

Autumn Edition  
1987  
\$2.50

# Landscape

W.A.s Conservation, Forests and Wildlife Magazine

This Issue  
W.A.'s Amazing Rock Art



- ☐ Kalgoorlie's Historic Railways
- ☐ Cape Range National Park



# Landscape

Volume 2 No. 3  
Autumn Edition/March 1987

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Published by Dr. S. Shea, Executive Director, Department of Conservation and Land Management, 50 Hayman Road, Como, W.A. 6152.

Executive Editor: Sweton Stewart  
Editor: Liana Christensen  
Designer: Trish Ryder

All Maps by Department of Conservation and Land Management Mapping Section.

Offset plates by Photolitho-PM  
Typesetting by Printworks.

Printed in Western Australia by the Department of Services, State Printing Division, ISSN 0815-4465.

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## Editorial

W.A. is a vast, sparsely populated State, and it is not uncommon to hear some parts of it described as 'the last frontier'. But there are few, if any, parts of W.A. that have not been affected by European settlement.

Evidence of western civilization in some of the most remote areas is far too often the empty can. But even where there are no obvious traces, the effects have been profound.

There is compelling evidence, for example, that the displacement of Aboriginal communities from much of inland W.A. — and the subsequent removal of Aboriginal firing practices — is directly responsible for major changes in vegetation, which in turn has resulted in the virtual extinction of many native animals.

It is not always easy to pick the effects of European civilization on the natural environment even when the history is well-documented. This *Landscape's* account of the woodlands around Kalgoorlie talks about the often horrific environmental damage, but an observer of these woodlands today would have difficulty recognizing that vast areas were clearfelled less than 50 years ago.

While the concept that we should 'let nature do its thing' has superficial appeal, the reality is that the purity of nature has been, and will continue to be, distorted by human presence. We have no option if we want to sustain the unique ecosystems of W.A. but to apply management principles.

The history and management problems of Benger Swamp, which feature in this edition, illustrates two fundamental points. Firstly, even the most disturbed areas of W.A. can make a major contribution to conservation. Secondly, we must be careful not to change a system that works even though the way it works may not be 'natural'.

As complex and as difficult as the task of understanding ecosystems is, the social and political factors which influence the type of management that can be applied are often more difficult to deal with.

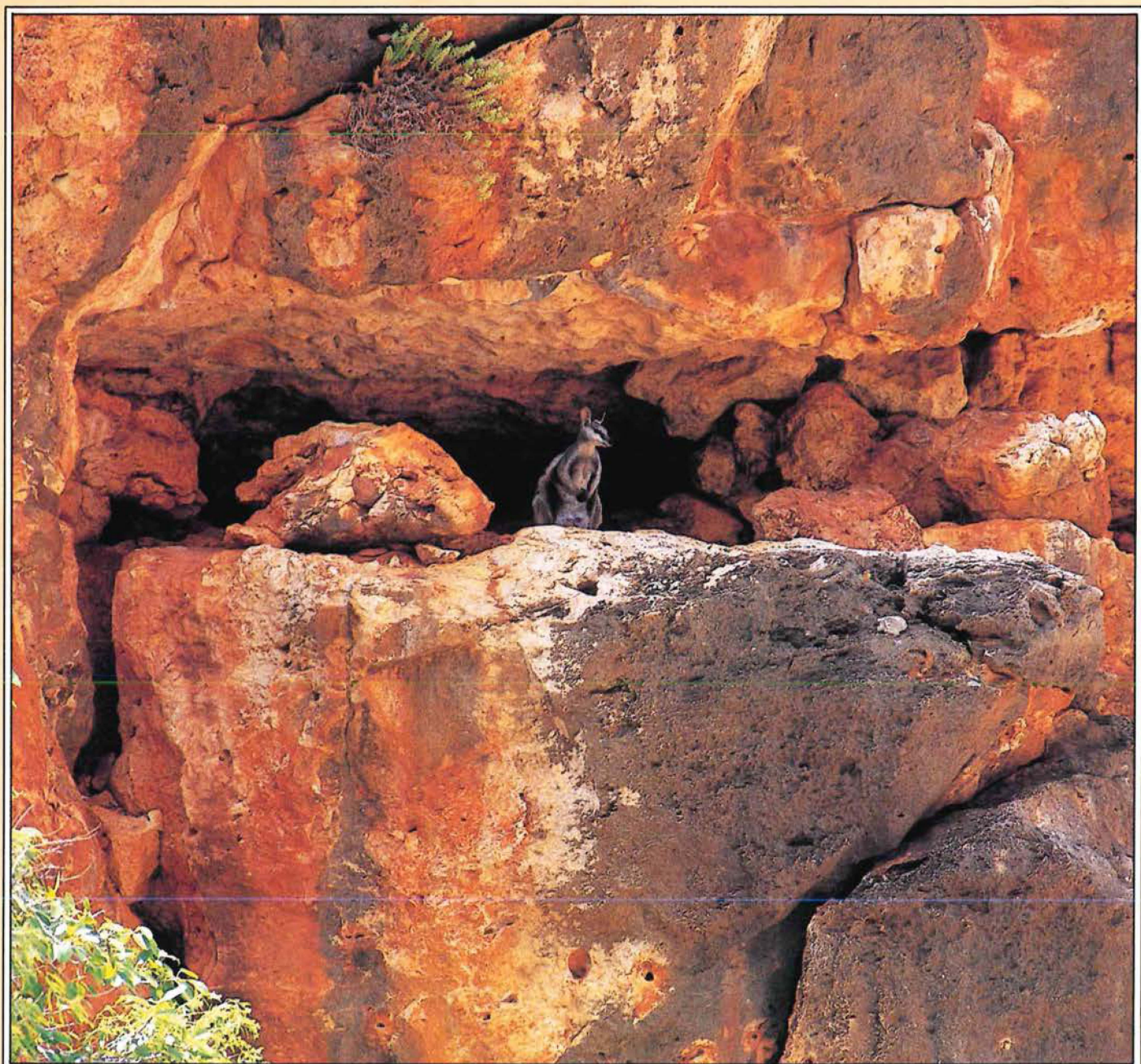
The key to good management is an understanding of the processes that drive the ecosystem. Once we understand what the natural processes are, we can then devise management systems which will mimic them.

The only way to ensure that rational decisions are made on environmental management is to provide the facts.

## COVER PHOTO

Just when you thought you had seen every angle on our State symbol, photographer Jiri Lochman surprises you with a fresh perspective.





Cliff Winfield

# Home on the Range

Dr Barry Wilson

Director of Nature Conservation in W.A.

Fifteen million years ago the north-west corner of Australia was flooded by a warm, shallow sea. Giant white sharks topped the trophic triangle over a diverse and abundant marine fauna. But the crust of the earth here crumpled and a huge anticline was upthrust to form an emergent limestone island. Its western shore lay close to the edge of the continental shelf and was washed by the warm and clear waters of the Indian Ocean. Coral reefs developed there. Later, during the Pleistocene Ice-ages, sea-level rose and fell several times and the position of the shore and the fringing and barrier reefs shifted back and forth. Today, sea-level stands still at a moderate height and the anticline, now known as Cape Range, forms a peninsula of the continent jutting northwards.



Much of Cape Range is now a national park and the adjacent coral reef and lagoon is soon to be declared a marine park. It is a splendid place for recreation, at least for those of us who love wild and craggy places and the feelings of vastness and timelessness this arid land provides. It also has enormous heritage and scientific values.

A series of fossil coral reefs along the western escarpment of the range preserves evidence of the various ice-age sea-levels, and a fossilized record of the marine animals which lived there during each stage. On the upper ridges of the escarpment where the original limestones are exposed there are fossil teeth of the giant sharks of earlier periods. Off-shore stands the coral-reef of present times, protecting a shallow lagoon between it and the beach. It supports a wonderfully rich modern reef fauna.

After its uplift the Cape Range was cut by deep ravines which now lead down from the high watershed central ridge to the eastern and western escarpments resulting in an incredibly rugged landscape. It is a desert land and its dark red soils and craggy hills are sparsely vegetated, standing in stark contrast to the blue ocean on either side.

Cape Range's tourist potential is obvious; we need to plan thoroughly to make sure it remains unspoilt.



Cliff Winfield

A fossil shark's tooth, relic of a time when Cape Range was below the surface of the sea.



Cliff Winfield

On windy days when the offshore reef is inaccessible Yardie Creek is a haven for holiday makers.



Cliff Winfield



The flora and fauna of the Cape Range peninsula contain many relict species. Together with their fossil antecedents they tell a fascinating story of the past climatic and evolutionary history of the region.

During periods when Cape Range has been a peninsula it has been populated by plants and animals from the mainland. But during periods when it has been an island its flora and fauna have been isolated from their mainland ancestors. Some unique species evolved there during periods of isolation. Other species, now also unique to Cape Range, were once more widespread. The land-snail *Pleuroxia ruga*, *Banksia victoriae* and *Ipomea yardiensis* are examples of species found only on Cape Range.



Barry Wilson

A native land snail (*Pleuroxia ruga*), found only on Cape Range, spends the hot, dry periods stuck on the underside of stones.



Cliff Winfield



Cliff Winfield

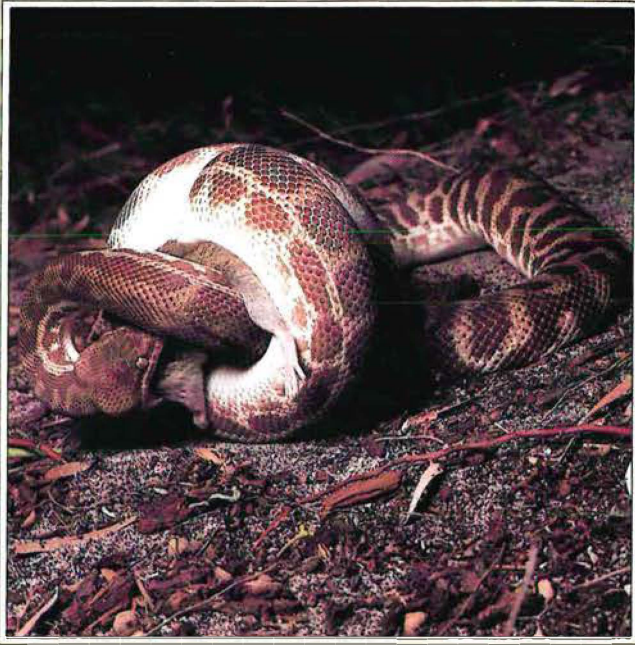
*Banksia victoriae* (above) and *Ipomea yardiensis* (left), two of the plant species endemic to Cape Range.



Jin Lochman

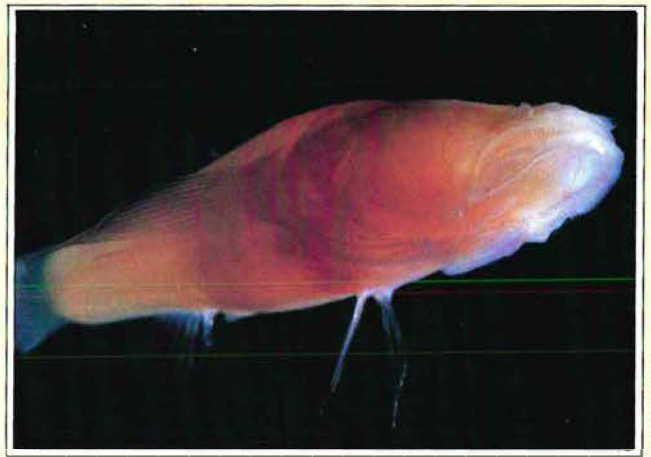
Cape Range is a good place for spotting the Soft Knob-tailed Gecko (*Nephurus levis*).





Children's python (*Liasis childreni*) constricting prey.

Jiri Lochman

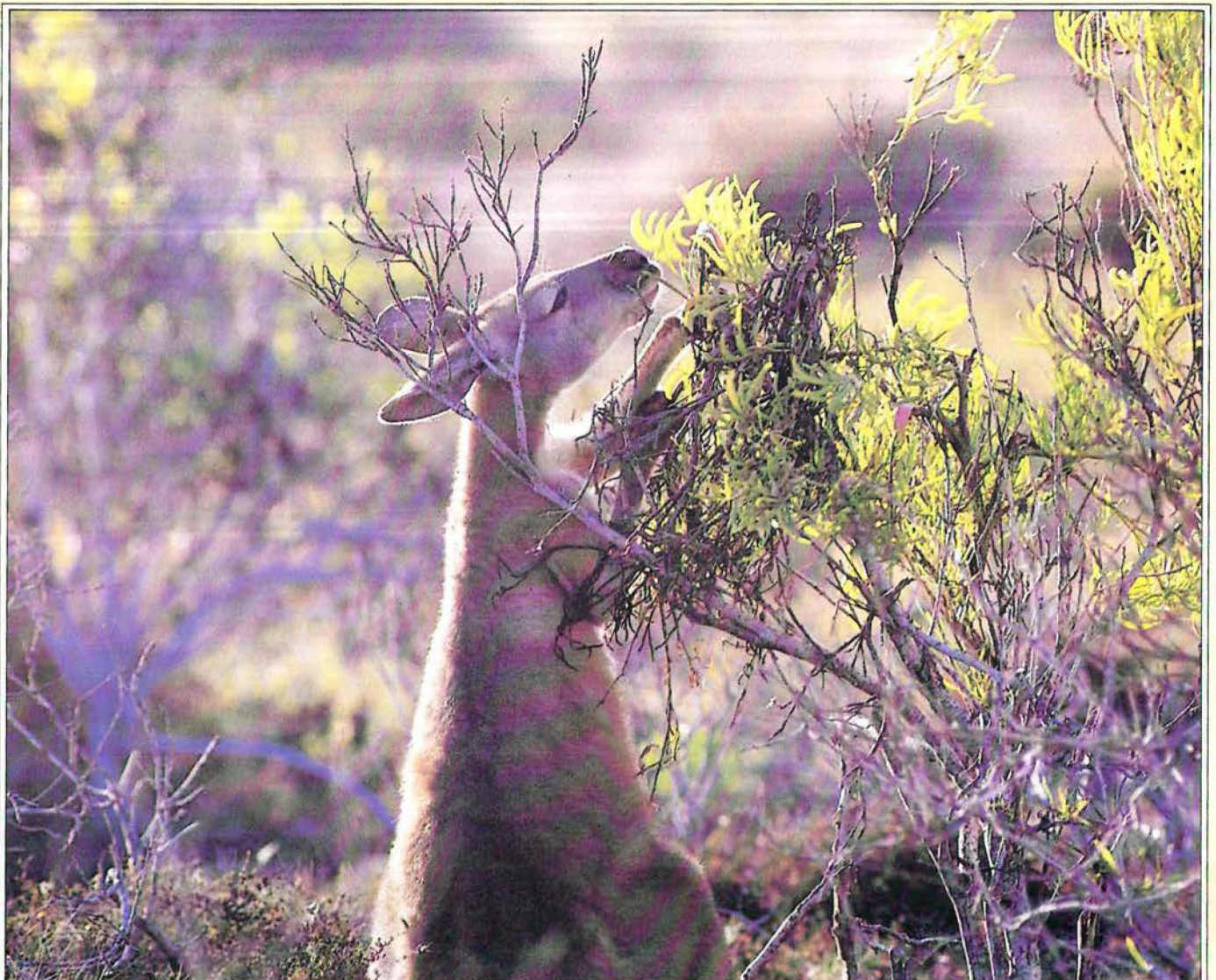


The strange Blind Gudgeon fish (*Milyeringa veritas*).

Cliff Winfield

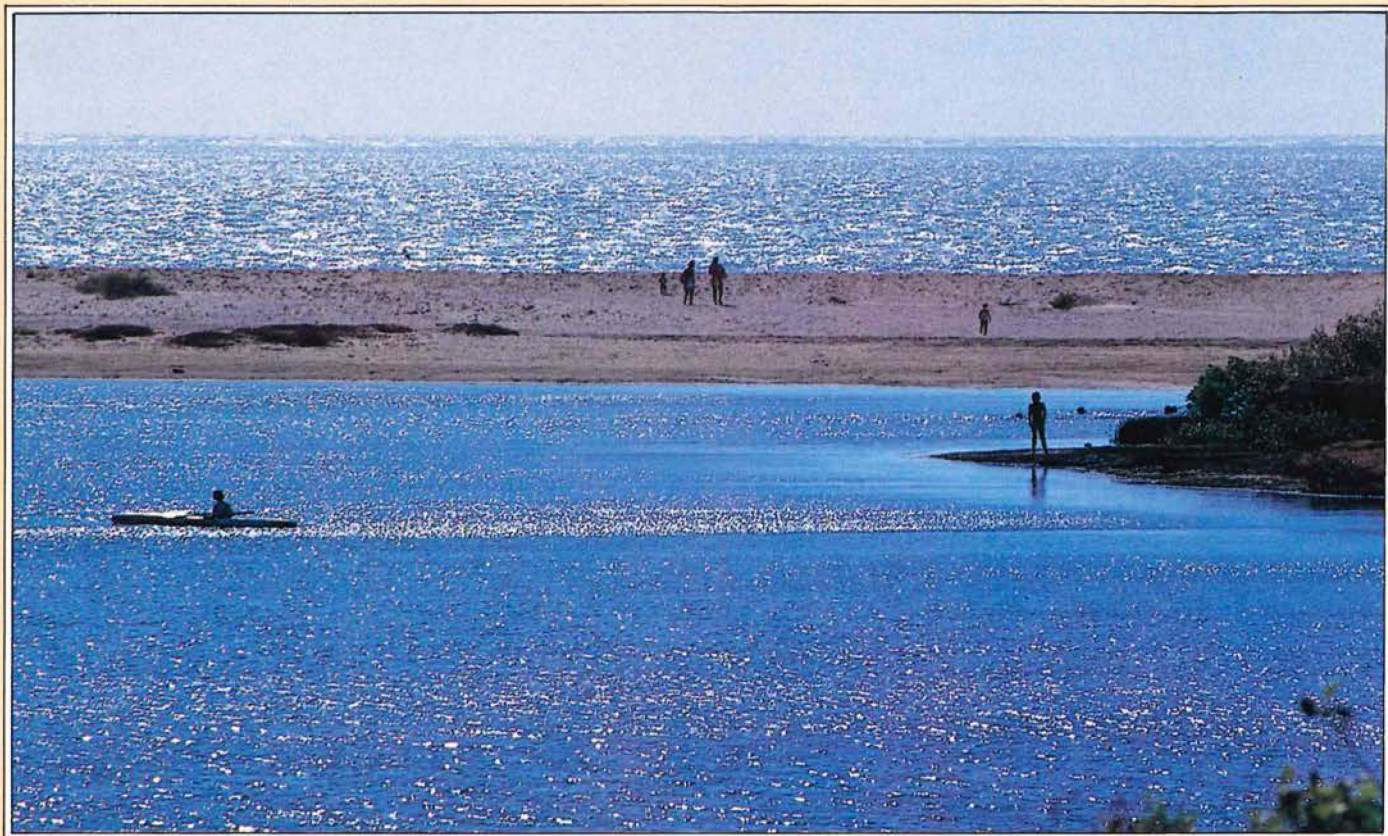
Late in the 19th century some of the coastal plains of the peninsula were taken up as pastoral leases but since declaration of the national park no sheep have grazed there and hunting has been prohibited. Wildlife has prospered. There are few parts of this State where wildlife may be seen in such abundance.

Euro at evening.



Cliff Winfield





Cliff Winfield

The best of both worlds — canoeing at the mouth of Yardie Creek.

At some stage in the geological history of Cape Range certain marine creatures invaded the saline waters in underground caves which riddle its limestones, and adapted to a life in complete darkness underground. Today a species of fish, an eel and two species of shrimp are likely to appear in the bottom of any newly-dug well in the flanks of the range. They are true troglodytes, colourless and blind. What do they feed on in there? How widespread are they in the cavernous limestone strata and do they travel about underground? Scientists have described and named these strange creatures but details of their biology and evolutionary history remain unknown.

Aboriginals established a presence at Cape Range many millenia ago during one of the periods when sea-level was low and the range was connected to the mainland. There are large kitchen-middens along the present shore containing the remains of the shellfish which these coastal people ate. In rock shelters along the escarpment several much older sites are known, representing occupancy at a time when the shore was further out and there was a wide coastal plain. These sites are tentatively estimated as 18-20000 years old. There is much to learn about human history in this area.

For all these reasons Cape Range is an area of immense interest to scientists. It holds secrets which may one day explain many mysteries about

the history of our land. But that story is of interest and importance also to laypeople

Cape Range is a special place which has much to tell and show us about our heritage. Knowledge and understanding can be greatly enhanced by communicating the natural history knowledge of scientists to park visitors. Plans are being prepared for the development of an information centre in the Cape Range National Park which will tell the natural history of the range and the adjacent Ningaloo Reef. Fittingly this project is generously funded by the Australian Bicentennial Authority.

The combination of such dramatic, arid scenery and abundant wildlife, with a coral reef, beaches and fishing of such quality is unique. These are the very things which the international tourist seeks. As transport, accommodation and other facilities improve, Cape Range and Ningaloo Marine Park will become inevitably a tourist target. This will contribute greatly to the local economy, and the creation of local business opportunities and employment. These parks are significant financial assets like fisheries, forests or mines.

It is possible to estimate the economic value (through tourism) of a heritage resource like a museum or a national park by figuring the number of visitors, their average expenditure on services in the region, and a variety of 'multiplier effects'. The total revenue generated and the impact on regional economics can be very large.



But there is a catch. Increased costs as well as increased revenue will follow increase in the number of visitors. We all know that too much fishing results in depletion of fish stocks, that too many campers crowding the coastal dunes cause erosion. Like a fishery, a landscape is not an unlimited resource. Like a pastoral lease, a park has a limited carrying-capacity. The people-carrying capacity of a park can be increased by proper management, but the basic principle is that management must ensure the long-term sustainability of the park's resources.

The dilemma for park planners and managers is obvious. If the desire to increase park and local business revenue by promoting tourism outstrips the capacity of park authorities to meet management costs, then priceless heritage will be lost and the resource upon which the tourism depends will become degraded.

Faced with this dilemma park management must either limit increased use of park resources or find ways to increase revenue to meet escalating management costs.

Resolution of this dilemma will allow Cape Range National Park, and others like it, to be managed as a community financial asset as well as a recreational resource and natural heritage.

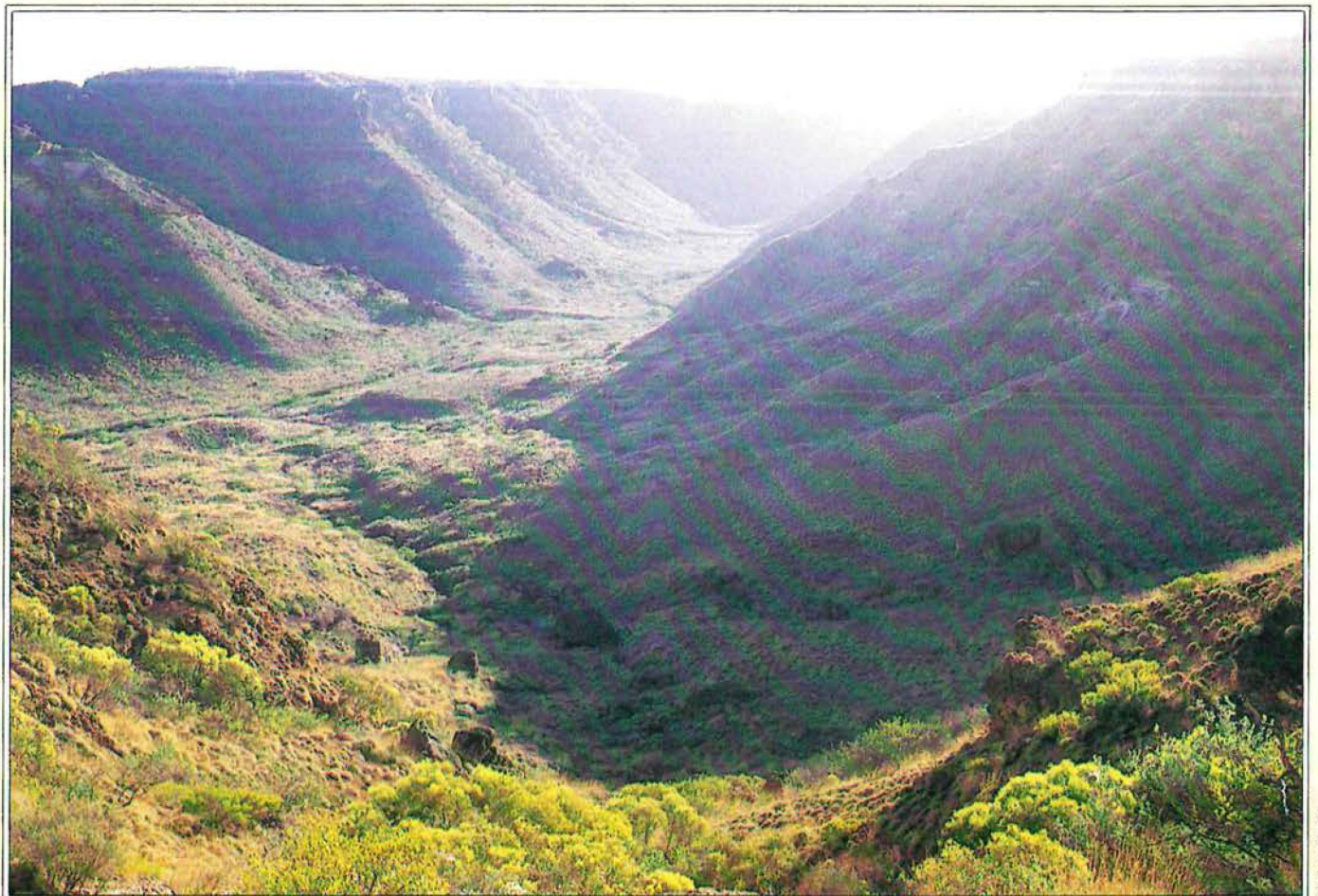


Use of vehicles in sand-dunes can cause serious erosion which is very expensive to repair.



Cliff Winfield

Shothole Canyon.



Cliff Winfield



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# Garden for Wildlife

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by Robert Powell

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Many of us who read *Landscape* care about nature and wish to make our own contribution towards conservation. One of the ways we can do this is by creating habitat for wildlife in our own back yard.

This is an important subject because, if enough of us considered wildlife habitat as one of the purposes of our private land, even of small suburban blocks, there would be an enormous benefit to wildlife conservation. The Nature Conservancy Council in England has produced a 'nature jotter' entitled *The Wildlife Garden*. The following paragraph from its introduction summarizes its message:

Wildlife may be safe in nature reserves but, on their own, these small areas are not enough if we are to continue to enjoy wildlife as an everyday experience. Most native plants and animals occur on private land, not on nature reserves. What we do with our land is thus extremely important for wildlife.

The same is true here.

## How To Provide Habitat

One approach, which many people have used, is to plant trees and shrubs that provide a large amount of nectar for honey-eating birds. But many birds and other animals do not use nectar; and, in any case, there is already a good supply of nectar in most Perth suburbs.



Robert Powell

Blackboy flowers are a rich source of food for honey-eating birds, and for insects such as native bees, wasps, ants, moths and butterflies. Moreover, a wide variety of beetle species burrow into the trunk and the spears.

Blackboy seeds are easily collected in summer. They germinate readily, and the young plants develop much faster than is commonly believed, sometimes flowering at three years old.

A better approach is to grow plants that provide habitat for insects. Insects are a very significant component of our fauna: about 50 000 Australian species are known. Of these, only a tiny proportion are harmful to humans, so planning for insects does not mean filling your garden with flies and mosquitoes! Insects are a fascinating group in their diversity of forms and ways of

life, and they are a major food source for other fauna, such as lizards, birds and bats. Even most honey-eating birds also eat large quantities of insects.

Many insect species depend on particular plants for their survival; thus numerous species have largely disappeared from Perth and other areas where there has been widespread clearing of vegetation. Plant species that occur naturally in the area



(local species) will support more wildlife than plant species that do not. Not only introduced plant species but also native non-local species (e.g. Eastern States eucalypts, commonly sold in nurseries) usually support less wildlife than local plant species.

If you have the opportunity to retain vegetation on a new block, this is of great benefit to wildlife, even if only a small part of the block can be left. Moreover, it will preserve something of the area's natural setting. Some bush species are difficult to propagate. Retaining them in gardens is a way of conserving these species and their associated wildlife.

## Grow Local Plants

Local plants are those species that grow or used to grow naturally on your block or close by. Even having one local tree, or a few local shrubs in a corner of your block, is of value.

Preferably grow the trees or shrubs from seed you collect yourself (with permission from the landowner). You will be surprised how easy it is to collect and germinate seeds of many, such as the eucalypts, hakeas, melaleucas and sheoaks. Neighbours and friends will often accept left-over seedlings. It is cheaper than buying plants from nurseries!

Many insects (and other invertebrates) and lizards live in or use ground litter. In suitable parts of the garden, leaves and twigs can be left to accumulate. This has the added advantage of keeping the soil cool in summer, and reducing



Peter McMillan

The larva of this beautiful jewel beetle (*Cyria vittigera*) burrows into the trunk of swamp banksia (*Banksia littoralis*), and the adult feeds on the leaves.

Swamp banksia is a small, stout, densely foliated tree natural to Perth. It is an adaptable species that grows well in gardens.

the need for watering plants, and thus contributes to water conservation.

Leave trees and shrubs unpruned if possible. Old wood is good habitat. Select trees and shrubs that will not grow too large for the space available.

In Europe, nest-boxes have enabled bird species to return to areas from which they had disappeared. Nest-boxes have

also been used with some success in eastern Australia. You may wish to construct one as an experiment. The entrance-hole should not be too large, and the box should be placed high in a tree.

Finally, we should consider eliminating or reducing the use of insecticides in our gardens.

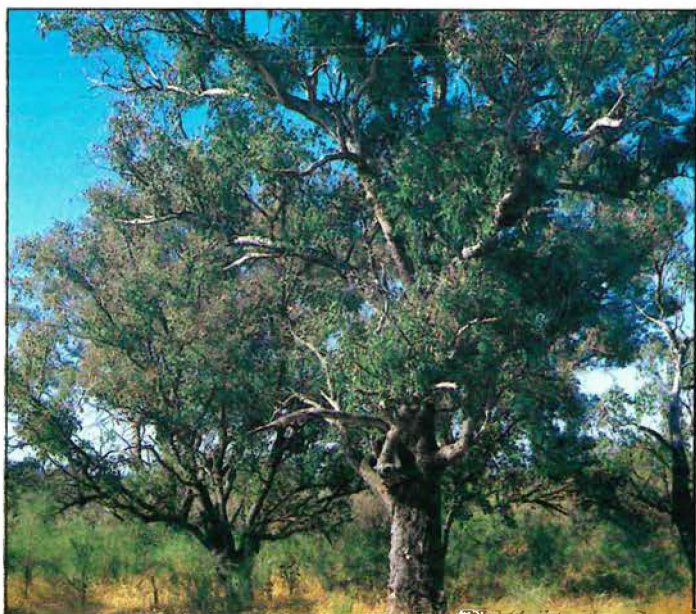
By taking the above approach, you have a marvellous opportunity to observe and experience nature right at your back door. There are quarter-acre blocks in Perth that have as many as eight species of small lizard, and where twenty species of bird have been recorded. This is a practical (and inexpensive) way of making a contribution towards nature conservation, which can also serve as an example to others. □

The Department of Conservation and Land Management has a list of trees and tall shrubs of the Perth Metropolitan Region and the soil-types they grow in naturally.

For extra information on obtaining and growing local plants, you can contact the Local Plants Group (3 Barque Place, Kallaroo, W.A. 6025).

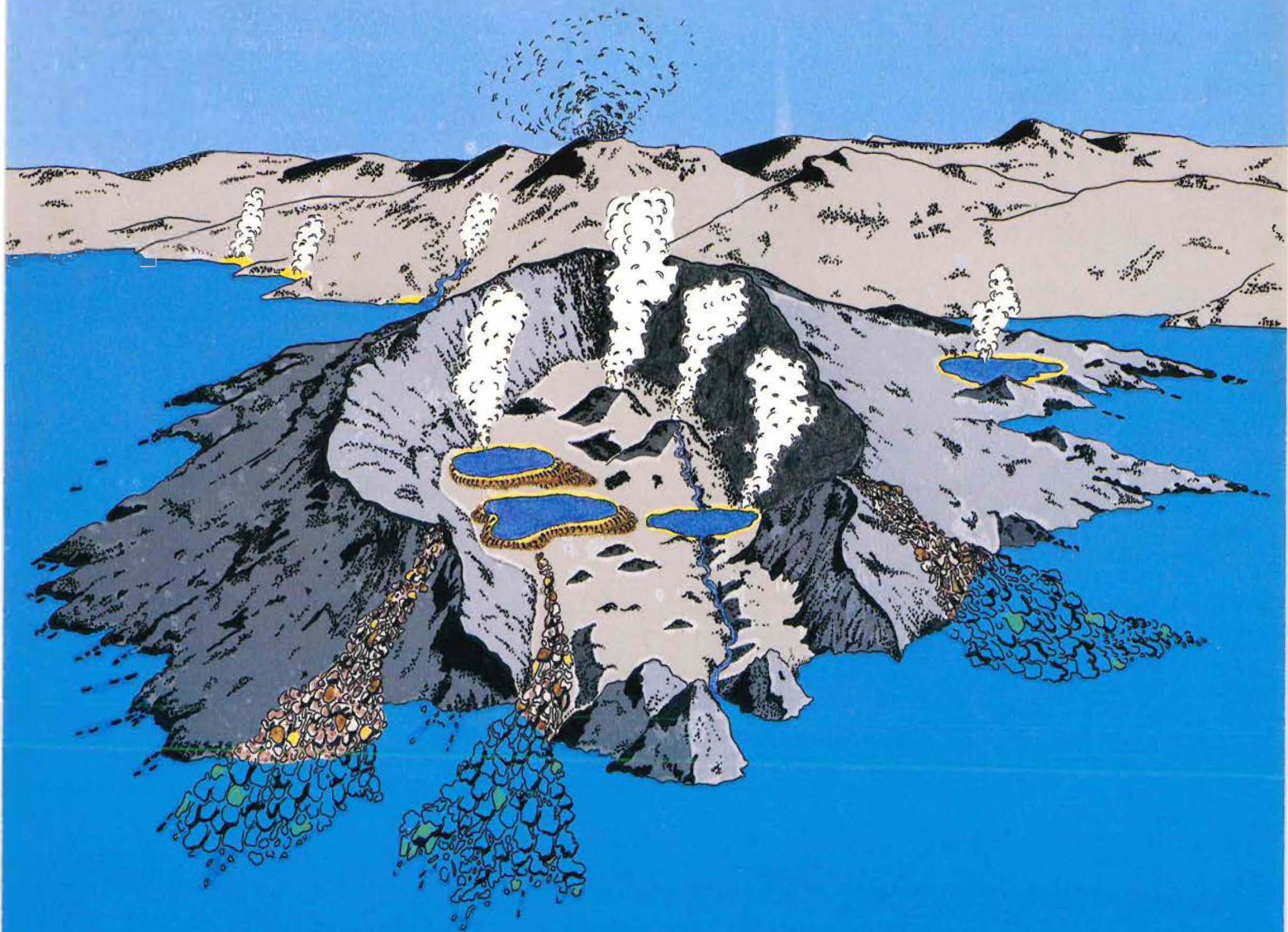
Flooded gum (*Eucalyptus rudis*) is a graceful medium-sized tree natural to the Perth area, where it occurs round lakes and swamps (e.g. Pery Lakes) and along the Swan and Canning Rivers. This vigorous species has a large amount of insect life associated with the leaves, branchlets, bark and trunk. It flowers over an extended period from late winter to early summer, and is thus also a useful supplier of nectar.

Flooded gum is readily grown from seed, which is easy to collect.



Citri Winfield





# Diplomats from Day One

## — W.A.s Stromatolites —

Near Kalgoorlie, about 2800 million years ago, stromatolites were growing on the edge of volcanic hot springs. Then the volcano erupted or eroded and fragments of stromatolites were carried along with other debris such as volcanic ash and deposited on the ocean floor.

Stromatolites have been around since 'Day One' of the evolutionary story. In W.A. we have some of the finest living examples of this ancient life-form.



## Stromatolites —Australia's Ancient Fossils

Science fiction authors are fascinated by artificial intelligence and other interbreeding between animate and inanimate. But their wildest imaginings could not improve on the bizarre experiments produced by that 'mad scientist': evolution. One of the earliest forms of life was a tiny non-photosynthetic bacterium which adopted a strange alliance with particles of sand and rock forming growing structures called stromatolites. Over a billion years ago stromatolites dominated shorelines of lakes and seas. Like other forms of early life they have left a fossil heritage. Remarkably, however, such structures are still being formed today in a few places throughout the world. Three of these sites are in W.A. The best known is in Hamelin Pool at Shark Bay but there are important stromatolite sites also in the coastal lakes of the west coast, particularly at Cervantes and Lake Clifton.

Stromatolites offer one of the best records of ancient organized cellular activity, and probably the first indication of life on earth. They offer a golden opportunity for scientists of many disciplines —geologists, organic chemists, microbial ecologists, to mention only a few. With no need for a time machine, they can study both the fossil

Three scientists at the forefront of stromatolite research in W.A. are Phillip Playford, head of Geological Survey, Kathleen Grey, also from Geological Survey and Linda Moore from the Microbiology Department at the University of W.A. Phillip is the expert on the stromatolites at Hamelin Bay. Kathleen, a geologist, is particularly interested in the fossil record. Linda is researching living stromatolites at Lake Clifton.

record and the living representative of an ancient life form.

The world's oldest known fossil stromatolites were discovered in the North Pole Mining District of the Pilbara, and are about 3 400 million years old. Non-photosynthetic bacteria living in an atmosphere lacking oxygen probably formed these early stromatolites. They are simple, laminated structures which form a series of small domes about 10 cm in diameter. Filamentous structures have been found in nearby rocks (these are known as black cherts, and are renowned for their ability to preserve fragile structures in great detail). The filaments are thought to be the traces of stromatolite-building organisms.

By about 3 000 million years ago stromatolites were common in shallow marine environments and around the margins of hot springs, and some of the constructing micro-organisms quite

probably were photosynthetic, or at least were sensitive to light. Younger examples from the Pilbara and from near Kalgoorlie in rocks 2 8000 million years old form a variety of domes, cones and columns with simple branching, and contain traces of microfossils. Those from the Kalgoorlie area closely resemble forms growing in hot springs at Yellowstone today, and provide important clues about how rocks in the area were formed.

Numerous layers of small, conical stromatolites probably formed around the margins of hot springs associated with a volcano. Because the micro-organisms precipitated silica from the hot water, the stromatolites hardened into rock almost as quickly as they grew. Eventually the volcano either exploded, or was simply weathered away. Debris, including boulders of stromatolites, was swept down the flanks in great flurries of material, dumped in deeper water and eventually buried. After billions of years the ancient horizon is once again at the surface, and the stromatolite boulders can be found weathering out of the softer volcanic ash which surrounds them.

Nearly all carbonate rocks between 2 000 million and 1 000 million years old contain some traces of stromatolites. The constructing organisms are rarely preserved, so identifications have to be based

Some of the organisms which construct stromatolites.



Linda Moore



solely on stromatolite shape and structure. Nevertheless, there is now good evidence to suggest that certain shapes are restricted to particular time-periods, and that stromatolites, like other fossils, can be used to date rocks.

The first green algae evolved about 1400 million years ago, and became important contributors to stromatolite growth. Rare, but exceptionally well-preserved, examples of these organisms have been found in the Bitter Springs Chert in the Northern Territory. They indicate a diverse community of both filaments and spherical organisms, some of which were blue-green algae, and others green algae.

Stromatolites continued to show a wide diversity of form and were abundant until the end of the Precambrian about 570 million years ago. Bacteria and simple algae were the only life forms until about 1000 million years ago. Rapid changes then took place; first with the evolution of more complex algae, and then the development of the metazoans. Nearly all the varied forms of life known today have evolved in the last 600 million years of earth's history.

The evolution of the metazoans marked a decline in stromatolites. They became less abundant and occur only sporadically in the later geological record, a factor usually attributed to the development of burrowing and grazing organisms, and to competition for ecological niches.

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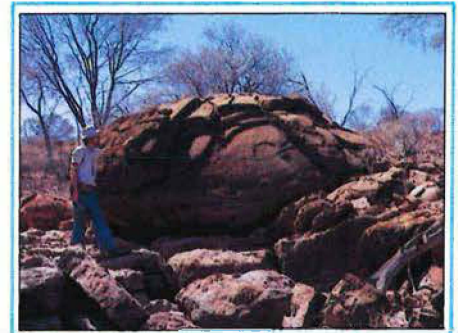
Large domed stromatolites at Thuragoody Bore, east of Wiluna. These fossils are 1700 million years old (top).

Stromatolite reef in Lake Thetis, near Cervantes.

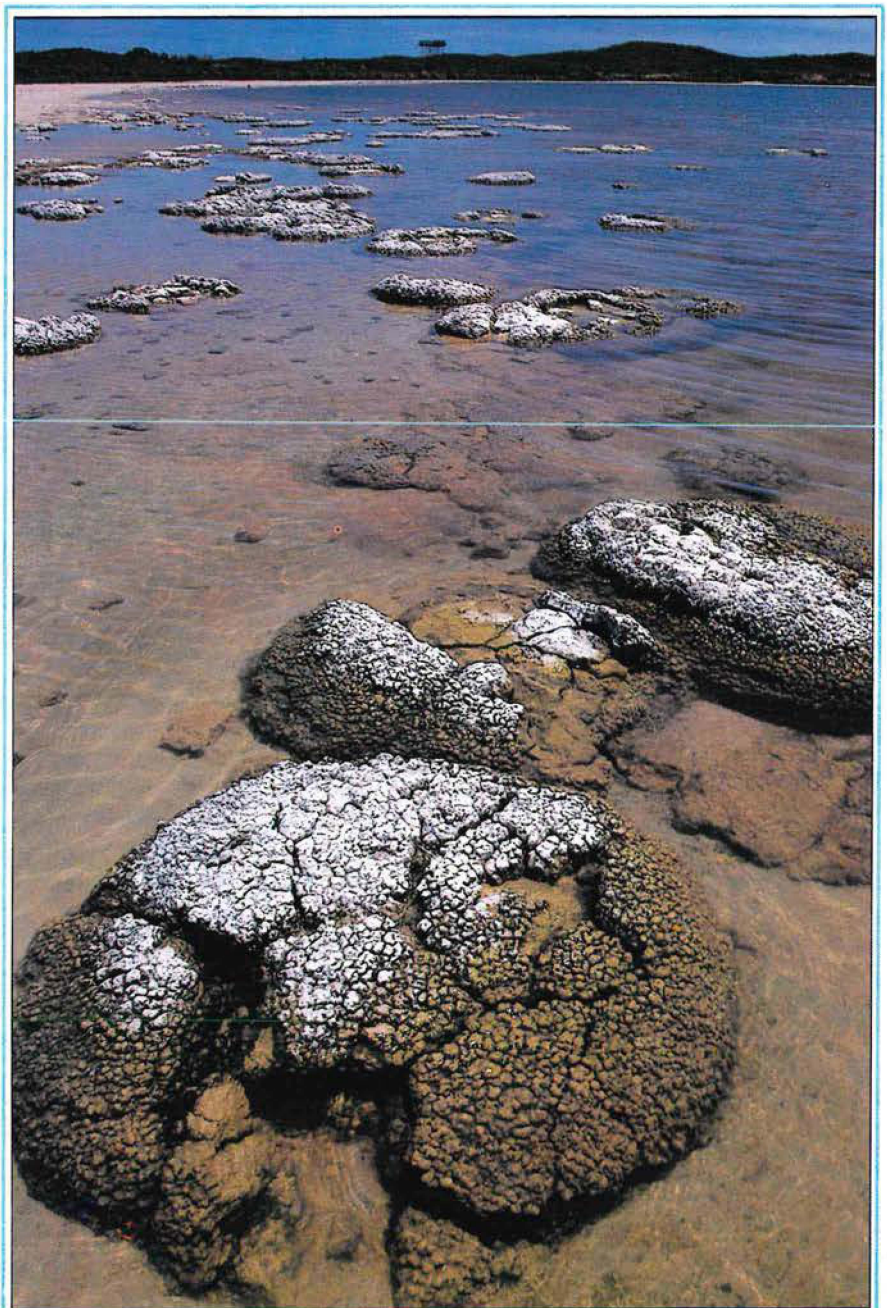
## The Lake That Time Forgot

In 1979 Linda Moore did a year-long study of Lake Clifton's ecology. When she finished there were no avenues for her to continue her research. Recognising the significance of the stromatolites, however, prompted her to send a copy of her thesis to the National Parks Board.

Neville Stanley, Emeritus Professor of Microbiology at the University of W.A., was curious about the strange structures he found growing



Kathleen Grey



Jiri Lochman



on the foreshore near his Lake Clifton retirement home. Extensive enquiries drew a blank until he found the National Parks Board's copy of Linda's thesis. He contacted Linda. The resulting professional alliance produced research which attracted world-wide attention.

Lake Clifton's stromatolites offered unparalleled opportunities for research. For a start they were close to the metropolitan area, which meant access to laboratory facilities. Professor Stanley's home became a base, and work began in earnest at the beginning of 1984. After his untimely death in October 1984, the University purchased it to be used as a headquarters and laboratory for stromatolite research. Linda carried on alone.

So many questions remain to be answered. What are the key environmental factors necessary for stromatolite formation? The relative scarcity of living stromatolites has been attributed to the fact that they were usually found in extreme environments: arid, hypersaline or under frozen-over waters. These conditions excluded those organisms which competed with or predated upon the cyanobacteria which construct

the stromatolites. Lake Clifton is low in salinity and abounds in fauna; in fact, numerous crustaceans comfortably co-exist with the stromatolites. The adjacent hypersaline lakes, devoid of stromatolites, offers a chance for comparative studies.

One of the unusual features of the Lake Clifton stromatolites is that they are closely associated with a high bicarbonate freshwater aquifer. Linda hypothesizes that subsurface upwellings of fresh groundwater, within the lake and along the eastern shore, are colonised by cyanobacteria capable of stabilizing the sediment. This forms a microenvironment where the cyanobacteria trap, bind and precipitate calcium carbonate to form stromatolites. The more we know about stromatolite formation the more chance we have of shedding some light on the origin and formation of cyanobacteria — one of the earliest forms of life on our planet.

## Hamelin Pool

The world's best known colony of stromatolites is at Hamelin Pool, part of Shark Bay, 735 km north of Perth. The algal stromatolites there are the most abundant and

diverse to be found in modern times. They vary from large club-shapes to columns, cylinders, and complex branching shapes.

Hamelin Pool is a classic environment for remnant populations of stromatolites. It is hypersaline — sometimes up to twice as salty as normal seawater — and landlocked on three sides. The north side is partially blocked by the Faure Sill, a shallow sand and sea grass bank. Because of its extreme salinity it is far less diverse in marine life than the surrounding ocean.

Marine gastropods (snails) graze upon algae. Their virtual absence from Hamelin Pool seems a major contributing factor to the survival of the algal mats. These mats from which stromatolites develop cover a large area of the intertidal and shallow-water shelf at Hamelin Pool. They have been known to reach depths of 3 m.

The persistence of such fine examples of stromatolites at Hamelin Pool makes it an area of extreme scientific interest. Hamelin Pool is one of Australia's most important nature reserves, preserving life-forms typical of the period long ago when life on earth began. □

*Special thanks to Kathleen Grey*

## What Are Stromatolites?

Stromatolites differ from normal fossils (such as shells or bones, which are actual parts of animals) because they are formed by the activities of micro-organisms. They result from some combination of trapping, binding and precipitation of sediment. The constructing organisms are mainly bacteria, blue-green algae (cyanobacteria) and various green unicellular algae (particularly green algae).

The micro-organisms form mats of gelatinous, slimy film which traps particles of sediment. Stromatolites will only form when the micro-organisms grow slightly faster than the rate at which sediment is deposited. The mats must also be able to keep pace with destructive grazing by other organisms.

Stromatolites grow as layers of sediment are trapped or precipitated by the microbial mat. These layers, called laminae, are a feature of many stromatolites. Sometimes laminae are related to day/night cycles. At night the blue-green algae filaments are inactive and form a dense mat which becomes a dark, organic-rich lamina when fossilised. Sediment settles on the mat to form a light-coloured, organic-poor lamina. During the daytime some of the buried filaments become active and move towards light. They push upwards through the layer of sediment and form the next organic lamina when night falls. Not all stromatolites follow this simple growth pattern. Some laminae are related to seasonal variations, a little like tree rings; others have more complex patterns of development. Most stromatolites, however, show a distinctive, banded structure of alternate light and dark laminae.



# URBAN ANTICS

by Andrew Cribb



## A Haunting in Suburbia

Screeeeech, screech . . . thump . . .  
rattle . . . rattle.

The house lights clicked on in the sultry dark of a summer night, and a string of expletives issued from the next room. 'Bloody little so and sos. Where are my golf clubs?'. Footsteps clumped down the hall and the front door banged.

We were witnessing a nightly ritual, enacted with monotonous regularity, month in and month out. It didn't seem to matter where or when we lived, we were members of a small, but select group. The front-line in an unceasing vigil against things that go thump in the night.

It might have been Floreat Park in the 1960s, Bunbury in the '70s, Wanneroo in the '80s. The rest of suburbia slept, while we battled the demon-haunted dark. You could always tell fellow hauntees by the trembling handshake, and gaunt look in their eyes.

After the rattling and shouting subsided outside we knew too well the sequence of events to follow.

First, mysterious yellow circles would appear in the corners of the lounge ceiling, and multiply with frightening rapidity. As one was beginning to fade, the next would appear. A week later a faint musky odour would begin to permeate the house, gradually growing stronger as the summer wore on. Friends would drop in less often, and leave more quickly. The curse was beginning to take effect.

Soon scufflings, rattlings, and faint snuffling noises would whisper through the darkened house.

Strange droppings, spontaneously generated, it seemed, by the very air, would liberally coat the car in the garage. The apple tree in the backyard would start to grow half-eaten apples . . . Amityville was kid's play by comparison.

Then it was time for an exorcism. In the '60s and '70s, instead of a priest it was a wildlife officer. Not bell, book, and candle, but a rented wire trap. This was radical action for a radical situation.

After the first 'haunting', it was interesting to learn the nature of our poltergeist. Not rats or cats, but the not-so-common brushtail possum: a beautiful small furry creature with bright eyes, a bushy tail, and no roof manners.



In their native setting brushtails live and nest high up in tree hollows. Often they occupy the same trees for years, or even generations. Males tend to be territorial, and have a definite 'home range', seldom venturing outside unless forced to move by a cataclysm. Females appear more flexible, and will occasionally share a part of their territory with other females, or move in and share a male's home tree when nesting.

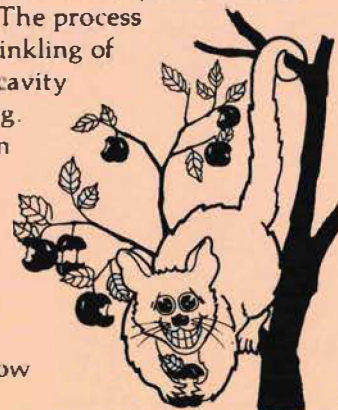
After the young are born and weaned they move out, seeking their own 'possum tree', and territories. Young males, particularly, are forced to find fresh pastures where they won't clash with established males.

Possum territories are not large, and appear to extend only about 200-300 m in any direction. But, this can include a lot of roofs in suburbia.

In the metropolitan area they are one of the few native mammals that has survived in close proximity to human society. They can, and do, live and breed in small bush areas, provided they can find a suitable tree to dwell in. Their main requirement is a large enough hollow, high above the ground. Because most large cavities in trees are formed from broken branches, or tops, most possum trees are large, old, and often in decline or dead. Surveys in the forests of the South-West have found that possum trees are seldom, if ever, less than 40 cm in diameter. You can usually tell a possum tree by the pathway of scratch marks which lead up the trunk.

The next best thing from a possum's perspective, when these trees fall over, or are lopped, is a nice warm, cosy roof cavity — preferably in a yard which provides an abundance of fodder in season.

How does this help you, the hapless hauntee in suburbia? Possums are a protected species, and molesting them is not permitted. The best advice, straight from the wildlife officers who have been coping with the possum tribe for years, is make your roof uninviting. The process is simple. A liberal sprinkling of mothballs in the roof cavity will send them running. Then get some chicken wire and search for any entries into your roof. Then nail them up. Your house is now possum proof, and if you ever get haunted again you know the answer. □







## EXPLOITS AT ICY CREEK

At Icy Creek, within the Lane-Poole Reserve, a 10 ha clearing that once grew cabbages, lettuces and tomatoes, has been recently transformed into the Department of Conservation and Land Management's first bush camp for environmental studies. Fire-rings, tents and tables are now the order of the day.

The Icy Creek clearing was once part of a 173 ha farm set amongst the scenic surrounds of tall jarrah, blackbutt and marri forest and a dense understorey of grass trees, zamias and acacias where wildflowers such as calothamnus and grevilleas thrive. There are 500 plant species found within Lane-Poole Reserve.

The property was purchased in 1984 (for \$310 000) after the Northern Jarrah Reserves Advisory Committee recommended that conservation and nature recreation were more appropriate land uses for the area than a proposal for commercial gravel extraction.

The transformation of the property from a farm to an educational community group camp was brought about by a Community Employment Program of six months duration, involving six men and women.

The semi-primitive style site development and the surrounding 'wilderness' are unusual qualities for a school camp that provides for such a diversity of educational opportunities. The various plant communities throughout the Reserve are habitats for a diverse range of fauna that the observant and adventurous may be fortunate to encounter while at Icy Creek. Fauna listed for the Reserve at present includes 29

species of mammals, 21 reptiles and amphibians, 10 fish species and at least 78 different bird species.

A forest-canopied amphitheatre has been constructed for group meetings and performances. There is also a large open space area for recreational activities. The one building will eventually be converted to a resource centre for use by educational groups involved in field studies.

As well as providing an excellent opportunity to practice camping skills, the area is well suited for environmental awareness activities, as well as more scientific ecological studies.

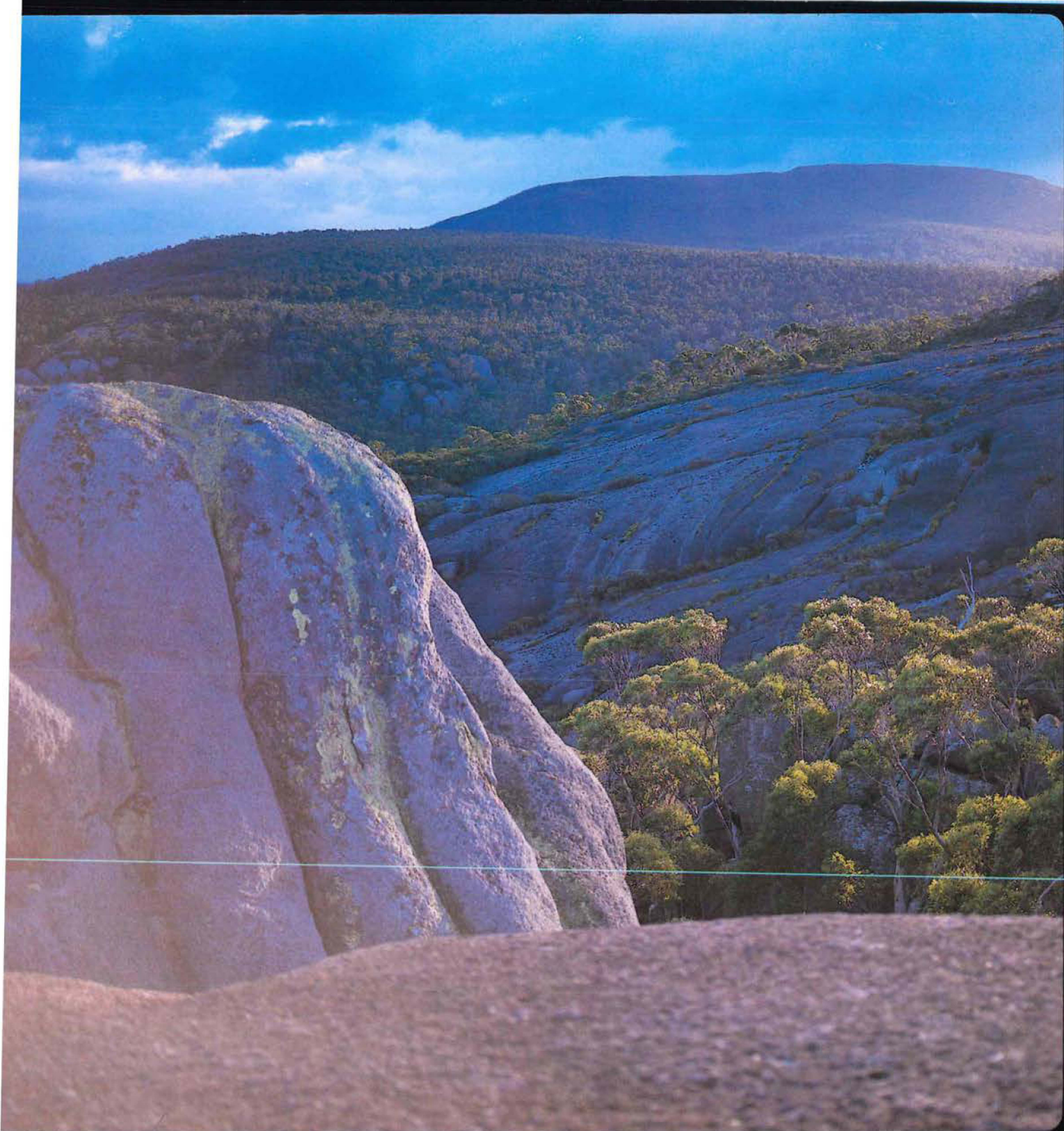
The forest surrounding Icy Creek was logged 60 years ago and the area is now an ideal spot from which to consider management issues such as conservation, recreation, fire protection, dieback control, water quality in forest catchment areas, timber production and bauxite mining.

The campsite caters for a range of outdoor activities, being in proximity to the King Jarrah walktrail (a 16 km circuit), the old Nanga Mill site, Nanga Brook and two small dams on Icy Creek.

The development of additional facilities is continuing with a community shelter, another amphitheatre, an extensive walk track system and a confidence course.

Bookings for the Icy Creek Bush Camp can be made through the Dwellingup District Office, Banksiadale Road, Dwellingup, W.A. 6213. (095) 38 1078.





# A Year in Lilliput

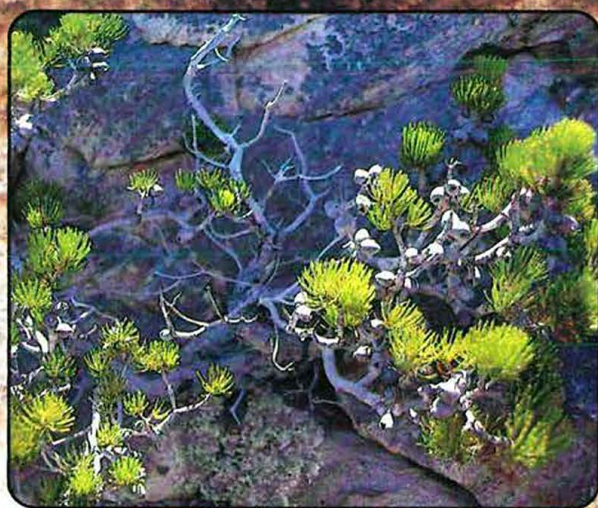
Story and Photographs by Grant Wardell-Johnson

The islands of rock rising above the forest and shrubland in the South-West are vestiges of an ancient land — the residual remains of eroded plains. These granite outcrops provide variation in the gentle landscape, and many reward a climb with a fine view over the surrounding countryside. They also offer the inquisitive a lilliputian spectacle of the seasonal cycle of life. Let us take a year-long journey to some of these outcrops





December: rare summer flowers, a geranium . . .



January: bottlebrush



and an elbow orchid.



The marbled gecko is active throughout summer.

In summer the outcrops bake and plants are exposed to searing winds. The rock and soil surface appears dry and lifeless, but don't be deceived. One careless step on the dry and fragile lichen may destroy many years' growth. This seemingly sterile surface will spring to life with the first winter rains.

While summer lingers, however, lichen and other plants near the rock surface are brittle, and the bulbs and corms of many perennials lie hidden in the shallow soil. The leaves of the





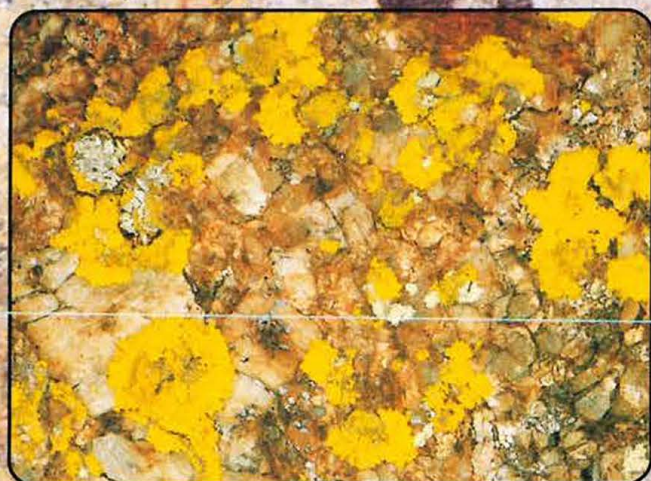
February: bottlebrush with lichen.



April: lichens on Mt Roe.



March: dried lichens.



May: colour comes back to the rock.

shrubs in the deeper soil aprons appear as muted greys, golds, browns and blues. Animal life, however, is very visible. The rocks and crevices of the outcrop surface provide shelter and habitat for many reptiles active only during the warmer months.

As the first winter rainstorms flood the granite, the thin soil becomes water logged and a new world is revealed. The almost-bare rock springs to life. Lichens, mosses and algae clinging to tiny depressions in the rock suddenly appear alive and vibrant. A multitude of shapes, colours and textures is visible.





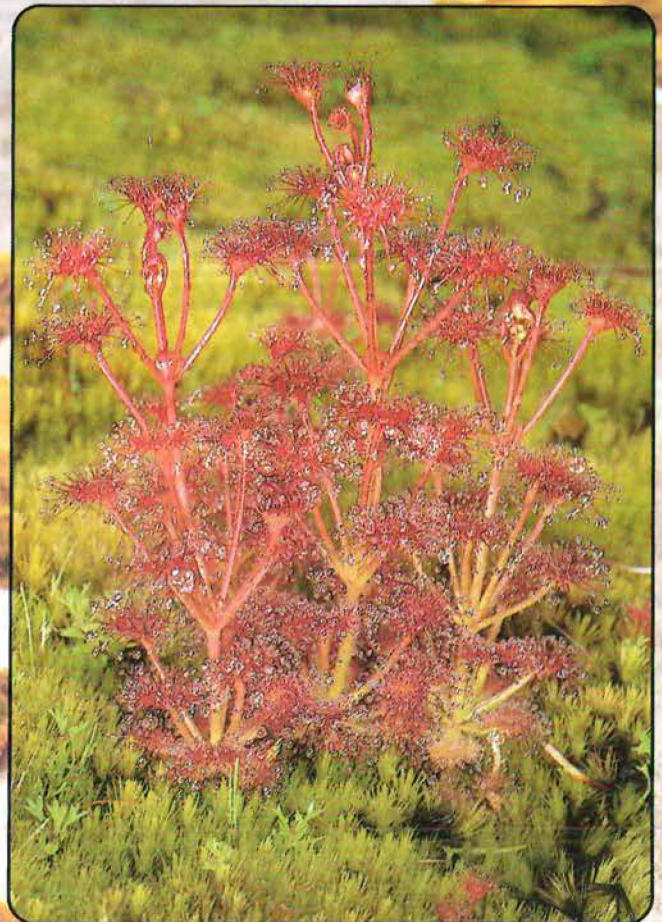
June: bottlebrush on Mt Roe.



and fully opened.



July: sundews emerging...



Sundews are deadly insectivorous plants with flypaper-like traps.

Where the soil and natural litter have accumulated a few millimetres of depth, a moss sward develops. The storage organs of plants hidden in the dry moss of summer respond rapidly to the surge of moisture.

As the lizards of summer disappear, they are replaced by other animals. Tiny, fragile invertebrates appear in the rock pools, and frogs shelter during the day under the rocks near the pools.

Granite outcrops harbour many rare and restricted species because of the unusual and patchy habitat that they provide. Fire is a rare visitor because of the natural fuel breaks created by the rocks' surfaces. Many ancient gnarled, lichen-covered stems are left on the outcrops after fire has swept through the surrounding bush. There is a greater effective rainfall in soil pockets





August: fungus and moss sward



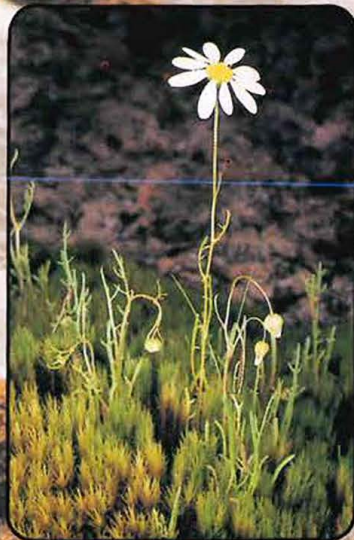
October: sun orchid.



Coral lichen and moss sward.



September: snakebush.



November: daisy in a moss sward.

around the base of outcrops. A good example of this is the jarrah trees growing around the base of Jilakin Rock in the northern wheatbelt a long way from their normal range. By contrast, because the thin surface soil dries quickly, some species which are characteristic of dry regions are found in granite outcrops in the moist South-West.

Granite outcrops are special places, deserving interest and care. Next time you visit a rock outcrop, take a close look at its living features. You might need to be on your hands and knees to appreciate the detail. Take care not to slip, but also not to break up the delicate swards that take so long to grow and develop. Don't forget that you are a giant privileged to take a peek into Lilliput.





Part of a panel of paintings at Gibb River in the Kimberley. A small Wandjina head is surrounded by numerous snake heads, said to be the children of the great rock python (above).  
The rock python at Gibb River. Its mythological role is comparable to other giant dreamtime snakes, usually called 'rainbow serpents' (top right).

# THE WRITING ON THE

Come and tour W.A.'s magnificent outdoor galleries. Your guide, Howard McNickle, has visited all the major rock art regions in Australia, and carried out detailed recording in the Pilbara, W.A., and the Victoria River District (adjacent to the Kimberley) in the Northern Territory. He has worked as a consultant with the Northern Territory Museum of Arts and Sciences.





Photography: Howard McNickle



W.A. has some of the world's most outstanding and varied rock art. The ancestors of the present day Aboriginal inhabitants left a priceless legacy on rocks at many thousands of sites throughout the State. Two major rock art regions are recognised in W.A., each displaying completely different techniques and styles.

In the Kimberley there are many places where large areas of sandstone have been dissected by watercourses to create overhanging rock shelters. These shelters provided ideal camping and occupation sites, especially during the wet monsoon period and wherever the surface is suitable, and were often decorated with paintings, many of considerable size and complexity.

Due to the remote nature and sparse population of the Kimberley, only a small percentage of the existing rock art has been recorded, but it is obvious that marked changes in painting style are found throughout the region. In the West Kimberley, the dominant and most impressive paintings are the 'Wandjina' figures, a

distinct style of painting in which large figures, usually human but frequently also snakes, crocodiles or other animals have been painted onto a prepared 'whitewashed' background. This painting style disappears towards the east and is replaced by different styles including large colourful figures of contorted and snakelike beings. These changes in style continue from the Kimberley through the Victoria River District of the Northern Territory where many very large human and animal figures are also to be found, and to Arnhem Land, where there is a great variety of styles, including the well-known 'X-Ray' paintings.

## Pilbara

Well to the south of the Kimberley region, and separated from it by the Great Sandy Desert, lies the second of the major rock art regions, that of the Pilbara. The geology of this region is totally different and a different type of rock art evolved. Sandstone is virtually absent from the Pilbara. Rock shelters and occasionally quite deep cave-like recesses do occur in the

# WALL



banded iron formations of the Hamersley Ranges, but the shelter walls are usually rough and blocky and rarely suitable for painting. As a result, the artists found another medium: numerous outcrops of dark rocks, mainly granite and dolerite. The hard surface of these rocks have a dark brown to black 'patina' of iron oxide as a result of weathering over a long period of time in the arid climate. This coating, however, is quite shallow and can be abraded or pounded off by the use of stone tools to reveal the light coloured undersurface. By this method an engraving with a strong colour contrast can be created. Weathering to the original colour or 're-patinating' takes place at an extremely slow rate so that an engraving can be expected to remain visible for thousands of years even when totally exposed. This type of high contrast figure is quite rare in other engraving regions of Australia, but throughout the Pilbara, the number of engraved figures would certainly run into hundreds of thousands and quite possibly to millions; no doubt the world's greatest concentration of 'petroglyphs'.

Outcrops along the coast and various offshore islands harbour many outstanding sites, due to the suitability of the marine environment for occupation with its abundant food sources. Concentrations of important sites are also to be found among the granite outcrops of the Upper Yale and Upper Shaw river basins.

## Interpretation of Rock Art

The Wandjina paintings of the West Kimberley are perhaps the best known and the most impressive of Australian rock art styles. These paintings represent expressions of continuing religious beliefs of Aboriginal tribes of this region. The

painted figures, usually depicted on a prepared white background, represent the resting places of spirit beings who are responsible for thunder, lightning and the coming of the annual monsoonal rains, vital for the continuation of vegetation growth and consequently, sources of food and game. The well-known stylised human figures, faces of which are portrayed with head halo, eyes and nose but no mouth, have been regularly re-painted until recent times. At sites in which snake or crocodile figures are also painted in the same style, aboriginal informants maintain that these animals are also the Wandjinas and are as important as are the human figures. The most common interpretation is that the spirit beings travelled for long distances and 'painted themselves onto the walls' of the rock shelters which they now adorn. Analysis of small samples of painted pigments have shown that up to 25 separate layers of paint have been laid down at some sites.

In addition to the Wandjina paintings, numerous paintings in other styles, presumably much older, are also found in the Kimberley region. These earlier, usually more weathered paintings are sometimes found at the same sites as the Wandjinas, often having been superimposed upon by the latter. Present-day Aboriginals usually claim that the earlier figures are not important to their culture and often state that these other paintings were done by 'the old people in the places where they camped', an explanation also commonly given by traditional custodians in other regions of northern Australia.

It is believed that only a small fraction of the rock art sites of the Kimberley region have yet been recorded, and it is likely that less than 10 per cent of the total number of

sites would be of importance to present day communities. As to the age of the earliest paintings, there is no reliable method of dating rock art unless it is found to be associated with datable archaeological layers, but one particular style of small thin monochrome animated figures known as 'Bradshaw figures' found on durable rock faces may well date to thousands of years.

In the Pilbara region, where engraving is the dominant rock art technique, a wide variety of styles and age differences are also clearly present. In contrast to the Kimberley, however, the



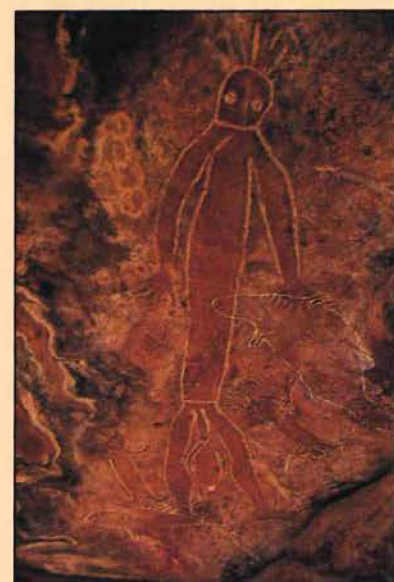


entire body of rock art can be described as pre-historic, for even the clearest and seemingly most recent of the engraved figures have no meaning to living Aboriginals.

When asked for information concerning the figures exposed on the rocks the elders have stated that even their own grandfathers did not know when the engravings were made or what they were supposed to mean. It can only be assumed that whatever significance the engravings possessed to the artists who made them has now been lost in antiquity. One exception is the Yapurarra tribe who made

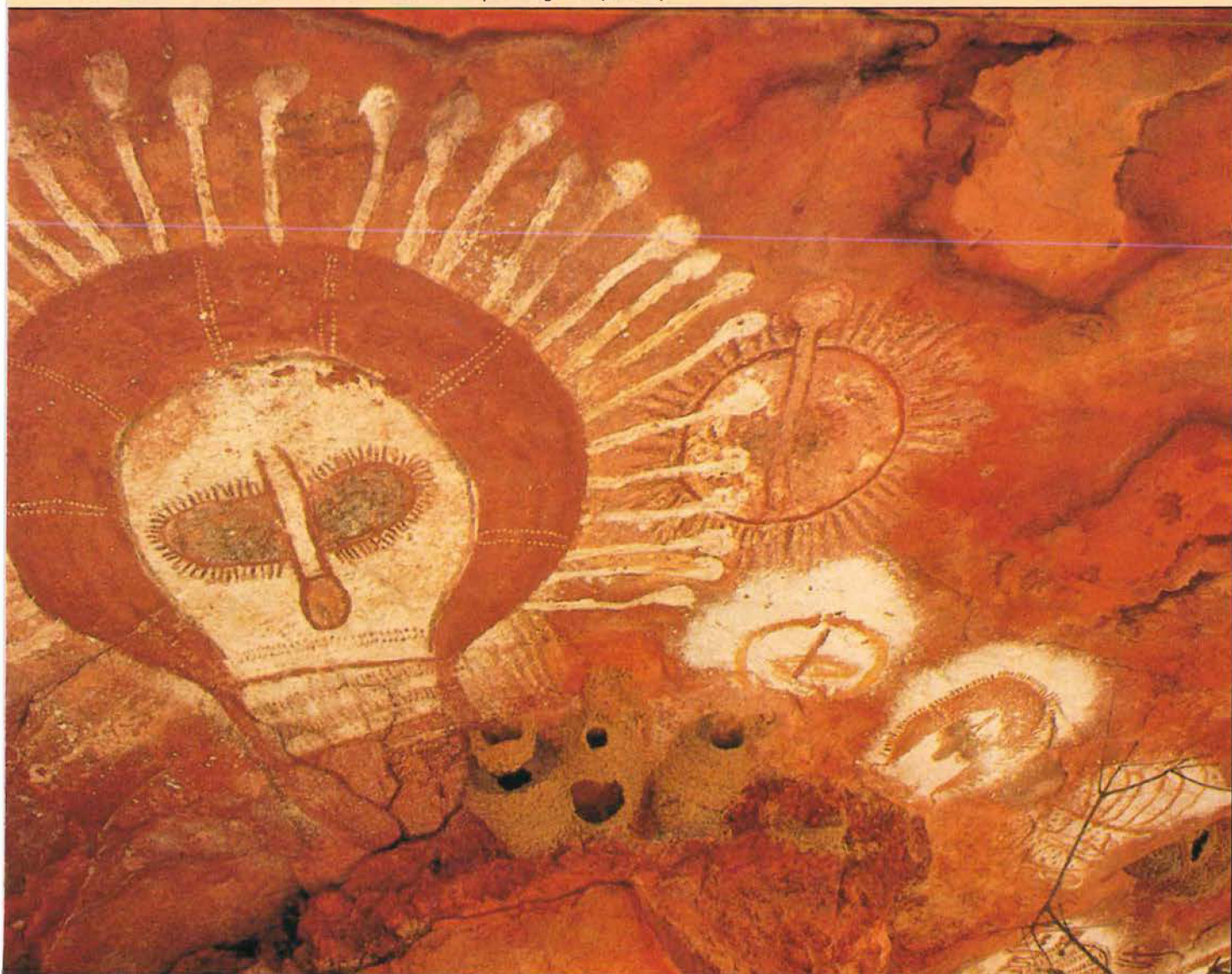
the Burrup engravings and were — as legend has it — killed in a massive war a few hundred years ago. There is also some conjecture that their art contained European figures — possibly French explorers.

There is some evidence that rates of patination of rock surfaces (i.e. formation of dark iron-oxide coating) may have been considerably greater during the period when the Pilbara climate was even more arid than it is today, namely prior to the end of the last ice age. Therefore, some of the re-patinated early outline figures could easily have a minimum age of 10000-15000 years.



Stylised human figures, commonly in red and white, plus a white outline figure of a fish. This is typical of the East Kimberley sites (above).

This magnificent Wandjina head has been superimposed onto an earlier smaller head of similar style. Close to these paintings are a cluster of mud building swallows' nests. These nests plus insect nests threaten rock painting sites (below).





Some Pilbara engravings still visible today may date from the first artists, perhaps even from its first occupation by humans. Animals now known to be extinct have been depicted in engravings, and such figures do not always display total re-patination.

Figures which clearly resemble the thylacine or Tasmanian Tiger, extinct on the mainland for some thousands of years, have been found and numerous early outlines of a kangaroo possessing a fat tail, a characteristic not found in any present day species, have also been found throughout the Pilbara.

In the inland and northern areas of the Pilbara, a series of quite distinctive styles has developed. There are the high contrast, usually unpatinated figures of the more recent traditions. These figures are usually fully engraved rather than outline, although outlines of the recent style do occur, often partially filled in or internally decorated with bars or spots. Stylised human figures tend to dominate, although animal and bird figures are also common, often being assailed by spears or boomerangs.

A particular variety of figure now known as 'Woodstock figures' after Woodstock Station where they were first recognised is the most unusual.

Woodstock figures are distinct from other styles of human figures in that they are normally long and flexible with arms, legs and bodies oriented randomly, sometimes inverted, while hands and feet are commonly represented as a two-toed fork. Unlike most human representations in Aboriginal rock art, Woodstock figures are frequently depicted in profile in which the head is normally given a protruding forked muzzle and one or two long antennae-like decorations.

The significance of these agitated figures will probably never be known with any certainty but throughout the far northern Australian painting regions, from the Kimberley through the Northern Territory and into Cape York in Queensland, paintings of contorted, animated or inverted beings are often described by Aboriginals as 'sorcery' figures or 'devil' figures, painted for purposes of evil magic, presumably serving the same purpose as bone pointing.

## Preservation

Unlike the more familiar forms of art, which are housed and protected in galleries or private residences, rock art is subject to attack from the very day it is completed. The most serious threat to the majority of rock art sites is weathering. At painting sites, there is the additional threat of water, construction of bird and insect nests, and occupation of shelters by animals. In a few instances, sites are also threatened by human activities and in some cases by vandalism.

Up until the 1960s the remote nature of the Pilbara and the small population meant that human activity posed little threat to the rock art of the region. More recently, however, the development of the iron ore and other mining industries, the establishment of towns and the building of roads, railways and port facilities has had a considerable effect on the environment. Unfortunately, during the early years of development, few environmental guidelines were in force and quite serious destruction of sites did occur, particularly in development of port facilities. Fortunately more stringent rules are now in force and mining companies etc. generally take a more

responsible attitude to preservation of the environment, but the growing centres of population, the need for recreation and the availability of 4WD transport means that visits to sites by unsupervised parties are more likely to take place.

## Public Access

Experience with rock art sites such as those at Carnarvon Gorge in central Queensland, which have long been accessible to the public, has shown that even though vandalism was common during the years up until the 1970s, in recent years, since the sites have been developed and literature made available to visitors, vandalism has become extremely rare, even though visitors are not normally supervised. Those who appreciate the art for its value are certainly likely to hold the same respect for any further rock art which they may encounter. Therefore, with the increasing likelihood of unsupervised visits to rock art sites, especially in the Pilbara, it may well be advisable to open a few selected sites to public access with explanatory signs or literature so that a general public awareness of the priceless heritage of the original inhabitants may be aroused.

It is rather ironic that many millions of dollars are spent in building art galleries to protect and display modern works of art and to purchase art as great cost, much of which is appreciated by a select few, while the vast collection of outdoor art galleries in their natural settings are left to deteriorate, mostly without even a photographic record having been taken. Unlike vegetation and wildlife, which are increasingly conserved and protected, the destruction of rock art is a one way process. When it is gone it is gone forever. □





In the most recent painting of the Wandjina figures, simply the head or the head and upper part of the body is represented.

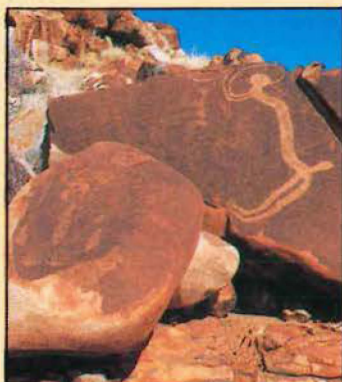
### The Museum's Role

Aboriginal sites and objects in W.A. are protected under the Aboriginal Heritage Act 1972-1980, which is administered by the Trustees of the W.A. Museum. Sites and objects located on land vested in the National Parks and Nature Conservation Authority and the Lands and Forest Commission, and managed by CALM, are subject to that legislation.

The oldest style of Pilbara engraving is that of deeply abraded outlines, usually of animal and bird figures or abstract designs such as concentric circles. These engravings usually display little or no colour contrast, having re-patinated to the original colour of the rock over a long period of time (Hammersley Range National Park) (above).

Some natural threats to rock art would be virtually impossible to prevent. This boulder, along with an impressive panel of figures, has completely split in two (top right).

The large flexible figure is a typical example of a 'Woodstock' figure. To its left is a much smaller example of the same style. On the boulder in the left foreground is an engraved panel. (below).







# The Nostalgic Naturalist

by Old Timer

It was one of those days in late summer, a real stinker with no breeze and the air so moist you could pour it. Then came a blinding flash and simultaneous ear-splitting crash as a bolt of lightning speared into a roof top just over the road.

I don't know whether it was the ozone from the lightning, or the noise of the thunder jolting my brain, but almost as if I was standing there I could visualize those storms in the Kimberley, when I was a young bloke. As the thunderstorm filled in, a rainsquall entered the street and rushed away to the north, with my memory jogging along behind it.

Old Ginger had just put in a 'wet' as a carpenter on the Wyndham meatworks construction job. He was a bit of a loner, a funny bloke. While the rest of the workers were down at the pub at every opportunity, Ginger would be climbing the Bastion or borrowing a horse to 'have a bit of a squiz'. I was a bit that way myself, so when I saw him sitting at the end of the jetty 'watchin' crocs', another of his pastimes, I sauntered out with a view to having a chat.

'G'day Ginge, what's happening?' I asked.

He looked around a bit startled. 'Orh, ya frightened six months growth out of me!! G'day young fella, I was daydreaming. A flock of birds just flew in towards Parry Creek, reminded me of a day one of the old tribesmen took me in to see the birds. Hey you're interested in the bush aren't you?'

'Yeah, I suppose I am,' I replied, sensing another one of Ginger's yarns coming on.

'Well, that place is like magic. In five minutes I can show you more than an eyeful of birds, more than you've ever seen at once, millions of them!'

Very few people ever doubted Ginger, he was about six foot and eighteen stone, but I must admit that I thought he was exaggerating a bit. He must have sensed my disbelief. 'Come Good Friday,' he said. 'If you want to, I'll borrow some horses and we'll get the Babblin (cook) to make up some crib and we'll have, like a picnic, and I'll show you the bloody birds!' he roared jovially. Just then the black sky started to spit, in normal fashion for that time of the year, and Ginger and I dashed for cover.

Slowly, over the next month or so, the clouds got less and less. Easter came around, and there hadn't

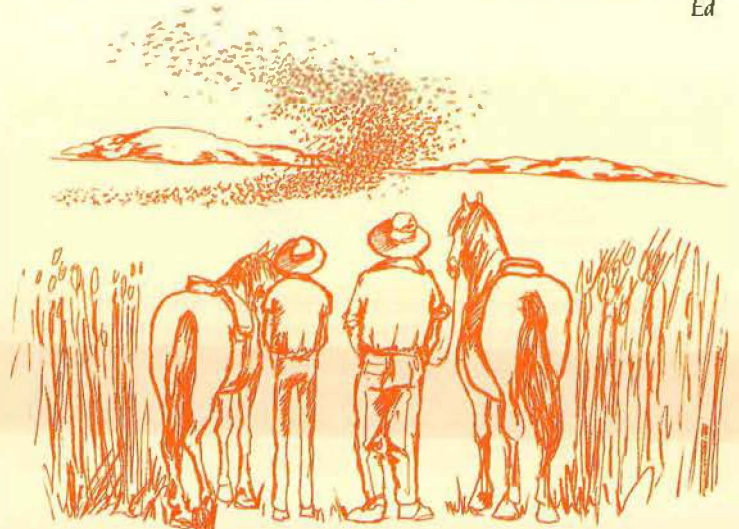
been any rain for a while. A cool breeze was wafting in from the south-east, and there wasn't a cloud in the sky. On Good Friday Ginger and I rode out to the Nine Mile, then headed north on a track across the flat towards Parry Lagoons. The flat was like an endless green felt table, with a few boab skittles here and there. It was dry for the most part, and the horses were able to negotiate the black-soil plain without difficulty.

Ginger hushed me and pointed to a drying swamp a hundred yards away. At first it seemed lifeless, but as my eyes became adjusted I realised that I couldn't see the banks of the lagoon for birds. Then one of the horses snorted and as if they were one almighty creature, thousands and thousands, or maybe a million ducks left the water and the grass surrounding the lagoon to blacken the sky like a thunderhead. I just sat there in wonderment and said 'Strewth!'. Ginger just smiled.

It seems that during the 'wet' the whole of the flat is mostly immersed and so is an excellent habitat for waterbirds. As the monsoon ends, the flat dries out and the birds are forced to concentrate on the more permanent pools. Flash Mick, another old Wyndham man, was in town a month or so ago. He tells me that in April or May, or when the track is dry enough, the quiet observer can still catch a good eyeful of waterbirds on Parry Lagoons Nature Reserve.

True as I'm sittin' here, cheers.

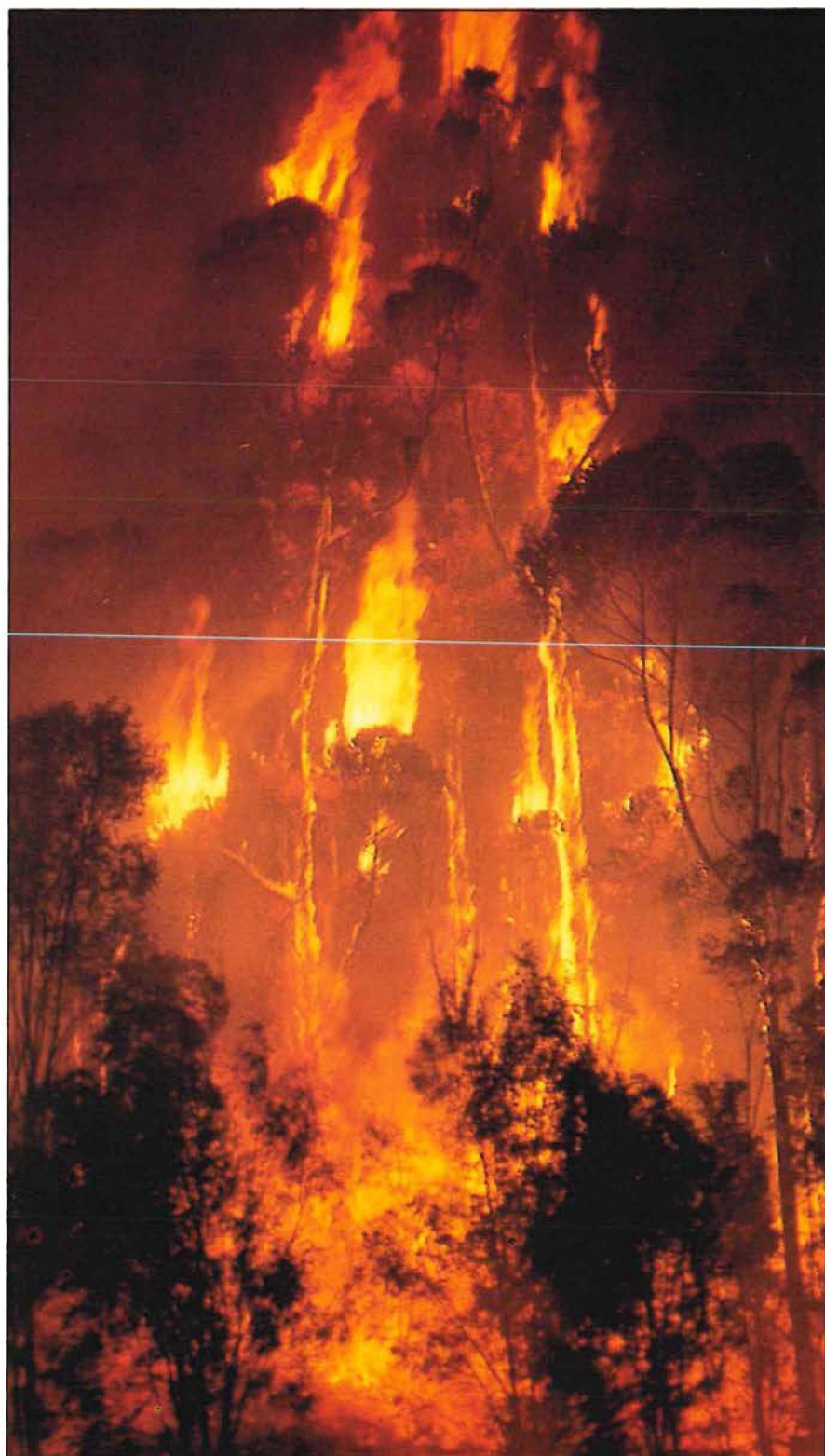
For more information on the reliability of the Old Timer's tale, contact the CALM office in Kununurra.  
Ed





# WILDFIRE

by Colleen Henry-Hall



It was Tuesday, 21 January 1986, the fifth consecutive day with temperatures around 40°C and no relief in sight.

Keith Latham had been on duty since 7 am at the Wabling Fire Lookout Tower, 30 km north of Wanneroo. At 10.30 he spotted a faint puff of smoke about 4 km east of the Yanchep pine plantation. Within a few minutes seven more columns of smoke rose in a straight line about 100 m apart. An arsonist was at work.

The Wanneroo fire would turn out to be a big one. The number of fire fighters and other people involved would eventually exceed 300. The fire would threaten communities at Yanchep Beach, Two Rocks and Guilderton, and would close Wanneroo Road to traffic north and south.

From this fire many lessons would be learned and refinements made to fire-fighting procedures used by the Department of Conservation and Land Management. One of the major changes would be the development of a campaign fire organisation — a procedure that would enable efficient cooperation between CALM and other organisations such as the Bush Fires Board, the Police and the State Emergency Service.

But at 10.30 am on 21 January, this was the start of just another fire.

Alan Hordacre





Alan Hordacre



Colleen Henry-Hall

Fire-fighting strategy is devised by CALM officers at the Wanneroo District Office

After the Walpole fire (left).





Marilyn Ramsey, CALM's Wanneroo District Clerical Officer, took the radio call from Towerman Keith Latham.

'When Keith gets excited, his voice gets very high, and when you're listening for the radio, you pick up on it right away. You know something's wrong,' Marilyn said.

She would be at the radio for almost 24 hours, and in that time she was the critical contact between the fire fighters and CALM officers devising strategy.

CALM's Wanneroo District Manager Alan Briggs treated the fire alert as he had many

others: he activated 'Red Action' — automatic dispatch of all Wanneroo fire crews, as well as two units from his neighbouring CALM District at Mundaring.

'The first half hour is very hectic, with people heading off in every direction,' Alan Briggs said.

Because nine out of ten fires can normally be handled quickly by the District, the procedure is to send all available District crews to the fire as quickly as possible to fight it when it is still small and put it out before it grows, Alan explained.

First to arrive at the fire was Barry Morris's crew from Yanchep.

'We found at least six fires burning in heavy banksia woodland and only one or two were small enough for us to tackle,' he later reported.

By the time five other crews had arrived 20 minutes later, the fires had joined to form a fast-moving front 500 m wide with flames up to 20 m high.

From the first radio report to the final mop-up, the radio channels were jammed with incoming information from the fire and outgoing directions from headquarters. By far the most frustrating part of fighting a bush fire is the lack of ready information coming in from the field. This is due to a number of factors, and the sheer bulk of information that must be transmitted is one. Staff at headquarters must be told where the fire is heading, how fast it's going, how many crews are fighting it and where. Staff in the field need to know where to concentrate their efforts, the wind direction, the temperature, what the fire is predicted to do next, and details of incoming men and equipment.

By noon winds were gusting from the east at 45 km an hour. A southerly wind change sent the fire north at a furious

rate of 3000 to 4000 m an hour. It was obvious now that the fire was a major one.

The 'large fire organisation' was put into gear — a central command group headed by CALM's Fire Branch Manager Jock Smart and set up at State Operations Headquarters in Como would be the nerve centre of the fire. (It was the large fire organisation, inherited from the Forests Department, which played such an important part in last year's whale rescue at Augusta.) The Chief Executive from CALM, the Bush Fires Board, the State Emergency Service and the Police worked side by side to deal with the emergency.

Both the large fire and campaign fire organisations developed by CALM have five different functions.

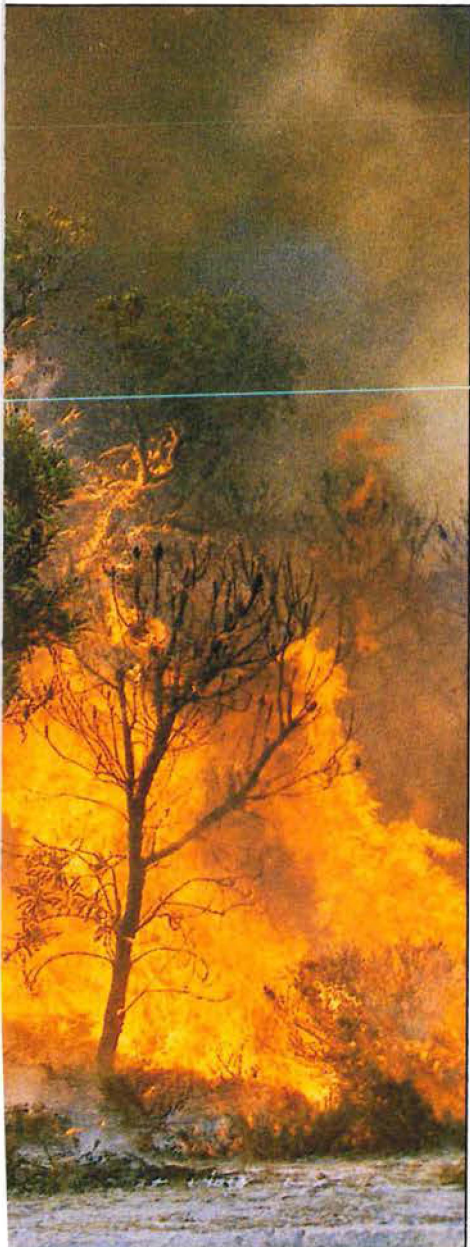
'Control' involves the total management of all fire activities. The controller makes decisions about how to fight the fire, where to place men and machines, what the priorities are.

'Intelligence' provides the controller with information and predictions on what the fire is going to do, weather forecasts, maps, staff and equipment requirements and relative costs.

'Suppression' is the organisation of the work on the fire line, a job handled by the fire boss who follows the plan of action laid down by the controller.

'Supply' involves the dispatch of all fire-fighting resources: men, machines, stores and fuel, food, accommodation and communications.

'Liaison' is essential at all fires where the media and other outside organisations attend. The liaison function enables briefing of media for press reports, and constant contact with other organisations to make a



Neil Burrows



cooperative effort in fighting the fire.

Wanneroo CALM Forester Bill Muir served as fire boss at a critical stage during the fire. At the start of the fire, he went up in the spotter aircraft to get a view of the fire.

'You know what it's like in the curl of a wave while you're surfing? Well, the smoke was rolling over and around the plane just like that. And once, when the wind changed suddenly, we could see the flame at the outer edge of the fire just stand right up, leaping from about 1 m to 8 m high,' Bill said.

It was also while in the plane that Bill and the pilot had to guide a grader operator out of the smoke and flames after he was cut off from ground crews by the fire.

The fire almost claimed other victims too. A group of three heavy duty pumpers

became bogged in deep soft sand while trying to cut off the headfire on a track near Coppino Lake parallel to Wanneroo Road. The crews couldn't get the trucks out and it became apparent that the fire would soon engulf them.

Marilyn Ramsey, on the radio at the time, said 'It was so hard to be somewhere safe and to know that these people were in danger. All we could do was give them suggestions on how to keep the fire away.'

First they cleared the area of flammable material and used their remaining water to wet the ground around the trucks. They climbed inside the vehicles, closed the windows and waited for the fire to pass over them.

Fire Controller Jock Smart said later: 'That's one of the good things that came out of this fire. You can train people in survival techniques but

you'll never know if that training will be okay in a real life situation. In this case, the survival training and crew discipline saved these people.'

During the night, the fire continued its fast pace westward.

By early Wednesday morning, it was obvious that the next line of defence would have to be Wanneroo Road, the main link between Perth and Lancelin. Police roadblocks were set up on Wanneroo Road to keep the public out of the fire's path.

A new control point was established on Wanneroo Road just north of the Yanchep pine plantation. District Manager Alan Briggs, after having served one shift as controller at Wanneroo Office, had had a rest and returned to the fire as field controller.

'When I got to the control point, it was almost a tent city', Alan said.



This fire-fighter shields his face from the heat as he carries out a backburn — one of the techniques used to bring wildfires under control.



Rae Burrows

A well-earned break.



Rae Burrows



Scattered around the area were an army platoon sent to help out with the fire, the CALM communications vehicle, Bush Fires Board personnel, trucks being serviced, vehicles parked everywhere.

'It was just amazing, this total confusion, and here were our men at tables way at the end trying to make decisions about how to fight this fire,' Alan said.

One of the first things he did as field controller was to order portable toilets, a necessity that had been overlooked. When they did arrive, they were deposited right in the middle of the control point.

He ordered whiteboards, tables, chairs, message runners. His efforts enabled the smooth operation of the control point, which in turn ensured more effective fire-fighting and better communication with Fire Controller Jock Smart at Headquarters in Como.

By 5 am the fire was fast approaching Wanneroo Road. For six hours CALM forces and brigade members battled to hold a series of separate headfires spearing toward them from Barragoon Lake.

Exhausted crews had been replaced that morning by fresh forces, with CALM crews arriving from Busselton, Collie, Harvey and Dwellingup districts. Voluntary brigades from the Gingin Shire, Wanneroo City and Swan Shire had been fighting the fire since Tuesday.

After a meeting at 8.30 am Wednesday, Syd Shea, Executive Director of CALM, asked the Minister for Lands to declare a fire emergency throughout the southern part of the State, which allowed the State Government to provide resources from its various departments to help fight the

fire. The Main Roads Department sent two teams of heavy machinery, including a dozer, a bucket loader and a grader and operators. The State Emergency Services provided teams of fire fighters, and through their contact with the armed forces arranged for some 45 army personnel and trucks to help on the fire front. Other support came from the Police with traffic control and possible evacuation. St. John's Ambulance provided medical assistance; the Salvation Army provided a field kitchen to feed the hundreds of men now at the fire.

Wednesday's forecast was for hot conditions with north-east winds possibly changing to north-west later in the day. The worst scenario for fire strategists back at Como was for the north-west wind to drive the fire into vulnerable pine plantations and Yanchep National Park. The fire could then turn to the densely populated areas north of Wanneroo city and could drive south nearly to Midland.

But the winds continued to be east to north-east all day, and the fire eventually ran into the Indian Ocean without directly threatening any of the residential centres.



The work doesn't finish when the fire is out. After the Wanneroo fire, researchers investigate the fire's behaviour.

The fire had been kept out of the valuable Yanchep pine plantations thanks to a narrow strip of land around them that had been purposely burnt by CALM three years before.

The fire reached the coast at about 5 pm Wednesday, 22 January. At that stage the fire stretched 30 km in length and covered some 11000 ha. The large fire-fighting force spent the next two days securing the fire's 80 km perimeter.

A year to the day later, CALM had another fire on its hands — a 2000 ha bushfire in the Walpole-Nornalup National Park on the south coast.

Jock Smart, who served as Fire Controller on both fires, said 'We've seen a remarkable transformation from one fire to the next. One of the most interesting things is that everyone at the Wanneroo Fire was unsure of the liaison role — who was responsible for keeping the Police, the SES and the Bush Fires Board updated on what was happening and what they should do.'

'At the Walpole fire I was very pleased with the liaison efforts. The fire highlighted the fact that the management structure can work in such a situation,' Jock said.

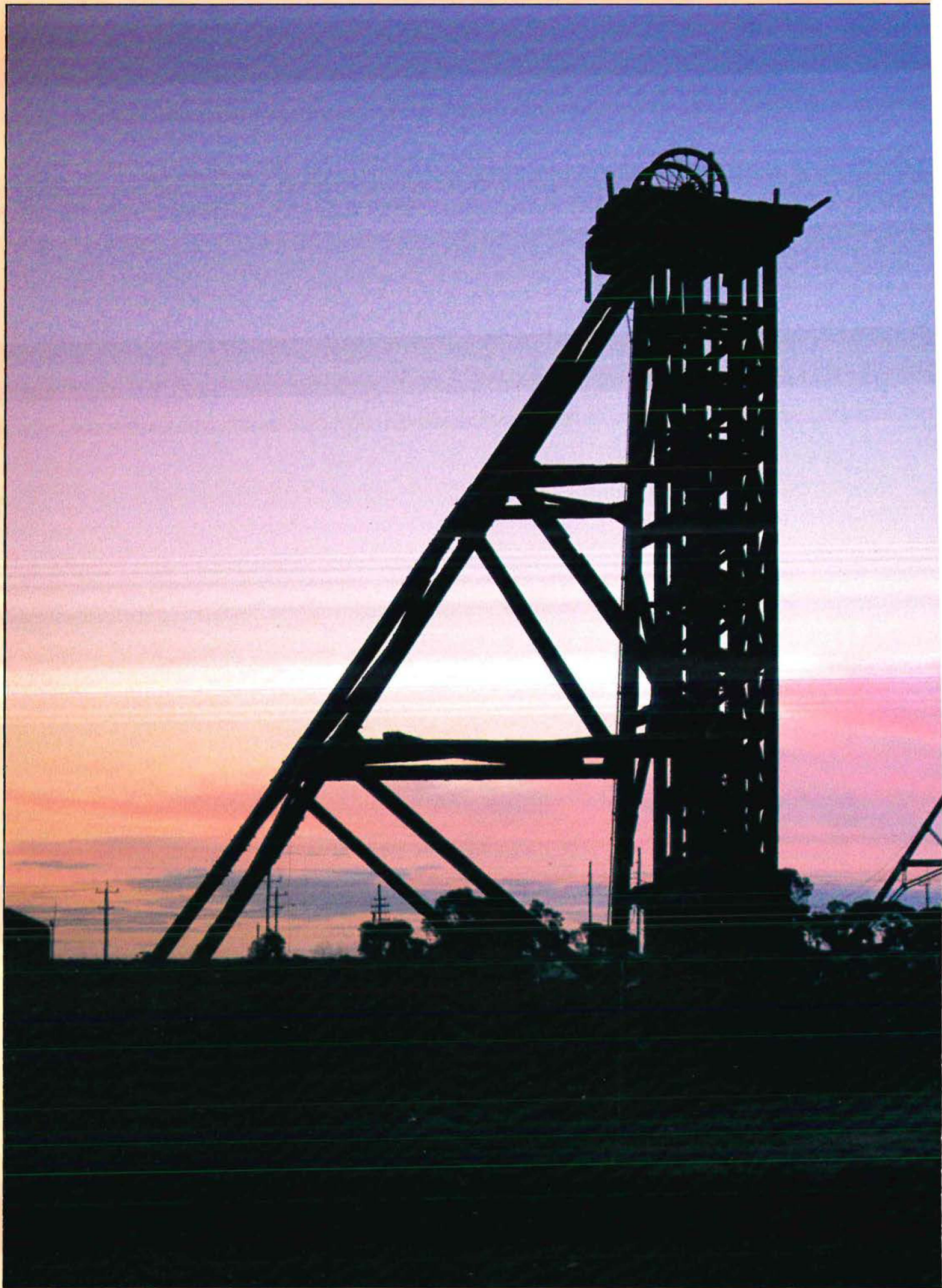
'A debriefing always follows any fire where CALM officers highlight good things and bad things, and try to plug the gaps before the next fire,' Jock said.

The Wanneroo fire resulted in the development of the campaign fire organisation and a series of practice sessions at different regions and districts where officers ran through a mock campaign fire and afterwards discussed their actions and decisions.

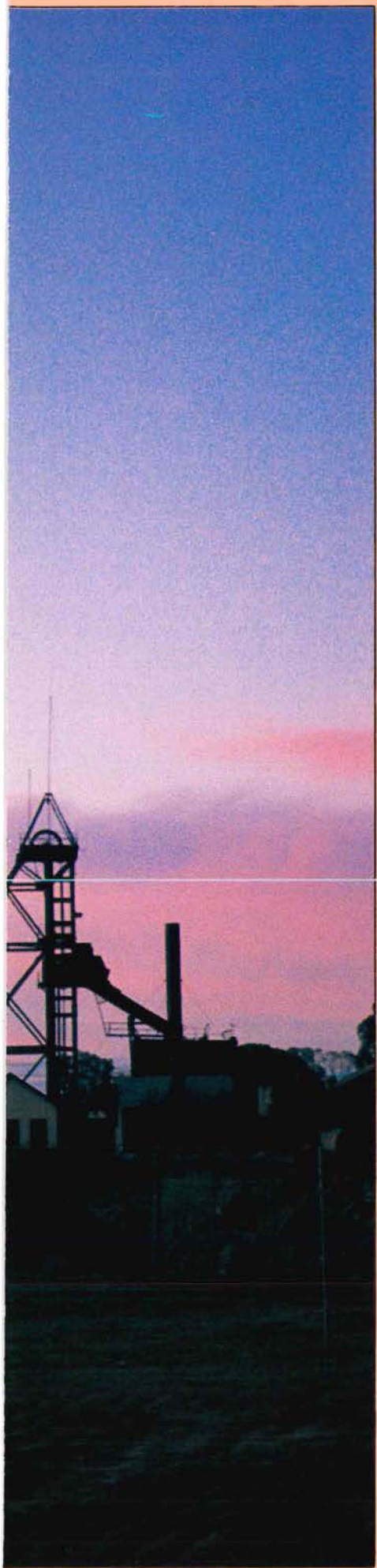
In Australia bush fires are a fact of life — and sometimes of death. Constant vigilance and continual updating of techniques ensure that W.A. maintains its excellent record in fighting bush fires.

Andrew Cribb









# Gimlets and Gold – The story of Kalgoorlie's woodlines

Story & Photographs by Cliff Winfield

Think of forests in W.A. and you picture the green south-west; think of Kalgoorlie and you conjure with gold, not trees. But the green and gold are inseparable. The trees that kept the hearts of the mines pumping were cut from native forests miles from the goldfields and hauled along specially constructed bush railways. These railways were known as THE WOODLINES.

Wood was needed for the steam-driven winders that hauled the ore to the surface, the generators that gave the cities electricity, the pumps that brought the essential water from Mundaring, and of course for home cooking and heating.

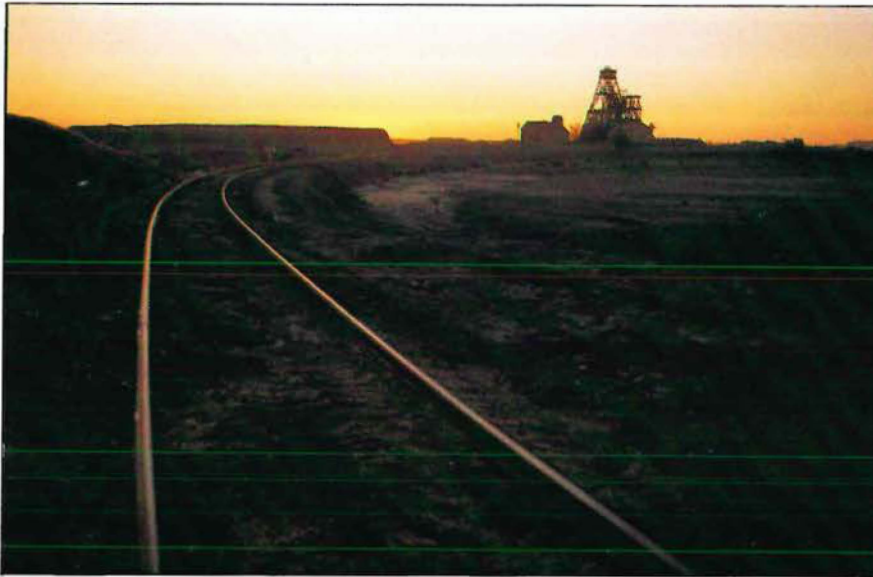
Without the salmon gums and gimlets of the goldfields, the miners would have had to move timber from the south-west in massive quantities to support the thousands of kilometres of shafts and stopes under the ground.

Before long, the area about 15 km radius from the mines was cut out and it became

uneconomical for men with horse and cart to supply the fuel. A few entrepreneurs set up companies equipped with railways, and teams of cutters, loaders and carters.

The woodlines began forging out from Kalgoorlie. In 1903 the W.A. Goldfields Firewood Supply company (WAGFS) (one of three supplying firewood and structural timber to the mines) had 60 km of railway and telephone line, four steam locomotives, a sawmill to supply sleepers milled from salmon gums and a small town to support the company. The main camp was based at Kurrawang 10 km south of the city.





Two steam trains worked around the clock ferrying the timber to Kamballie on the outskirts of Kalgoorlie. There it was distributed to the mines and other consumers along a government railway encircling the main mines and service industries. The trains would return to the spurline after a round trip of up to twelve hours, and deposit a rake of empty trucks which the loaders would fill from stacks.

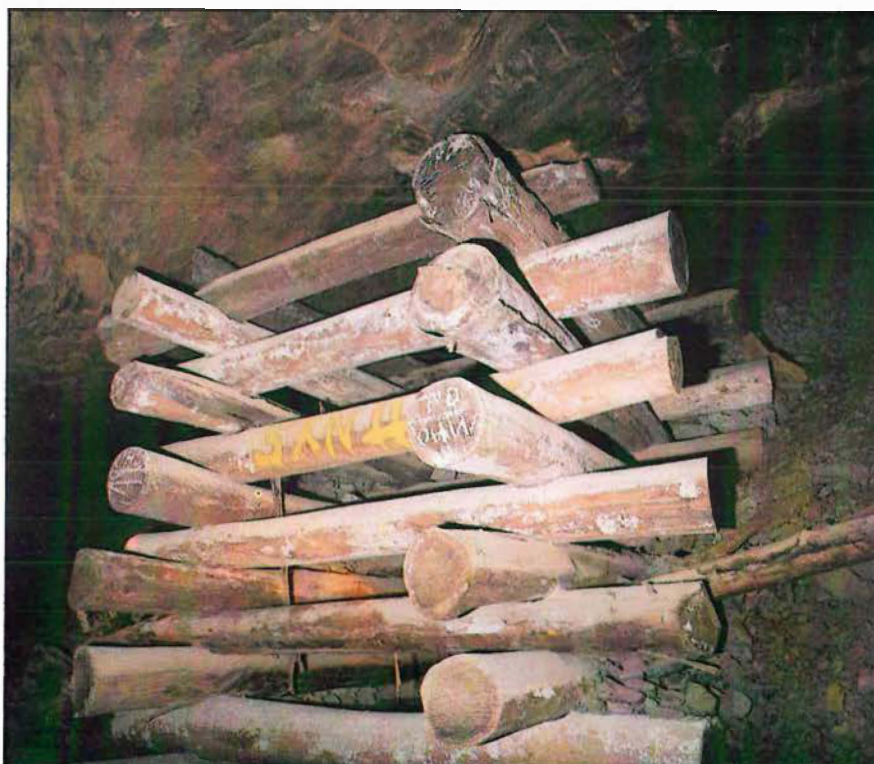
Loading was by far the most onerous task on the woodline as some of the logs that had to be lifted by hand onto the trucks were 1.5 m long and weighed over 100 kg.

There were occasional strikes for better rates and conditions. Some of the stoppages brought the whole goldmining industry to a halt for weeks.

The timber companies employed 1500 men and supplied over 500000 tonnes of firewood and mining timber per annum — roughly equivalent to the current karri/marri chipwood operation. The other companies amalgamated with WAGFS to counter the economic pressures as haulage distances increased.

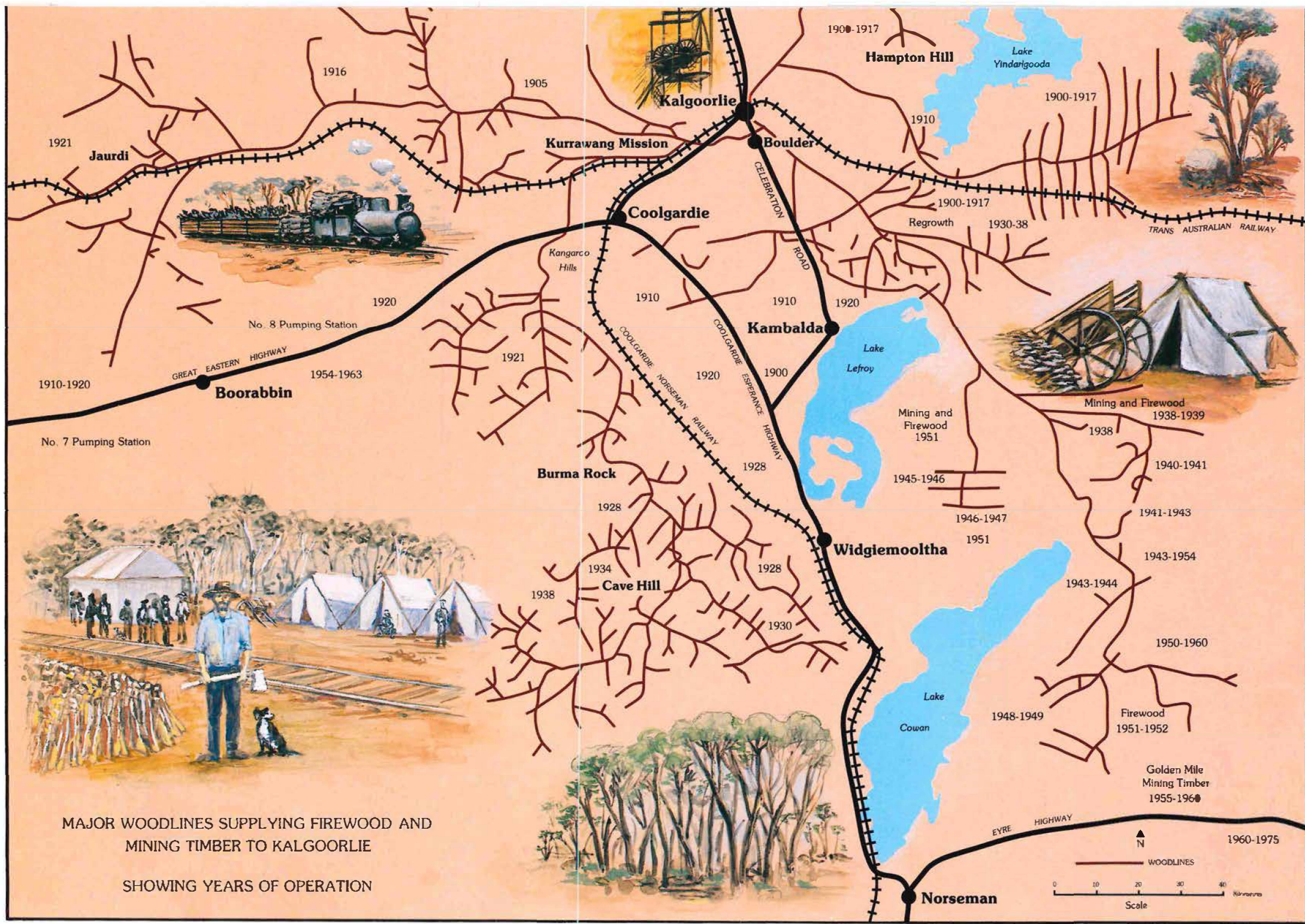


Wood was used extensively in the underground mines.



By 1937 WAGFS was hauling timber over 170 km from its main camp near Cave Hill. The operation was uneconomical, but repeated pleas to the government to open up reserves closer to Kalgoorlie were resisted by the Forests Department. The company decided to try to lessen their overheads by reducing the haul distance, taking up new permits to the east of Kalgoorlie. This also meant that the woodline trains avoided crossing the government railway, for which it had been paying a toll of fourpence a ton. But the government permit now levied a timber royalty of threepence a ton. Moving the whole base town of 70 houses, shops, a







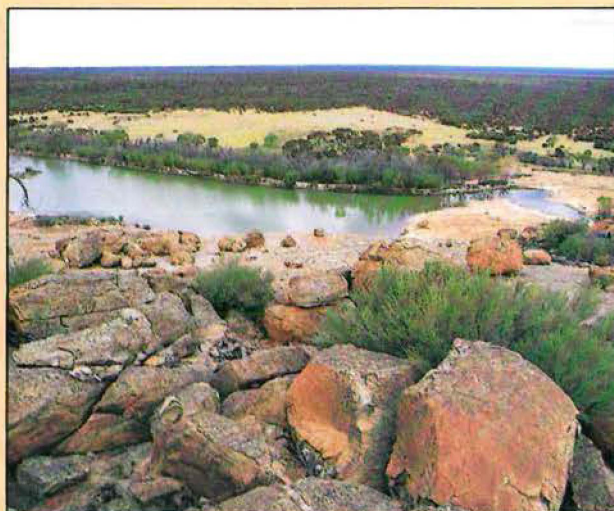
As the sun rises on an autumn dawn, already the calm icy air is disturbed by the distant blows of axes on tree trunks and by the steam-snorting draught horses.

Looking around this outlandish settlement, in the middle of one of the most harsh and arid areas on earth, we see that most of the larger buildings are on wheels. The rest are made of flimsy hessian strung over bush poles and roofed with corrugated iron. The adult conversation filtering from behind the hessian walls is mostly Slav and Italian, yet that of the children is English.

This is the 'main camp' of a goldfields woodline. Perhaps 160 km out into the bush from Kalgoorlie, a dozen or so families and a hundred single men are out here to harvest the timber necessary to keep the gold mines producing.

The 'main camp' was where the main line from Kalgoorlie to the timber ended. Here were the living quarters for married people, the horsemen, carters and railwaymen. The 'main camp' also offered services such as the school, police station, store and drapery. All these were built onto railway wagons so they could be easily moved. Main camps might be moved every 18 months or stay in one place up to seven years.

In the 'main camp' life was hard and simple, with little or no sanitation. The hessian walls provided minimal privacy and scant protection from the elements. The only entertainment was gambling and drinking in the 'tolerated' sly grog shanties.



The 'main camp' at Burra Rock left virtually no trace.

hotel, and workshops from Kurrawang to Lakeside, 5 km on the other side of the city, was not seen as a great problem to a workforce accustomed to continually moving camp.

During World War II Italians working on the Woodline were interned. This caused a crisis in the gold industry as the woodlines could supply only a small part of wood demands. The production of gold was essential to the national economy, but without the Italians the woodlines were hopelessly understaffed. Rather than release prisoners-of-war to relieve the labour shortage, the government chose to open mining timber reserves close to the mines for firewood.

In 1942 the firewood industry was declared 'protected' by the government. This meant that it was considered as important to the security of the nation as fighting the

enemy and all involved in the industry were required by law to stay in their jobs on the woodline rather than enlist in the armed forces. This didn't ease the crisis, but it ensured that it wouldn't worsen.

At the end of World War II the WAGFS was only servicing one third of the needs of its customers. The management decided that they could no longer carry on. They suggested that the consumers should buy them out and run the business themselves. This went ahead and the State Government underwrote a loan to a consortium of mining companies and the Power Corporation (SEC), which called itself the Lakewood Firewood Company.

The Lakewood Firewood Company started on shaky ground when, almost synchronous with the consortium taking over, the Power Corporation lost its biggest consumer. Buses superseded electric trams.

Labour shortage continued to be the greatest stumbling block to regular supply.

Now, however, the flood of refugees from war-torn Europe was there to be tapped. The company used the sponsored immigrant scheme to augment their labour force. Under this program, immigrants were contracted to work for two years for the organisation which sponsored their migration. Many highly educated people from southern Europe, who had never done any physical work to speak of, found themselves forced to cut 4 tonnes of wood a day just to eke out a living.

Lakewood Firewood Company slowly began to prosper and by 1952, 550 men produced 135000 tonnes of wood for the year. But that was the last peak for the industry. Soon afterwards the Power Corporation switched at first to coal-powered boilers and then to diesel

(continued overleaf)



The inland of W.A. known as the Eastern Goldfields, is unique for the amount and type of vegetation that grows in such an arid climate. Of about 500 eucalyptus species Australia wide, roughly 10 per cent occur in the W.A. goldfields. Of those, 34 occur **only** in the goldfields, making the area one of the richest in eucalyptus species.

The 1897-98 Woods and Forests Department Annual Report shows that Coolgardie was one of the first places in the State to have a resident Forest Ranger. However, the Forests Act was still 20 years away and the rangers were powerless to do much more than keep the peace between the wood cutters. Thus forestry was able to remain only on a 'care and maintenance' basis with more attention given to policing the operators than to conserving the resource.

In 1926 George Brockway, a young graduate from the Adelaide University school of forestry, arrived in Kalgoorlie to take over as Officer-in-Charge. He was to remain involved in the administration of the inland forests from Kalgoorlie until 1949. He remained concerned for their conservation until his death.

Brockway brought with him a fresh view of the problems of managing and conserving the forest resource of the region. He developed a knowledge of the area that is probably still unsurpassed.

Brockway was particularly concerned about land degradation. Apart from the goldfields, he was an outspoken critic of the mass clearing of woodlands in the developing wheatbelt. He managed to marry his knowledge and



appreciation of the goldfields eucalypts with his concern for the land by establishing a small nursery in Kalgoorlie in 1946. The nursery raised local eucalypts from seed with the aim of distributing them in the wheatbelt. The Forests Department Annual Report of that year describes the reason for establishing the nursery:

*In clearing much of our wheatbelt, too little attention has been paid to the retention of shelter belts, woodlots, and in some instances, even shade trees. Farmers and country Road Boards are now faced with the task of repairing, to some extent, the damage wrought . . .*

Brockway's pioneer work in the cultivation of the inland eucalypts and his enthusiasm in their promotion was probably the biggest factor influencing the surge of public interest in growing native plants. His small nursery grew in stature and size. In 1955 the operation was transferred to Dryandra then later to Narrogin. The CALM Narrogin nursery still supplies trees to farmers and local authorities. In 1986, 300 000 seedlings left the nursery for planting in the agricultural and goldfields area of W.A.

George Brockway instituted many other conservation projects: perhaps one of the most valuable legacies of his foresight was the hundreds of timber reserves scattered throughout the agriculture areas. In later years many of these became Nature Reserves, and today these are a vitally important system of conservation reserves within the wheatbelt region.

The magnificent street trees of Kalgoorlie also stand as a memorial to this far-sighted forester.



Coral gum (*E. torquata*) (above) and mottlecah (*E. macrocarpa*) (top right) are two beautiful goldfields' gums that have become very popular with gardeners.



generators, as did the mines. By 1962 the woodline was only producing 9000 tonnes a year, most of that was logs and timber for use underground in the mines. But even that market was diminishing. The new underground technique of leaving rock columns standing to support the stopes, had reduced the demand for structural timber drastically.

In 1965 the Lakeside woodline ceased operation, and by 1967 the railway line, engines and rolling stock were sold for scrap metal. □



Marble gum (*E. gongylocarpa*).

## What Happened To The Woodlands?

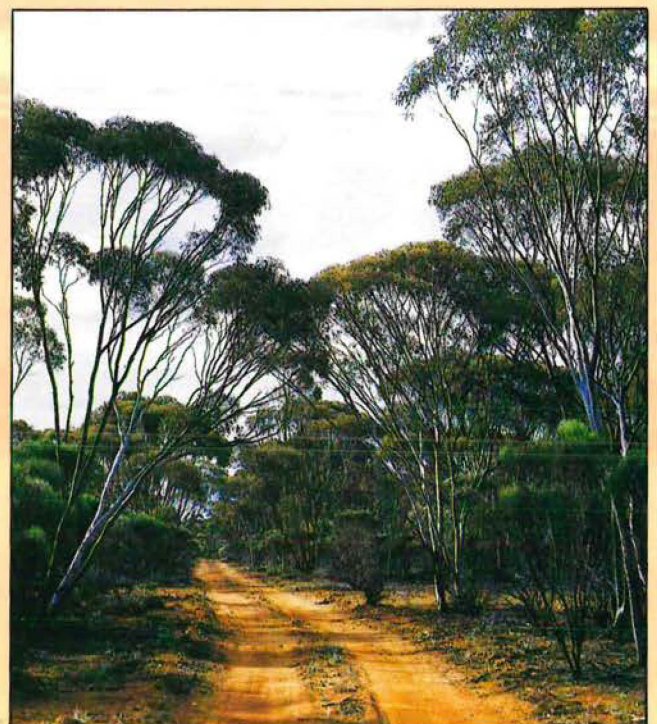
The visitor to the Kalgoorlie area may find difficulty in believing this story.

Healthy eucalypt woodland extends as far as the eye can see to the north, south and east of Kalgoorlie. With a few exceptions, the old woodline cutting areas have regenerated back to their former glory. Only the trained eye of the forester or the botanist can recognise the relative youth of today's goldfields woodlands.

But what of the evidence of the past timber harvest; the tree stumps and crowns that were not used? Termites have made short work of the branches and twigs of the tree crowns that were left behind. Tree stumps can still be seen, but not within a few kilometres of Kalgoorlie where they provided fuel for the miners' stoves.

The extensive cutting created a dearth of firewood within easy reach of Kalgoorlie. However, the ready availability of gelignite (or 'fracture' as it was so aptly known then) provided the miners with an easy way of reducing the iron-hard eucalypt stumps to lumps of burnable wood.

The exception to this success story is found on the broad drainage lines, or flats, to the east of Kalgoorlie. These formerly supported a woodland of salmon gum. Evidence suggests that the salmon gum flats regenerated as readily as the rest of the woodland, but were highly prone to grazing pressure by sheep. Those flats now support a



The regenerated woodlands.

shrubland of blue-bush. Interestingly, similar salmon gum flats to the north of the town, where grazing pressures were less, have regenerated back to salmon gum woodland.





## *A SWAMP FOR ALL SEASONS*

Bengier Swamp, 25 km north-east of Bunbury, is one of the State's most important wetlands for waterbird conservation. What is most unusual about Bengier is that it is also used for crop growing. CALM Planning Officer Susan Moore looks at the controversy surrounding Bengier and some of the difficult management decisions ahead.



Benger Swamp is like no other nature reserve in W.A. — its water levels are artificially controlled and the swamp bed is cultivated every summer. Why have such manipulative management? To understand that it is necessary to look at Benger's history.

## History

Over the 150 years of European settlement in the Benger area, the Swamp has been used for cattle grazing, potato and vegetable cropping, prisoner-of-war work camp, stick cutting and fodder cropping. Prior to this Aborigines used the plentiful supply of food offered by the Swamp — waterbirds, frogs, tortoises and wetland plants.

Local Aborigines referred to the place as 'Bengerup' (place of water) or 'Beenja' (big water). In April 1836, Governor Stirling, the first

European to explore the area, described it as a 'vast marsh and swampy plain, 2 miles long'.

By the 1890s the agricultural value of Benger Swamp had been recognised. Cattle were grazed on the dry Swamp bed over the summer months and by 1910 subterranean clover and water couch had been planted to provide pasture for stock. In the early 1900s the first potato crops were grown.

The 1910s was a decade of rapid expansion of the potato growing industry on Benger Swamp. The area was divided into 152 lots with an average size of 2-4 ha. As well as potatoes other vegetable crops such as peas, beans and maize were grown.

During World War II there was a lack of workers so the potatoes were harvested by prisoners-of-war. Under the

supervision of the Forests Department, the prisoners — known as the Civil Alien Corps — worked on the potato crops at Benger and Donnybrook.

By the 1960s only a small percentage of the Swamp was still being used for potato growing. Despite several irrigation trials Benger could not compete with the better potato-growing areas around Manjimup.

To enable crops to be grown and harvested before flooding in late May, the Swamp was drained in early December. To allow drainage (and facilitate filling) of the Swamp, and to prevent flooding of adjacent low-lying ground, a complex network of levees and drains was constructed. Thus, water levels on the Swamp have been artificially controlled for most of this century. During this time the Swamp was reduced from over 1000 ha to 570 ha.

The main drain at Benger Swamp.



Cliff Winfield



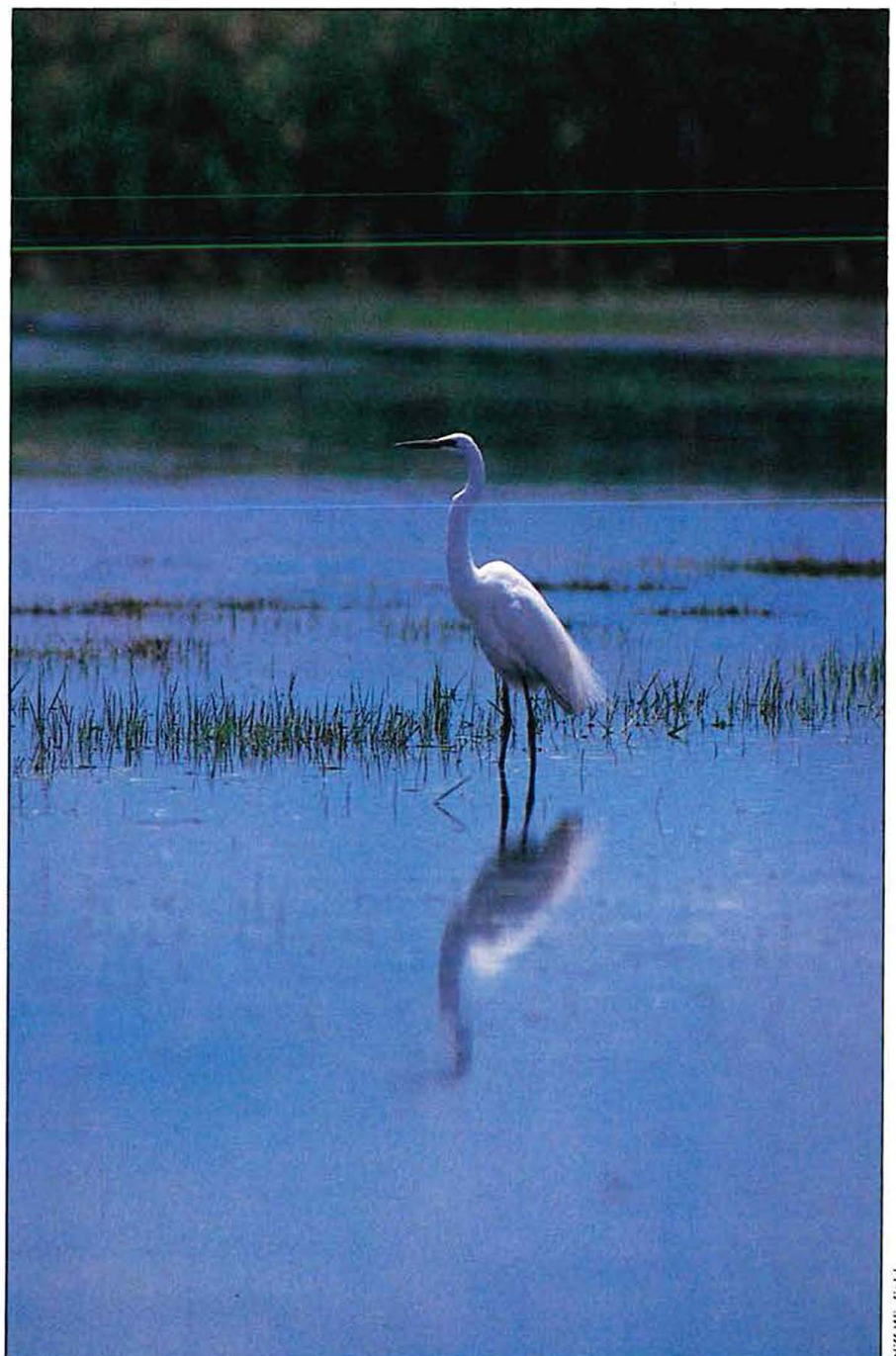
Agriculture also led to a number of other changes. The 200 ha cropped between 1920 and 1960 were treated with fertilizers and insecticides such as DDT. The native vegetation was cleared or disturbed. There was invasion by exotic species, particularly the rush *Typha orientalis* (bulrush) which several botanists believe to have been introduced with European settlement. Fires were used to clear parts of the Swamp prior to ploughing. The introduced *Typha* stands rapidly regenerated from its underground roots, but many of the native melaleucas were killed. The melaleucas are particularly important as they provide nesting areas for a number of waterbirds, including the Freckled Duck.

Benger Swamp is ranked, by the Royal Australasian Ornithologists' Union, as one of the top ten wetlands in south-western Australia. They observed over 3000 birds in November 1982 and 4300 in December 1985, with a total of 50 waterbird species — including 12 that were breeding. The Swamp is also one of nine known areas in south-western Australia where Freckled Ducks breed. The Freckled Duck is considered rare and in need of special protection in W.A., and is fully protected in all Australian States.

The conservation values of the Swamp were highlighted by honorary game warden Reg Taylor, who kept detailed records of waterbird use of the Swamp between 1957 and 1969. During the 1950s he regularly observed 2000-3000 ducks on the Swamp. Among these ducks was the rare and endangered Freckled Duck. He



Cliff Winfield



Cliff Winfield

Damselfly (top).

Great Egret (*Egretta alba*).





The Sacred Ibis  
(*Threskiornis molucca*)  
takes flight from Benger  
Swamp (left).

A swamp for all seasons:  
the same spot during  
winter; prior to planting;  
and planted with the  
fodder crop sudax  
(below).

Looking like the  
inspiration for a painting  
of the Heidelberg School,  
these dairy cattle graze  
peacefully near Benger  
(bottom).

Cliff Winfield



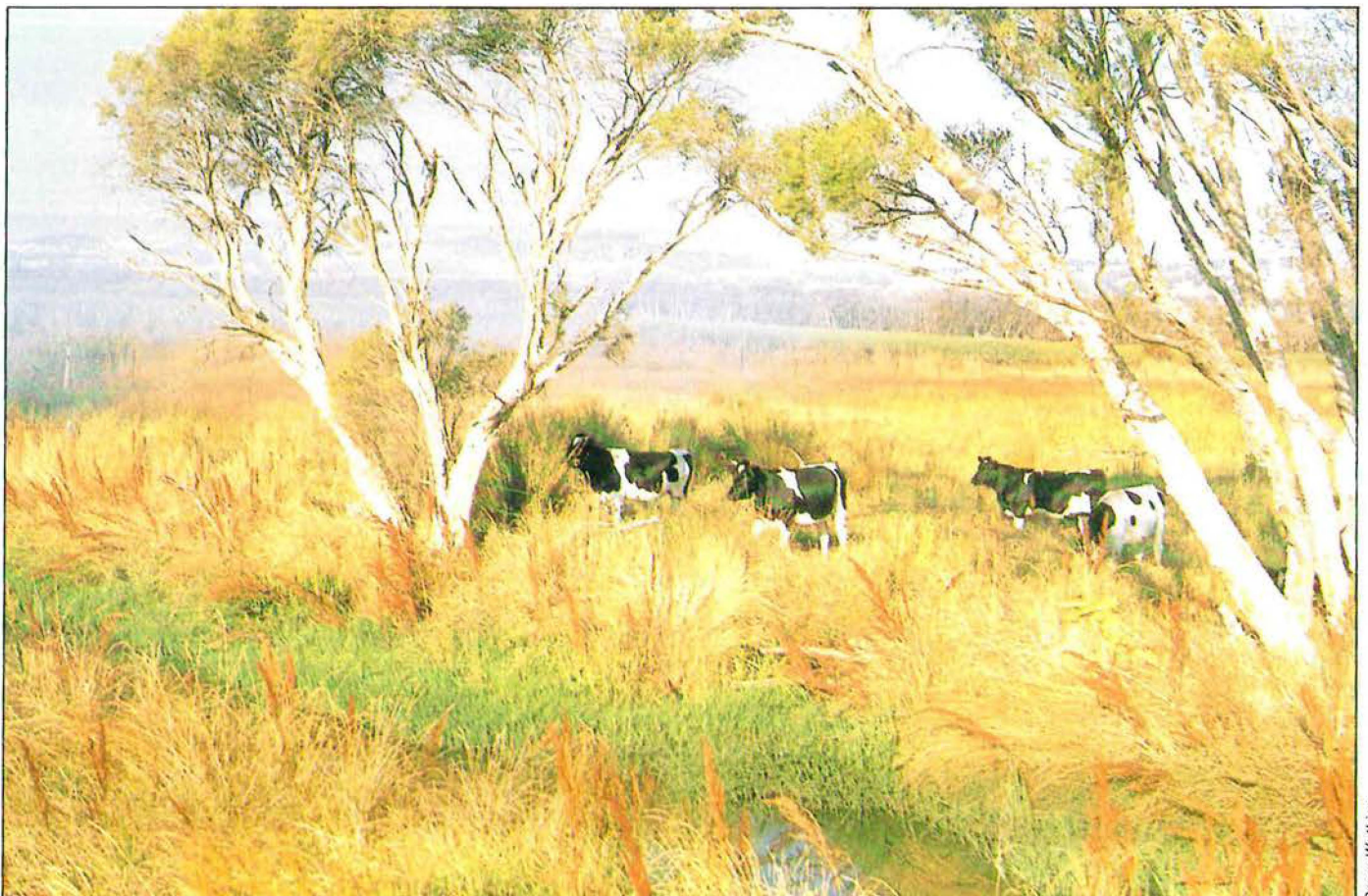
Doug Watkins



Doug Watkins



Doug Watkins



Doug Watkins



studied their nesting and made an important contribution to our knowledge of this species. This information provided the basis for purchase of 56 ha of the Swamp in 1973, by the then Department of Fisheries and Fauna.

## Habitat Requirements

The Swamp provides a range of habitats, both at one point in time, and through-out the year. In the former case, the Swamp offers open water or mudflats or grasslands (depending on the time of year), bulrush stands and melaleuca thickets and forest. Over the year a range of water levels, across all three major habitat types, is provided — from deep water (usually 70 cm) to drying mud flats. Areas of open water are particularly important as they provide landing and refuge areas, as well as feeding grounds, for numerous waterfowl.

## The Need for Manipulative Management

Benger Swamp is an example of the dilemma of managing an environment that has been severely disturbed; an environment that nevertheless has very high conservation values.

Integrated management is essential to deal with pressing issues such as bulrush control and duck shooting. Management decisions must also take into account complex land tenure.

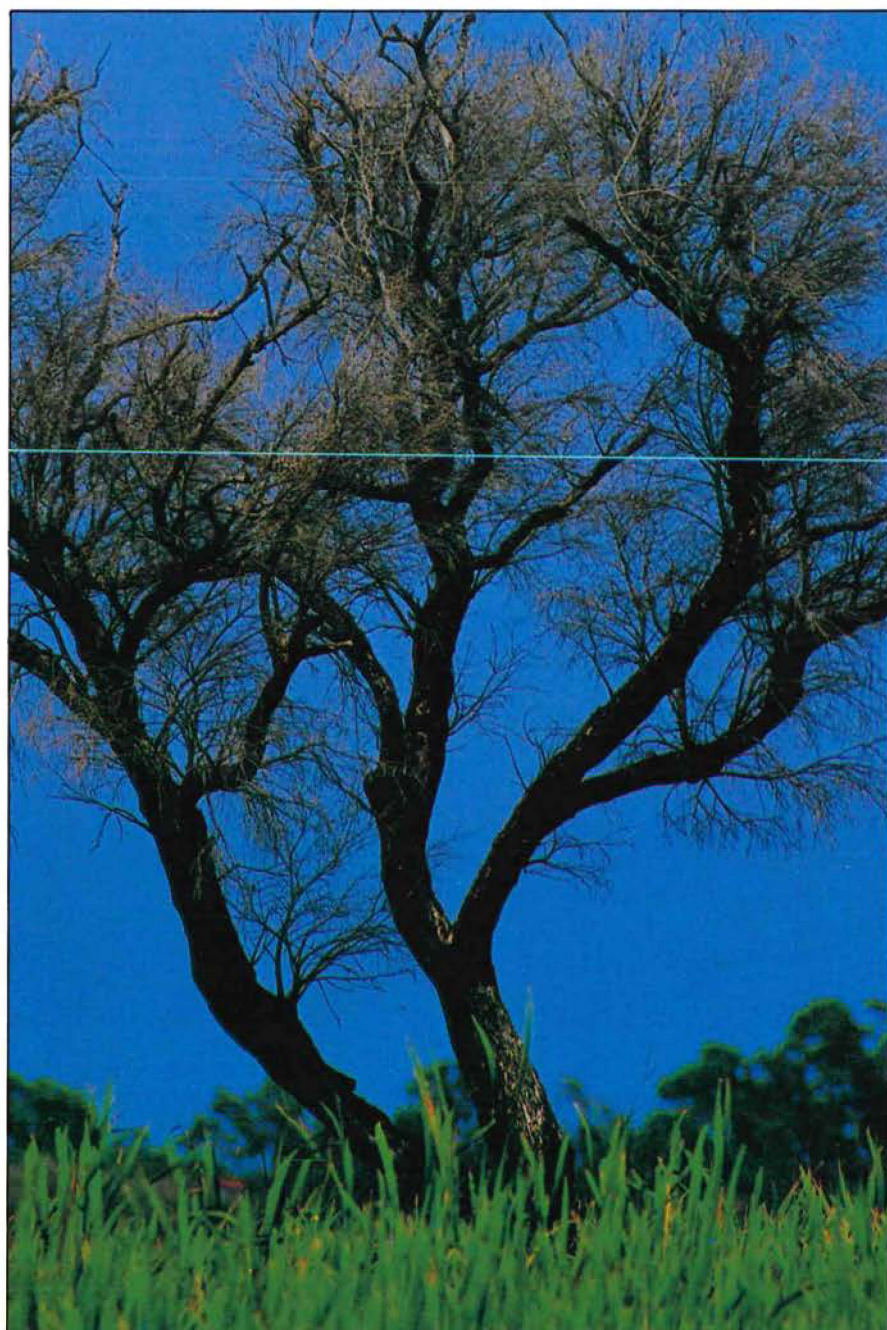
It is essential to control the spread of bulrushes, which currently cover 50 per cent of the Swamp. If control measures are not implemented, they are likely to spread and

cover the remaining 20 per cent of open water.

At present, ploughing and subsequent cultivation of open areas of the Swamp appears to be the most effective and economic method of controlling the spread of bulrushes. There are two possible approaches to cultivation — either employing contractors or leasing parts of the Swamp to local farmers. Leasing parts of the Swamp to local farmers, for fodder cropping, creates few costs for CALM and provides a small return to local farmers who undertake the work.

This has significant implications for drainage. If fodder crops are grown the Swamp can be left to dry naturally, as their short growing season allows harvesting before the Swamp floods in June. Vegetable crops on the other hand have longer growing seasons requiring that the Swamp is dry and ready for cultivation by mid-January.

Over the last 10-15 years the date of commencement of drainage has been based on the need to retain water in the Swamp for as long as possible to provide waterbird habitat and the need to have the



A burnt *Melaleuca raphiophylla*.

Doug Walkins



Swamp dry by mid-January so cropping can commence. It should be noted that if the Swamp was left to dry naturally it would only take an extra six to eight weeks to dry.

This artificial drainage regime has led to expressions of concern, particularly in recent years, that the Swamp's value as a refuge is being fore-shortened by a number of weeks and its values as a breeding area are being similarly affected. To assess the effects of leaving the Swamp to dry naturally the draft management plan proposes that the Swamp be divided into two compartments, north and south. The northern compartment will be drained so it is dry by mid-January, and the southern compartment will be allowed to dry naturally. This proposal will enable the Department to determine whether more waterbirds will use the Swamp if the entire area is allowed to dry naturally and if there are any adverse effects (e.g. increased salinity)

that may be associated with natural drying.

Water level management is made more complex by the range of land ownerships on the Swamp. Eighty-seven per cent of the Swamp is controlled by CALM, with 13 per cent under private ownership. A portion of this privately owned land is used for vegetable cropping, requiring that the Swamp be dry by mid-January. Allowing the southern compartment to dry naturally will not result in land-use conflict as all privately owned land lies in the northern compartment.

Benger Swamp has been used for many years for duck shooting. Over the last couple of years concern has mounted that duck shooting, although strictly controlled, may be threatening the Freckled Ducks at Benger. In December 1986 the Minister for Conservation and Land Management closed Benger Swamp to duck shooters for the 1987 season.

To achieve integrated

management and clarify management direction a draft management plan was prepared and released for public comment in December 1986. The public submission period associated with the draft plan provides an opportunity for those interested to comment.

Successful management of Benger Swamp for waterbird conservation is dependent on intelligent professional decisions and ongoing local support.

Copies of the draft plan are available for your comment. □

Write to:

Di Johns

Department of Conservation  
and Land Management  
50 Hayman Road  
COMO WA 6152

Phone: Di Johns, 367 0481

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The rare and  
endangered Freckled  
Duck (*Stictonetta naevosa*).



Roger Jaensch



# LETTERS

May I congratulate all concerned with Landscape on the consistent high quality.

With regard to the prison trees mentioned in the last issue, I heard another story many years ago that a mentally disturbed person was found by the police sheltering in the tree and he claimed he had been imprisoned there.

I will be in the west in January and hope to renew old friendships.

Vincent Serventy

As a teacher of environmental education and a long-time member of four wheel drive club in Perth I offer the suggestion that Landscape would be an appropriate forum for advising the public of proposed and recent track closures in National Parks. On a number of occasions in the past year I have been involved with organising Club trips through National Parks/State Forest areas. Having initially consulted relevant maps and then conducting reconnaissance/survey trips we have been surprised several weeks later when taking club members through these areas to find tracks closed for conservation management.

I have enclosed a gift subscription for our club with the hope of a wider readership of your magazine.

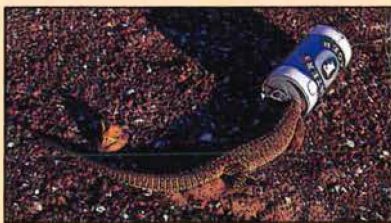
Alan May  
Dept. of Social Science  
W.A.C.A.E. (Mt. Lawley Campus)

The best thing to do is contact the Regional Office of CALM, or the local ranger (phone numbers are listed in the country directory) before you embark. You will then get up-to-the-minute advice on track closures, fire or road hazards, as well as good local information on features and new facilities. Ed.

Please find enclosed a photograph of a victim of littering along the North-West Coastal Highway near Minilya.

Attracted to ants the goanna poked its head in a little too far and would have died a lingering death if not found wandering on the road verge. The goanna was released with no ill effects far away from the road.

George Kulek



Your Bungle Bungle article in the Summer Edition 1986/87 was interesting and I have two questions that may be of interest to other readers.

- (1) You commented that 'Bungle Bungle became a symbol of our wild north-west'. While I have been guilty of also referring to that area as 'the north-west' should it not be referred to officially as 'the NORTH-EAST'? (Wyndham-East Kimberley Shire for example as opposed to the Kimberley West Shire across at Derby . . . also is not the Pilbara the true north-west?
- (2) On page 23 'What is Bungle Bungle'? My question — What does Bungle Bungle mean? How did 'it' come by it's name?

S.D. Breeden

My research proved fruitless — I leave this question to the readers.

Ed.

I wish to congratulate everyone connected with the publication of this beautiful magazine. I am a retired compositor (after 50 years in the printing industry), and the format, layout, art-work and type selection in this publication is first class. It is very pleasing to see the results of excellent craftsmanship. Keep up the good work.

M. Chance

## Editor's Note

We wish to apologise for the discontinuity in last issue's article 'Saving the Whales'; some paragraphs were transposed during production.

Your letters are welcome. Please address any correspondence to:

The Editor  
Landscape  
50 Hayman Road  
COMO, WA. 6152

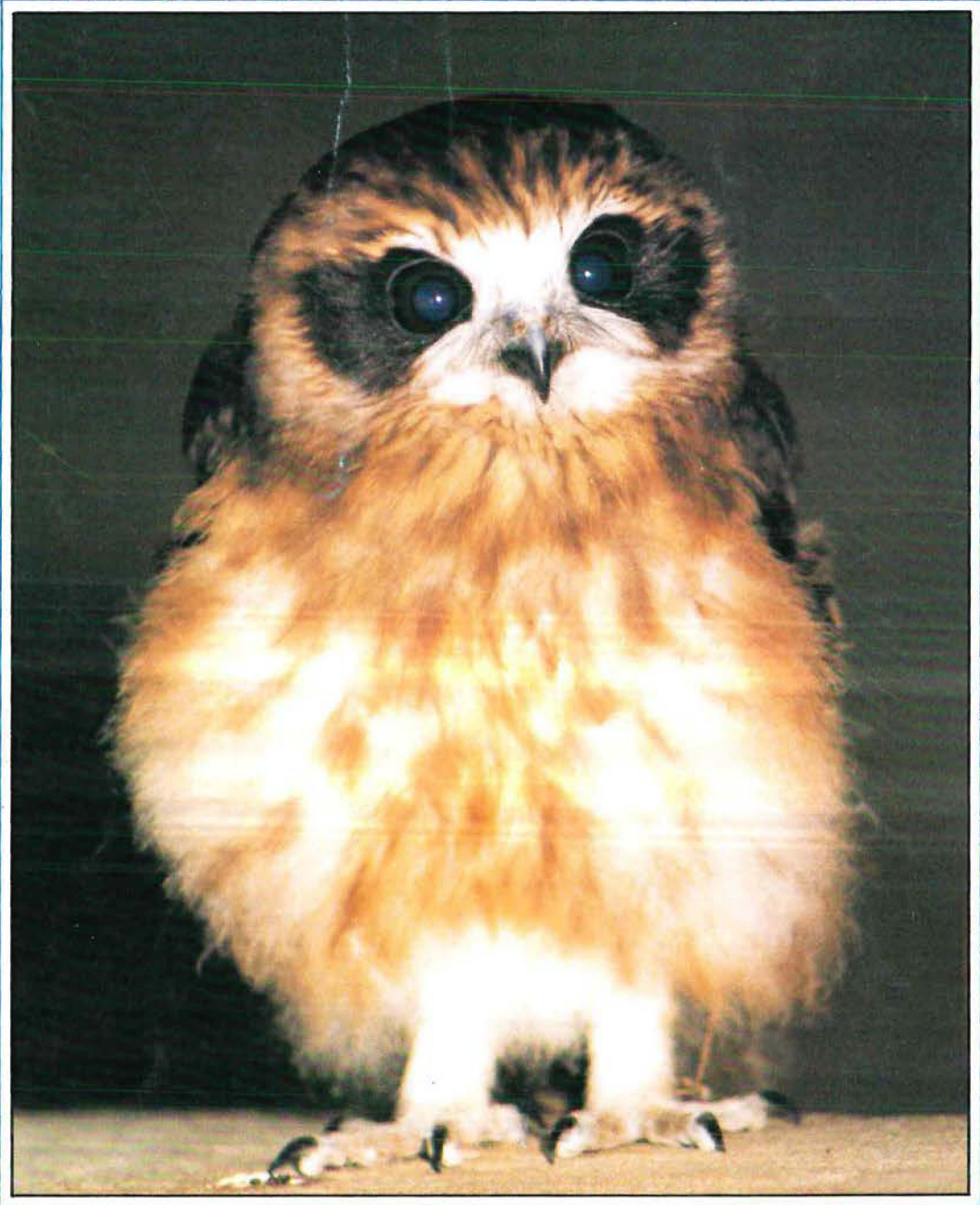
'Western Australian Art and Artists 1900-1950' will be open until March 29, 1987 at the W.A. Art Gallery. This show includes paintings, prints, drawings and watercolours by over 50 local artists.



Karri Forest, 1925, George Pitt Morison



## *Looking Back*



This young Boobook Owl (*Ninox novaeseelandiae*) was found inside the entrance to Crystal Cave, Yanchep National Park, by Ranger Rod Annear, and photographed by Ranger Terry Goodlich.

The Boobook gets its name from its two-noted call which sounds like 'boo-book' or 'mo-poke'. Its call is remarkably like a nocturnal version of the European Cuckoo.