee members are:

Janet Mattiske	Pres.	712 0237	Neil Harvey	712 0462
John McCallum	V. Pres.	712 0319	Ross Henry	712 0547
Michael Pelling	Sec'y	712 0286	Andy McMahon	730 1652
Frank Pierce	Treas.	712 0316	Franca Majoor	712 0591
Joy Coldrey		712 0256	Chris Steed	712 0558

Issues currently receiving attention:

- Shire of Healesville Planning Scheme. The scheme is now on exhibition and can be viewed at the Shire or the Ministry for Planning and Environment. A limited number of copies are available from the Shire at a cost of \$15. It will be examined in detail by the Committee and you will be hearing more from us on this important issue.
- Sugarloaf Dam Recreation Study. This study has been released and has recommended passive recreational use of the Dam -- sailing, rowing, fishing and nature trails. The MMBW will be making recommendations to the Minister regarding implementation. If you would like to read the report, contact Janet (712 0237). The Committee will be making further comment on the proposals to the MMBW.
- Henley Road Restoration. A plan for the revegetation of areas damaged by road works on Henley Road will be submitted to the Council shortly. Work needs to be completed before the end of the financial year. While the Council will be doing some of the work, it will be necessary to call on the community for a working bee to assist. We do ask for your support. Keep looking for a notice at the bridge.
- Working Bee. Quite a successful working bee was held on Saturday 28th March. Roadside rubbish was collected along Henley Road and from Oxley Reserve. The Council are to collect the huge pile the willing workers put together. Thank you to those who braved the wet weather.

Janet Mattiske
President

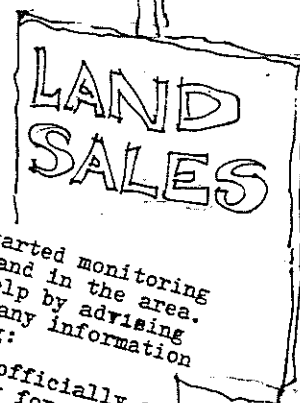


We have sought the advice of the Department of Conservation, Forests & Lands regarding the increasing rabbit problem in the area.

CFL have advised that the only practical way of decreasing the rabbit population is by the introduction of myxomatosis. To do this we have to catch 20-30 local rabbits so they can be injected.

We have arranged to catch the rabbits with ferrets but need to know the location of a wide spread of active warrens.

If you know where there are any active warrens, please contact Frank Pierce on 712 0361 ASAP.



We have started monitoring the sales of land in the area. We need your help by advising us if you have any information on the following:

- any blocks officially or unofficially for sale
- any people interested in buying property in the area
- any blocks that have recently been sold.

Please contact Michael Pelling on 712 0286.

A Rocky Road

for the environment



The past decade has seen 'landscaping' become an extension of 'home decor' .. we all want our gardens to look great, so we fill them with artistic shapes formed with expensive imported rocks, soils, gravels and timbers. We buy these things with no thought about where they come from. They can't be manufactured .. they all come from NATURAL SITES SOMEWHERE ELSE!

Thousands of metres of rocks and soils are taken (sometimes illegally) from forests, woodlands and prime agricultural land leaving it denuded and damaged. Thousands of unseen creeks are mined for gravel and sand leave them degraded. WE ARE PLUNDERING THE ENVIRONMENT, desecrating one area to adorn another!

The ever increasing demand spells environmental disaster for the natural sites these things come from. Whole areas are mined, dug out or bulldozed to provide for 'landscaping'. Its ironic that to beautify our own area we must desecrate others, and its sad because its unnecessary. We can make our gardens places of great beauty without importing these things, simply by using what is natural to our own area, using what we have already to create forms and shapes more natural to the local environment. Rises and falls and newly-formed mounds made from excess fill from our building sites can combine with multi level planting to create magical effects more in keeping with our woodland setting.

WHAT HAPPENS WHEN ROCKS ARE REMOVED FROM NATURAL SITES? * Soil disturbance is created leading to erosion problems (particularly on granite soils) * Weeds invade the disturbed soils where rocks once sat * Habitat of plants which grow on rocks is lost (mosses and lichens) * The major habitat of small marsupials like the Fat Tailed Dunnart is destroyed * Habitat for reptiles and a host of invertebrates is lost * Plants which rely on rocks to cool their root systems die * The visual beauty of natural landscape is destroyed forever. ALL THIS IN THE NAME OF LANDSCAPE!

WHAT HAPPENS WHEN MOUNTAIN SOILS ARE DUG OUT? In the mountains and forests topsoils are gauged out leaving irreparable environmental damage just so that we can pile it on top of our garden soils which, with a bit of effort on our part, would grow what we wanted anyway, especially if we preserve local topsoil when clearing and use it to cover damaged areas later. We can make our own planting soils by using a little gypsum, home-made compost and leafy litter (cheaper and we don't import weeds).

If we really care about Australia's environment and not just our own backyards, we should think before we buy natural materials like rocks, gravel, sand and sleepers and try to build our gardens without plundering other areas. We should look at the way nature arranges her bush gardens in our local area and use that as a guide for creating lovely natural gardens around our homes which echo nature. This way, we make a double contribution to the environment, by not desecrating other areas and by replacing our own natural bushland in areas we disturb by building.

We should remember that every rock taken displaces plants, soils and animals elsewhere, each metre of gravel taken contributes to the death of a creek elsewhere, each metre of topsoil taken damages forests elsewhere and each sleeper comes from a tree somewhere else. The more demand we help to create for these things, the more we contribute to the environmental ruin of other natural sites.

felicity

We are not alone

This article was in the Travel & Leisure section of The Age a few months ago. It demonstrates a number of facts that are relevant to our area:

- the resilience of the bush and its creatures and their capacity for re-establishment if given a helping hand by us.
- the devastating effect of "those super efficient killers of anything small in the bush - cats, foxes and dogs".
- the amazing variety of native birds and animals which the bush can support in its natural state.

The object of the ELZ is the protection and regeneration of the natural bush in the area. Its planning provisions are based on the above facts and are essential for the realization of this objective.

Here are a few local experiences which back up these points:

- Sheila Dixon was brought up in this area in the 1930s. She recalls that as a child she did not see such animals as wallabies and echidnas, so familiar to our children now that the bush and its wildlife are being protected. In those days the Catani Blvde area had virtually no houses, but there were many dogs, horses, pigs &



Proo Geddes on the prowl at Warrawong sanctuary spotlights a red bettong, a tiny relative of the kangaroo.

On the prowl in Adelaide

WHAT DO YOU do with one night in Adelaide? You can stare at blackened churches, take pot luck on a restaurant, remain sealed up in your city hotel room or go ogling in the bar. This is not a reflection on the festival city; it is pretty much the same for any stopover anywhere.

Now Adelaide is offering a one-night stand with a difference. It is at a spot called Warrawong in the hills behind the city. The name means "water on the side of a hill".

Warrawong is a 14-hectare property owned by Dr John Wamsley, a reader in mathematics at Flinders University. What he is offering is a chance to see nocturnal creatures in their natural habitat.

"It's not a zoo. I don't approve of zoos," Dr Wamsley says. "I don't believe things should be locked up in cages to be looked at by people. I think there is a tendency to study animals as we would like them, rather than as they would actually be." Dr Wamsley and his wife Proo Geddes show off the animals at Warrawong by

Report: Rod Usher
Pictures: Simon Corden

torchlight. They accompany small, quiet groups of visitors walking around the property and they answer questions about the inhabitants. These include three types of bettongs (rare small relatives of the kangaroo), dama and red-necked wallabies, red and grey roos, bats, water rats, potoroos, possums, boobooks and many more.

Dr Wamsley bought his hillside in 1969. "It had been developed — or devastated, depending on your point of view — as an apple-and-pear orchard, then a pine plantation and finally a high-intensity dairy," he says. During 15 years he planted more than 50,000 native trees and shrubs on Warrawong, restoring it as a habitat for the furred and feathered and frightened.

By day peewees, cuckoo shrikes, herons, Cape Barren geese, rosellas, crested

pigeons and many others feed on the nectar Warrawong offers. When the sun goes down the shy night feeders come out.

But the secret of Warrawong is not so much its richly renewed vegetation. It is a fence. The fence around the property is 2 kilometres long and 2.4 metres high with overhangs, anti-digging footings and a job of electricity running through it. The only gate is radio-controlled and the whole thing is checked daily, as though the place was a bank.

The "robbers" it keeps out are cats, foxes and dogs, those super-efficient killers of anything small in the bush. "Without doubt the fence is the most important asset we have at Warrawong," says Dr Wamsley. "Without it we could not have introduced the animals that we have."

On the moonlit night that we visited Warrawong was alive with footsteps and rustling Bettongs, the tiniest of the marauding Bettongs, scurried off as we walked through the tall trees and low scrub, but

sat still. Ignoring our torches once our heavy feet stood still. By a broad, reedy lake a sleek water rat glided across the still water, its nose breaking the surface like a prow. Once his ancestors' dense, lustrous fur was turned into fashionable coats. Nearer to the rambling old house a potoroo pattered on his business.

John Wamsley and Proo Geddes, who is also a teacher, are now spending many of their nights taking students from Adelaide schools around Warrawong. They are also getting a steady stream of adult tourists and offer advice to farmers and block owners in the Adelaide hills on how to live there without wiping out those whose home it was long before the white man.

A conducted night walk around Warrawong lasts about one and a half hours and the charge is \$5 for adults and \$2 for children. The sanctuary is about half an hour's drive from the Hilton. Details about this different "night out" can be had by phoning Warrawong on (08) 388 5380.

WE ARE NOT ALONE CONTINUED.....

foxes in the area where Sheila lived. She did not see a wallaby until she was fifteen years old or an echidna until her own children had been born.

- On a recent bush wander we discovered the nest of a scrub wren. This was a delicate sphere of twigs and moss, well hidden in a tussock of grass at ground level. After hearing the baby birds calling from it, it still took us five minutes to find the nest. These birds, like so many other native creatures, have no chance against any cats or dogs wandering through the bush. The most docile domestic pet will, by its very nature, be a devastating predator when introduced into the bush, irrespective of its owner's preconceptions or attitudes.
- You can wander through any part of the ELZ and find a fascinating variety of native birds, far in excess of that found in the more 'developed' sections of Kangaroo Ground or the surrounding areas. The birds rely on the native plant habitat for survival. The presence of introduced plants or the removal of native trees in an area can threaten the suitability of this habitat.

Warrawong is an encouraging example of natural bush being regenerated on land that has been extensively cleared and farmed. Some sections of now thriving bush in the ELZ were cleared farmland as recently as twenty-five years ago.

The ELZ planning provisions will ensure that the regeneration will continue, giving us, the residents, a unique opportunity to experience the wonderful diversity of the bush in its natural state, at our doorsteps.

Frank Pierce

No! It's a Bird

Black Faced Cuckoo Shrike



Coracina Novaehollandiae

The Black Faced Cuckoo Shrike is one of the most widely distributed and frequently seen birds in Australia.

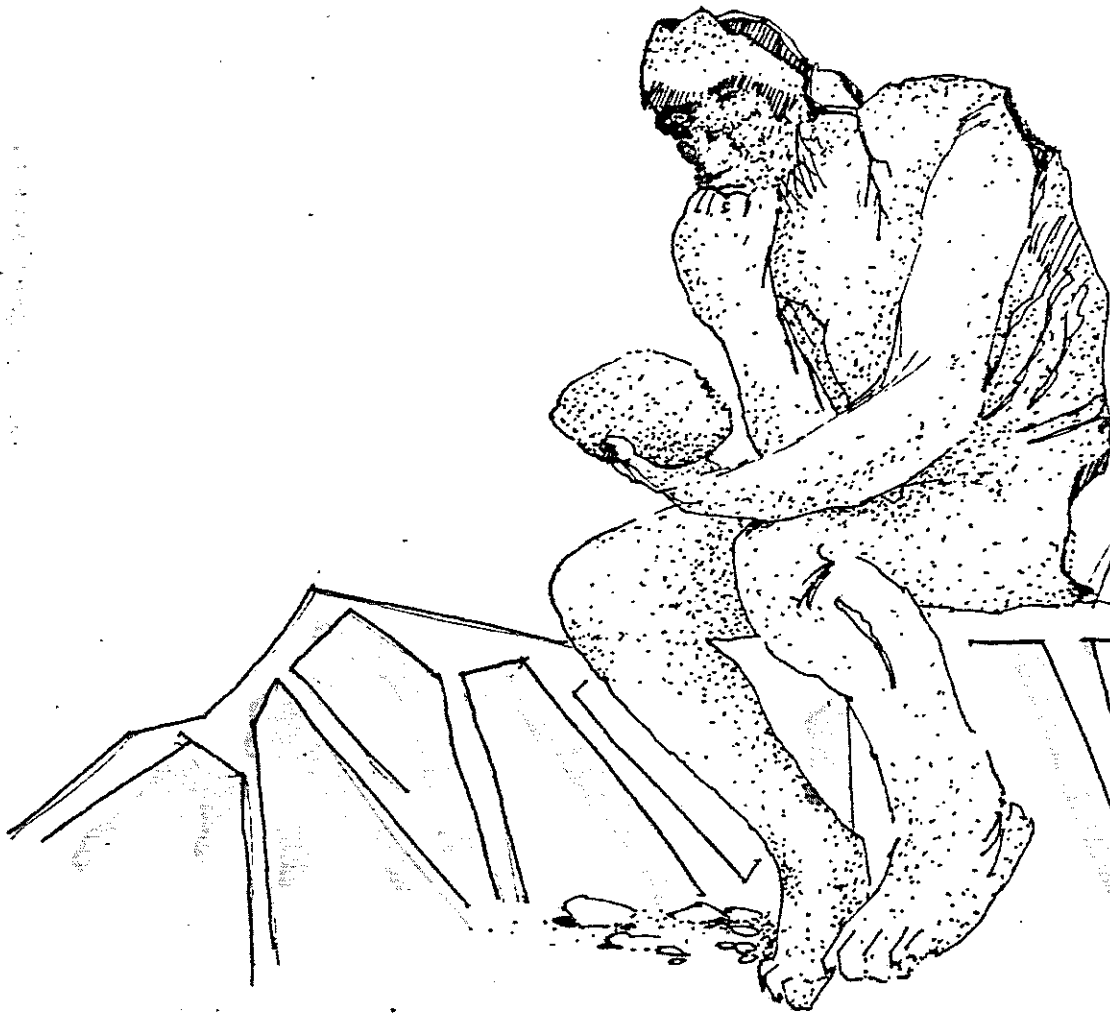
It is found in many varying habitats. It is likely to be observed throughout the Bend of Isles Grassland with trees to denser forest and timber along water courses.

In the ELZ I have usually observed them sitting in dead trees at or above the level of the surrounding foliage.

Description: The Black Faced Cuckoo Shrike is about 305 to 355 mm in size and a blue-grey colour with black face and throat fading to white below. In flight look for the black throat and black tail which has a pale tip. Flight is strongly undulating and on alighting they have a habit of repeatedly folding their wings. Voice - The call is a rolling churring sound, and when in flight or refolding its wings it often makes a higher 'cherreer' noise. It can also come out with a harsher 'serr' sound. 'skair' noise.

The Black Faced Cuckoo Shrike is migratory and nomadic. In autumn after breeding, large numbers migrate from northern Tasmania to southeast Australia. There is also movement from Australia to some Pacific Islands.

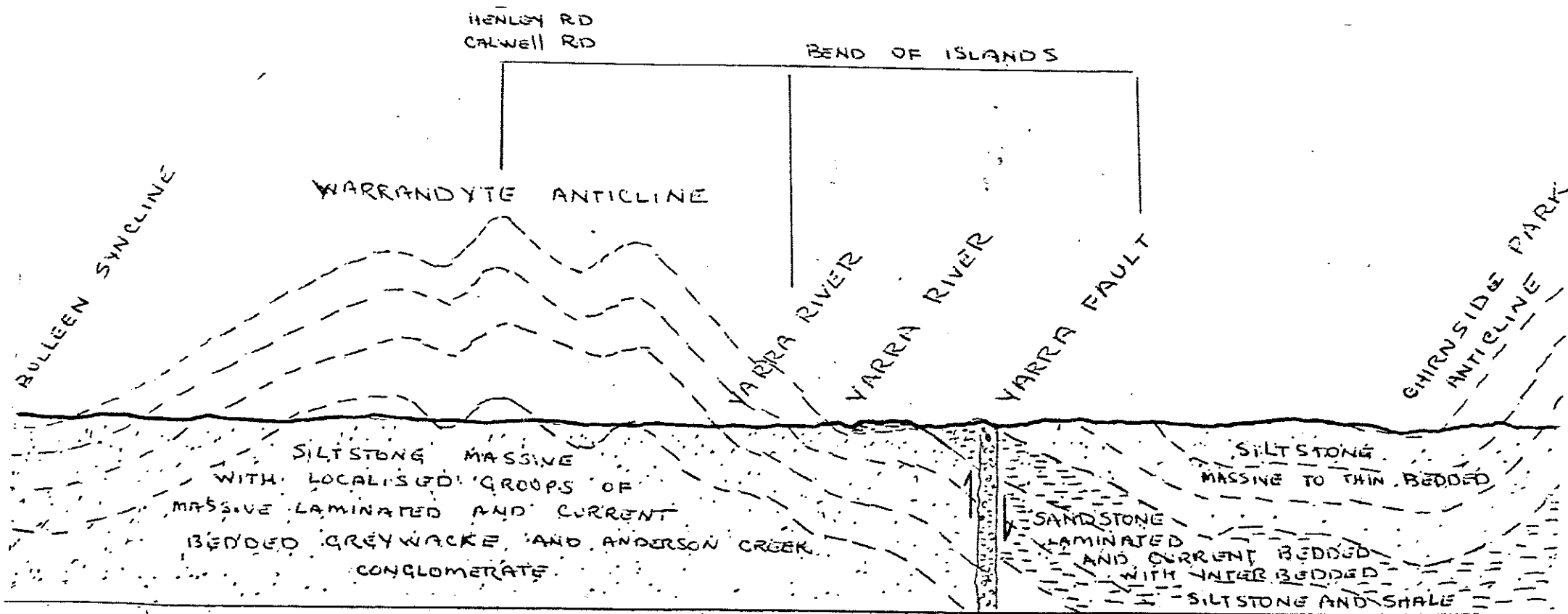
Matthew McCallum



**GEOLOGY
AND
GEOMORPHOLOGY
OF THE
BEND OF ISLANDS
AND
SURROUNDING
AREAS**

The dominant rock forms in the district are sandstones and shales of Silurian Age. Small intrusions of igneous rock are exposed at isolated points throughout the district, mainly quartz and feldspar porphyry and extrusive olivine basalt. The largest extrusion is around Kangaroo Ground's Garden Hill where, in the Pliocene, lava flows covered that district.

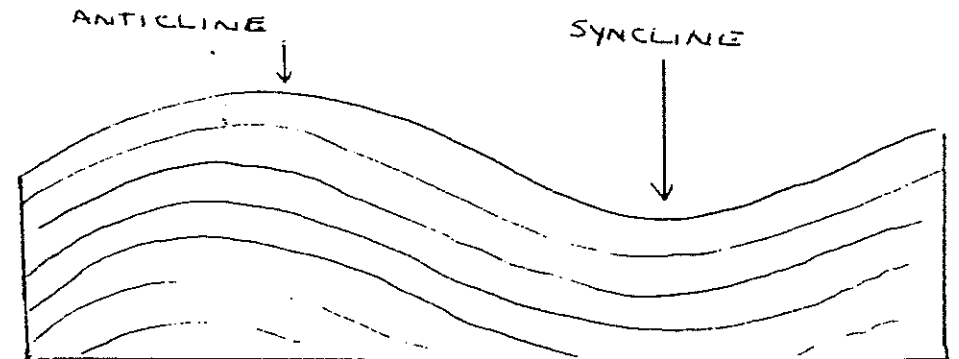
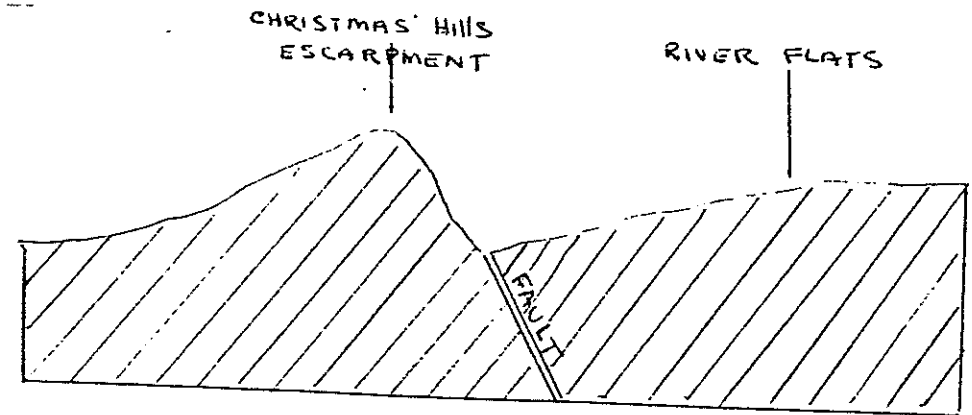
The Silurian sedimentary rocks were formed by the accumulation of mainly water borne deposits of sand and silt in an ancient shallow sea. As the deposits built up layer upon layer, their combined weight caused the sea bed to subside at approximately the same rate as deposition took place. Eventually the deposits built up to a thickness of over 6,000 metres. The horizontal nature of the



WEST—THE NILLUMBIK TERRAIN, KANGAROO GROUND AND CHRISTMAS HILLS—EAST

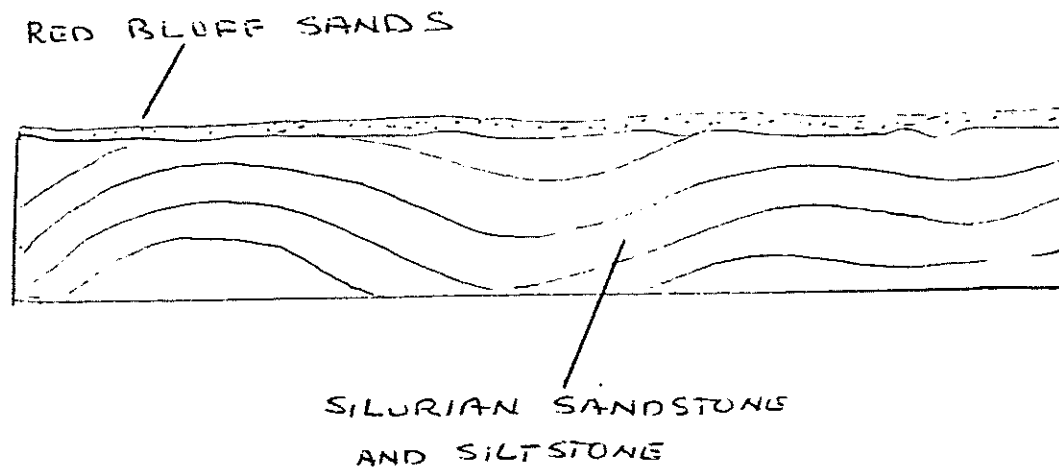
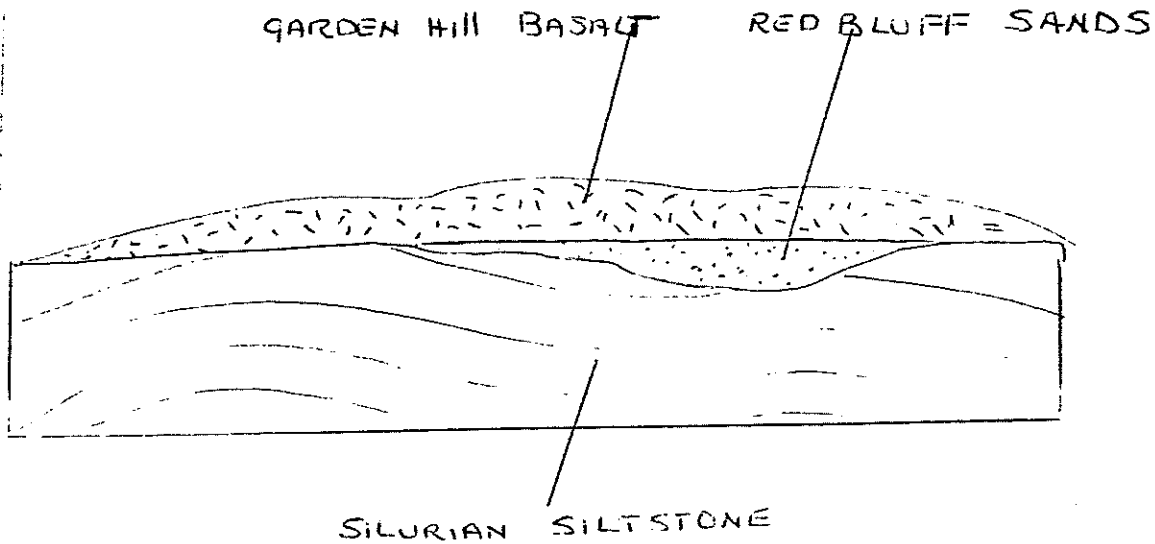
layers was worked upon by other stresses within the earth's crust. The eastern edge of the tectonic plate upon which Australia rests came in contact with Antarctica, causing the horizontal layers to be folded into a series of synclines and anticlines, the crests and troughs of which ran approximately north-south. Exposures of these tilted strata are visible in the road cuttings along Skyline Road, but more extensively for two kilometres along the Maroondah Aqueduct. That cutting gives some indication of the depth of the sediment, for it is composed of just the eastern leg of the Warrandyte Anticline, the largest anticline in the district.

The Devonian period in eastern Australia was a time of much activity beneath the earth's crust. The Silurian deposits were elevated by these forces from below the sea to form high mountains over much of present day Victoria. Again the forces of sun, wind, rain, snow and ice came to bear upon the land. Millions of years passed by and the mountains were eroded away. Even if a mountain loses only a millimetre a year from erosion, in a million years it will lose one kilometre of its height. Eventually the entire countryside was reduced to a flat, featureless peneplain tilted slightly to the west and south. Across that plain there flowed a large river called by some geologists "The Wurundgeri" to distinguish it from the present day stream "The Yarra". That peneplain is called the "Nillumbik Terrain". The Wurundgeri was a fast flowing river. It deposited not silt like the present river, but larger grained sands. It coated the Nillumbik Terrain with deposits of sand which remain today in isolated pockets, such as at Kangaroo Ground, where at the present tip site, they were extracted for a number of years for the building industry. There is an exposure of a thin lens of that sand, called "Red Bluff Sand", in a road cutting a few hundred metres south of the Kangaroo Ground Cemetery.



The Triassic epoch about 200 million years ago brought about further changes to the landscape. Two faults occurred in the earth's crust in this district. One extended from near Yarra Glen to the Yarra-Brushy Creek junction (end of Gongflers Drive), a distance of approximately 15 kilometres in an east-west direction. The other extended from that latter point to Bayswater, a distance of 14 kilometres in a north-south direction. The country to the north and west

of these two fault-lines commenced slowly to uplift and has continued to do so ever since. During that same epoch, volcanic activity around Kangaroo Ground led to the extrusion of lavas over the sand-covered Nillumbik



THE NILLUMBIK PENEPLAIN

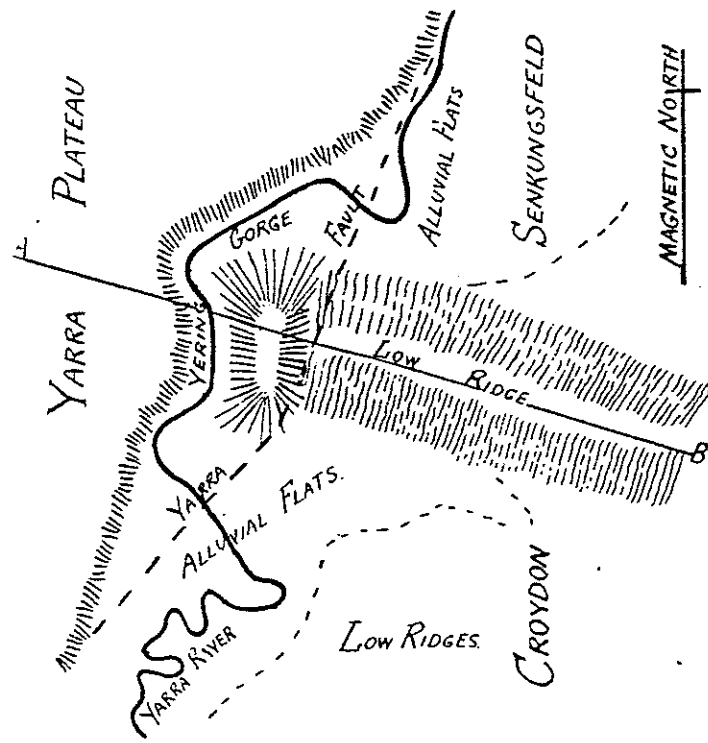
Terrain in that district. Deposits of the Red Bluff Sands were trapped below that basalt. The basalt decomposed to form the deep black soils characteristic of Kangaroo Ground.

Elsewhere the river flowing westward to the sea across the peneplain, partly upon the uplifting block but mostly upon the old stable Nillumbik peneplain, came into a new stage of its existence. In order to maintain its course upon the uplifting block, it became necessary for the river to cut down into the old hard Silurian sediments. This was only possible because of the slowness of the uplift; otherwise its course would have been deflected to the south of the fault.

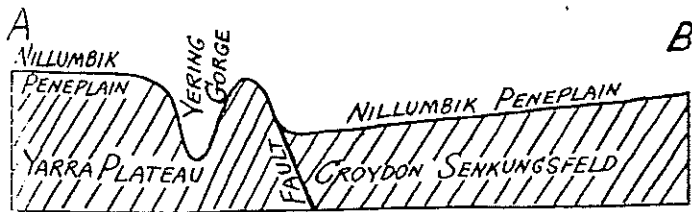
As the river cut down, it became a rejuvenated stream as happened at Yering. That particular meander of the river north of the Yarra Fault became an "entrenched meander". That cutting down action created Yering Gorge. Another entrenched meander is a couple of kilometres downstream where the river enters another gorge alongside Mount Lofty. Further downstream the river flows entirely through the uplifting block, creating Warrandyte Gorge, which extends from Brushy Creek to Templestowe.

"In the depressed area above the gorges, the river was constantly reaching a temporary base level waiting for the erosion of the gorge. This gave great play for lateral stream erosion and atmospheric denudation with the result that low ridges have been eroded into wide shallow valleys by the sluggish tributary streams and the Yarra itself in its meandering course has formed the wide alluvial flats of Yarra Glen." (J.T. Jutson Proc Royal Soc Victoria Pr 11 1911)

Viewpoint 1 - The Escarpment on Skyline Road,
Christmas Hills



SECTION ALONG LINE AB



SCALES - HORIZONTAL 2 INCHES = 1 MILE. VERTICAL 1 INCH = 1/10 MILE.

The escarpment is approximately 200 metres above the flood plain. Yering Gorge is a kilometre downstream. The Yarra in this section is a "mature stream" meandering sedately across its flood plain.

As the meanders grow, their necks become narrower until eventually an increased spring flow cuts the necks, thus isolating the meander and forming an oxbow lake or billabong. This was a continuous process in the past, but it is now modified by dam construction upstream and farming activities here on the flats. These flats once supported an abundance of resources exploited by a wide variety of wildlife.

The features on the south side of the valley are residuals being formed of rocks more resistant to erosion. The Warramite Hills are composed of Ruddocks Siltstone, a commercially exploited metamorphic rock. Further to the west are the Lilydale basalts and Cave Hill formed from a Coral Reef. That reef has been mined for over a century producing all of Victoria's lime requirements. Further west again can be seen the Brushy Creek Escarpment. The Dandenongs (residual mountains) are made up of Ferny Creek ryodacite, granites together with other igneous and metamorphic rocks.

The Christmas Hills Escarpment is also a type of residual feature. Here the sandstone-siltstone has been invaded by vadose silica, thus forming a type of quartzite which resists erosion.

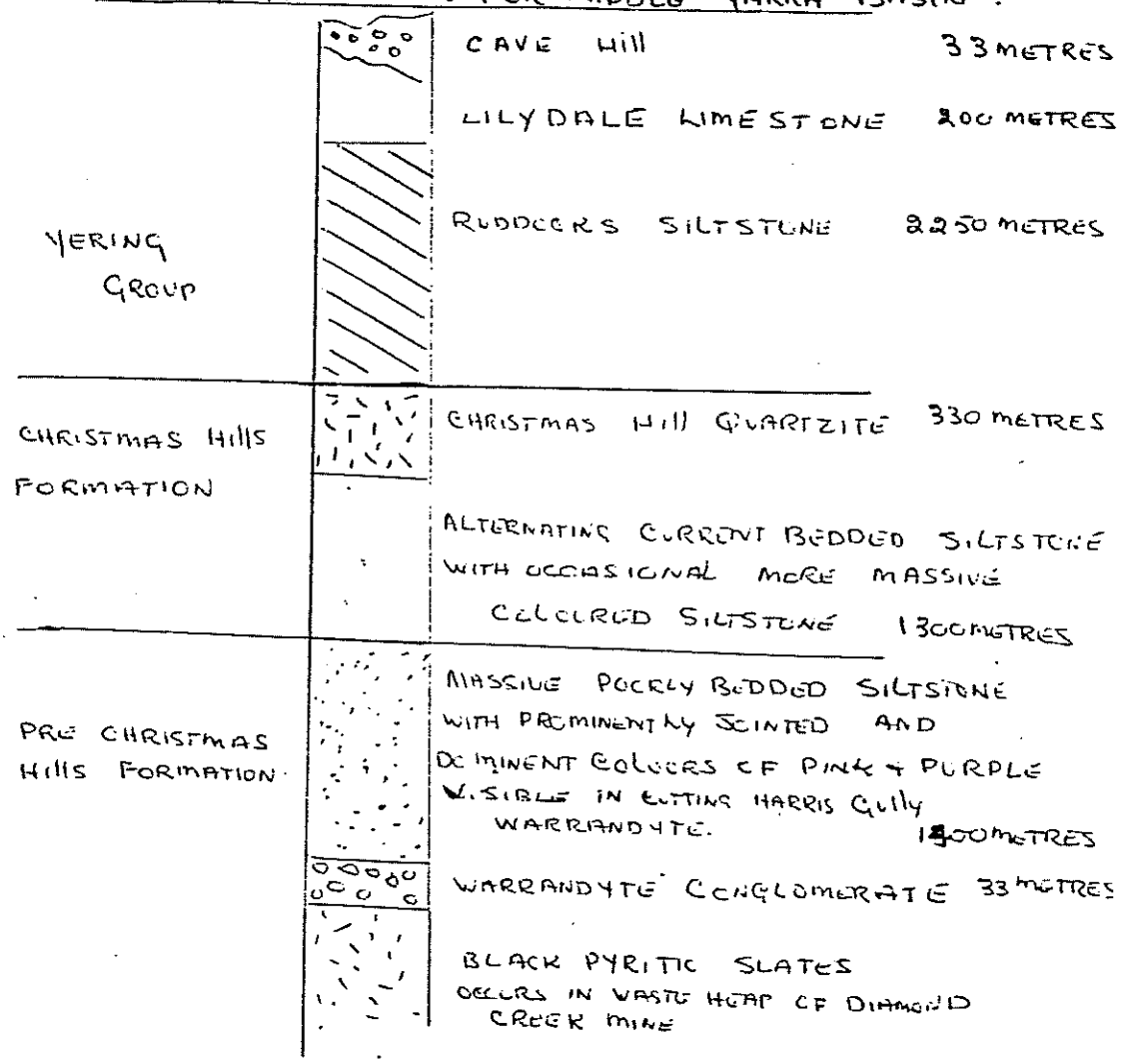
Climate and the River

The river and its valley have seen many changes over recent geological times. At one time the river was 600 kilometres longer. About 18,000 B.P. (Before Present) it flowed out across the floor of Port Phillip Bay, picking up on the way the Werribee and the Barwon Rivers. Southward it flowed to the present day north coast of Tasmania where it picked up the waters of the Tamar River and transported them to the cold Southern Ocean off the northwest coast of Tasmania. By 14,000 B.P. the average temperature here in Victoria was 6°C to 7°C cooler than at present. Christmas Hills would have had bitterly cold winters with snow in June-July. Permanent ice-sheets formed upon the Divide. The oceans of the world dropped by 150 metres. The cooler, deeper valleys of the Yarra would have supported plantlife more typical of today's Tasmanian highlands. A large range of megafauna roamed the land. A hippopotamus-sized wombat-like creature, the diprotodon, and a three-metre high kangaroo probably browsed along the river flats. After 14,000 B.P. the temperature began to rise. The climate became much wetter than it is today; the ocean levels rose until about 5,500 B.P. the waters of Port Phillip Bay were two metres higher than they are today. The cold-adapted beech forests and ferns gradually disappeared, their place taken by eucalypt forests.

Christmas Hills

During all that time new landforms were coming into existence on the north and west sides of the two faultlines. At Christmas Hills

GEOLOGICAL COLUMN FOR MIDDLE YARRA BASIN .



AFTER FIG 2 SEDIMENTS OF MIDDLE YARRA BASIN BY BRUCE R MOORE

the waters of the Watsons Creek system transported the products of erosion down to the Yarra. What had been a flat peneplain now became dissected by deep gullies. More resistant strata often led to the creation of conical hills such as Mt. Graham and Sugarloaf, the latter being capped by a Porphyry of feldspar and quartz.

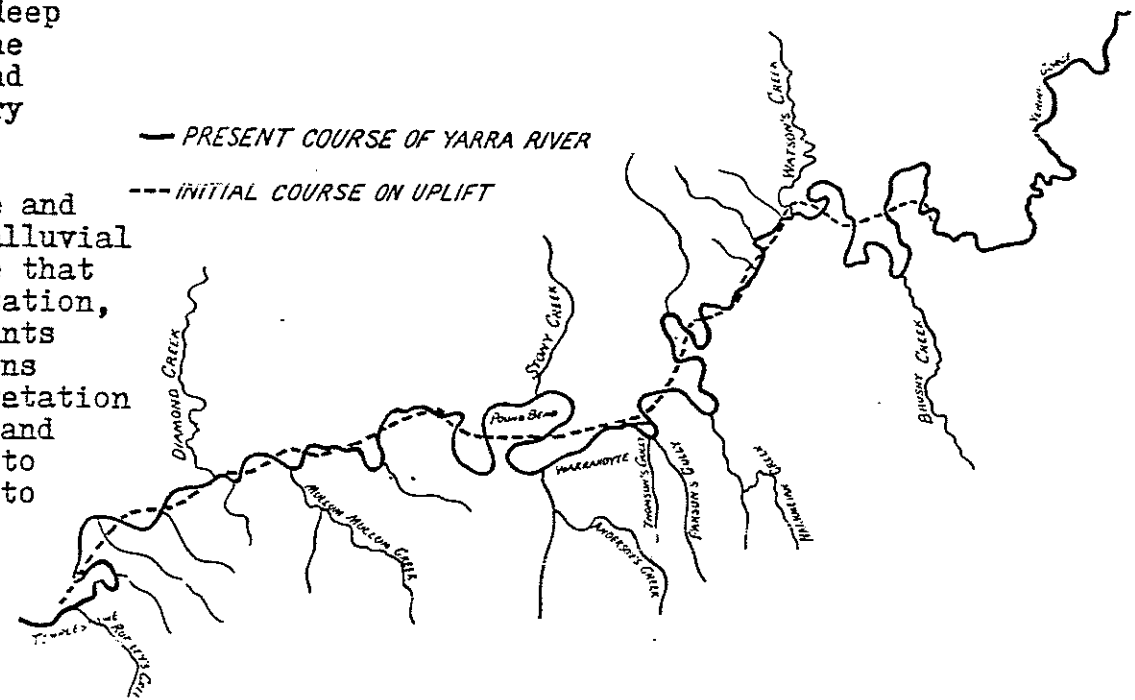
Parts of Watsons Creek reached their grade and commenced lateral erosion, eventually forming alluvial flats. The animals that we see today are those that have successfully adapted to the changing vegetation, climate and terrain; many failed to adapt. Plants also have had to adapt to the changing conditions to survive. In Devonian times there was no vegetation to arrest erosion. The evolution of our hardy and varied native plantlife has possibly done more to prevent this land from having already reverted to that old featureless peneplain.

Viewpoint II - Yering Gorge

The Gorge can best be seen from the public viewing platform at the pumping station for Sugarloaf Dam. Here the river is an Antecedent Stream. It occupies the same bed as it did in Triassic times. It is an entrenched meander. Here it is cutting down into the hard Silurian bedrock. It is a rejuvenated stream. Upstream and downstream of it are flood plains.

Viewpoint III - Warrandyte Gorge

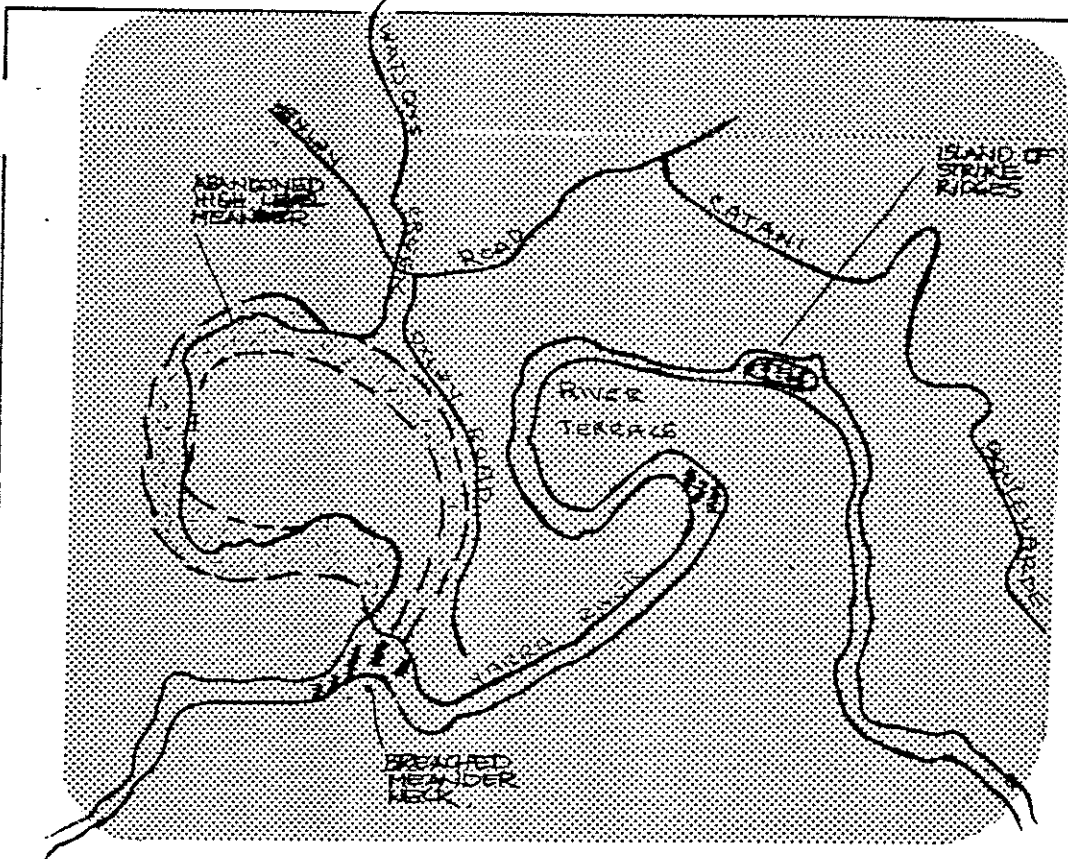
The Gorge is best seen from a point in Catani Boulevard west of Ironbark Road. Here the river flows through the rising block of the Nillumbik Terrain. The bends of the Bend of Islands are not "entrenched meanders". Originally the river followed a more direct route through the Warrandyte Gorge.



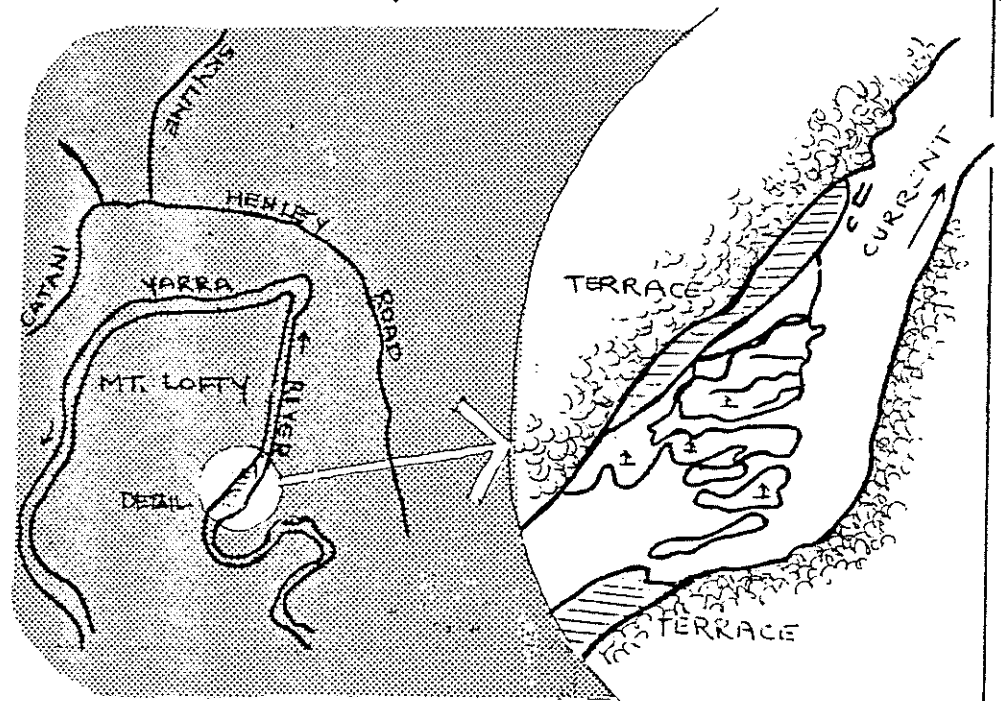
— PRESENT COURSE OF YARRA RIVER

--- INITIAL COURSE ON UPLIFT

Here as the river cut downwards it was deflected to the south or as is possible it captured the lower reaches of Brushy Creek. It seems much more than coincidental that almost every change in the course of the Yarra from the old to the new takes place adjacent to one of its tributaries. At some time in the distant past it flowed across the properties of the McCallums and the Pierces. On the McCallums' block there is a pit excavated into these old river deposits of water-worn quartz pebbles.



ABANDONED HIGH LEVEL MEANDER.



LATERAL ROCK BARS

16

Viewpoint IV - Public Reserve, Catani Boulevarde:
The Islands

As the Yarra River flows from east to west across strike of the strata, which itself runs north-south, it is affected by the more resistant formations of that strata. Outcrops of the Dargile Formation of sandstones affect the river considerably at two points in the Bend of Islands. Where the river turns north around Mt. Lofty, outcrops of the Dargile Formation form lateral rock bars in the river bed, causing the Yarra to be deflected to the east, leading eventually to the formation of an "ingrown meander". The other section affected is at the Public Reserve off Catani Boulevarde. It is from this feature that the name "Bend of Islands" is derived. Here the river flows over strike ridges of resistant Dargile Formation with an easterly dip of 40°. Where the country rock is left exposed above the water level of a river such as occurs here, the strike ridges first trap upstream of it accumulations of sand, gravel and other debris such as branches and logs. Grasses and sedges colonize the accumulated debris, to be followed eventually by shrubs and trees. The flow of the river then becomes restricted to narrow channels on either side of "the islands", often cutting into the bank alongside in the process. The various small islands formed on such outcrops, if close enough together, will eventually form one island longitudinally aligned with the current. The "island" at the Public Reserve in Catani Boulevarde is the largest on the River Yarra. It has been 42 years in the making. What it was like

before the 1934 flood stripped it of vegetation we may never know, but we do have a description of it a couple of years after the flood, written by a very observant canoeist who had paddled downstream from Yarra Glen describing the landscape as he went:

"The river flows in such a setting until we reach the bend of islands [no capitals] somewhere due north of Wonga Park. A portage is necessary here and as we carry our canoe through the light undergrowth we could see that for half a mile the Yarra is 200 yards wide. Numerous small islands break up the stream into many channels where the water seethes and boils with a roar that is amplified by the echoes thrown back by the hills. Here it is that the brown and rainbow trout leap as they journey upstream to the spawning grounds." (W. Duke, Walkabout Magazine, November 1, 1937.)

Ned Haughton, who owned much of the land of the present day Environmental Living Zone, changed the name of his Glen Agnes Estate to the Bend of Islands Estate because of these numerous small islands. A number of the early block owners were doctors with an interest in angling. The islands are classed as "Strike Ridge Islands". The river in the past has experienced huge floods such as in the years 1844, '49, '51, '63, '91 and 1934. Perhaps each time the strike ridges would be stripped of their vegetation. The advent of the upstream dams and the introduced willow probably means that never again will anyone describe the scene as W. Duke saw it in 1937.

The Abandoned High Level Meander

Viewpoint V - Clare Watson's Swimming Hole

Here is the best example in the gorge of the river having developed a large meander and then of having truncated that meander in order to pursue a more direct course. The Yarra in the not too distant geological past occupied this meander which looped out almost to the present Oxley Bridge, at which point the Watson Creek flowed into it. Eventually it was severed when the Yarra breached the resistant strike ridges which now form the rapids on Clare Watson's property. Watsons Creek inherited the western arm of the meander which it rejuvenated leading to the present short gorge on that stream. Since its abandonment by the Yarra, that river has cut its course down several metres below the old river bed. It is therefore an "Abandoned High Level Meander".

On the south bank opposite, there is an example of an active meander bend encompassing many hectares of fertile river silt deposited upon its slip-off slope as a high level river terrace.

The neck of the abandoned meander is the site of an aboriginal campsite and stone tool workshop. For many generations the old billabong would have been a resource-rich site for the Wurrundjeri tribe.

Warrandyte Anticline

Viewpoint VI - Junction of Henley Road and Calwells Road

The Warrandyte Anticline runs in an approximate north-south direction between Tunstall (East Doncaster) and Watsons Creek. It crosses Henley Road at Calwells Road. The crest of the anticline has been eroded away during the process of peneplanation and again afterwards by stream erosion after uplift. Exposed here are pebbles of water-worn quartz up to 100 mm in diameter together with calcite, chert quartzite, sandstone breccia and matrix, all products of the decomposition of the Anderson Creek Conglomerate. This is an old Silurian shoreline and these are the oldest rocks in the study area. The grits and the breccia are angular and appear not to have been transported far from their source.

These Anderson Creek Conglomerates were the source of the gold discoveries at Warrandyte in 1851. The bed varies from 100 mm to 4 metres in thickness. Fossils have been found in them: various species of graptolite and also worm holes. Mica is a common ingredient of Silurian rocks. The flakes are large in the sandstones and small in other types. The mica is a form of muscovite, indicating that granite is a likely source of the materials that make up Silurian rocks of the district.

Viewpoint VII - Garden Hill

The rich black soils of Kangaroo Ground, so different from the poor stony soils of the surrounding countryside, were derived from the decomposition of Greensborough Phase Volcanics. The lava flowed out over the old sand-covered Nillumbik Terrain trapping deposits of Red Bluff Sand at the end of Graham Road. It is an excellent vantage point from which to view the surrounding countryside. The early literature describes all the country surrounding the Kangaroo Grounds as the Stringybark Forest. The forest on the Kangaroo Grounds was obviously different. The rich soil favoured Candlebark and other smooth bark eucalypts as is obvious from the few remaining old trees. The original settlers found it not heavily timbered and obviously a haunt of the kangaroo, an animal of the more open country.

There are strong reasons to believe that it was the product of aboriginal fire-stick technology. Originally it would have been a richer resource to them than the stringybark forest. In exploiting it, they would have frequently set fire to it. The smooth barked eucalypts were not fire resistant like the stringybarks and boxes; they would therefore diminish in number. The grasses increased, the kangaroos increased. Lorimer Fison, in his Aboriginals in Victoria, writes, "There were aborigines camped on the Kangaroo Grounds, especially around the water holes on the northeast slopes." The Eltham Council plans to use that site on the northeast slopes as a dump for the refuse of that township of 40,000 people.

* * * * *
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These notes rely to a great degree upon the writings of a rather remarkable geologist, J.T. Jutson, who studied the area around the turn of the century. He stood on Garden Hill 80 years ago and described the surrounding countryside. He was the first to describe Yering Gorge and explain its formation. He postulated the existence of the Yarra and Brushy Creek Faults and described the formation of the islands in the Yarra. His theories were held in disrepute by generations of geologists, yet in the end they had to admit that Jutson was right.

In 1911 he wrote:

The Warrandyte Gorge possesses some of the most beautiful scenery along the Yarra. It has a magnificent series of great bends of which Pound Bend at Warrandyte is the largest and most imposing. As well as imposing cliffs, long quiet reaches and numerous rapids, abundant vegetation also fringes the river.

Another to leave his mark upon the district, Alister Knox, once said, "We are what we stand upon".

Mick Woiwod

THE K:G TIP.
 THE PROPOSED
 ELTHAM TIP AT
 ROAD OF HEZLEY
 ACROSS HAS MUCH
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 THERE ARE SOME
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