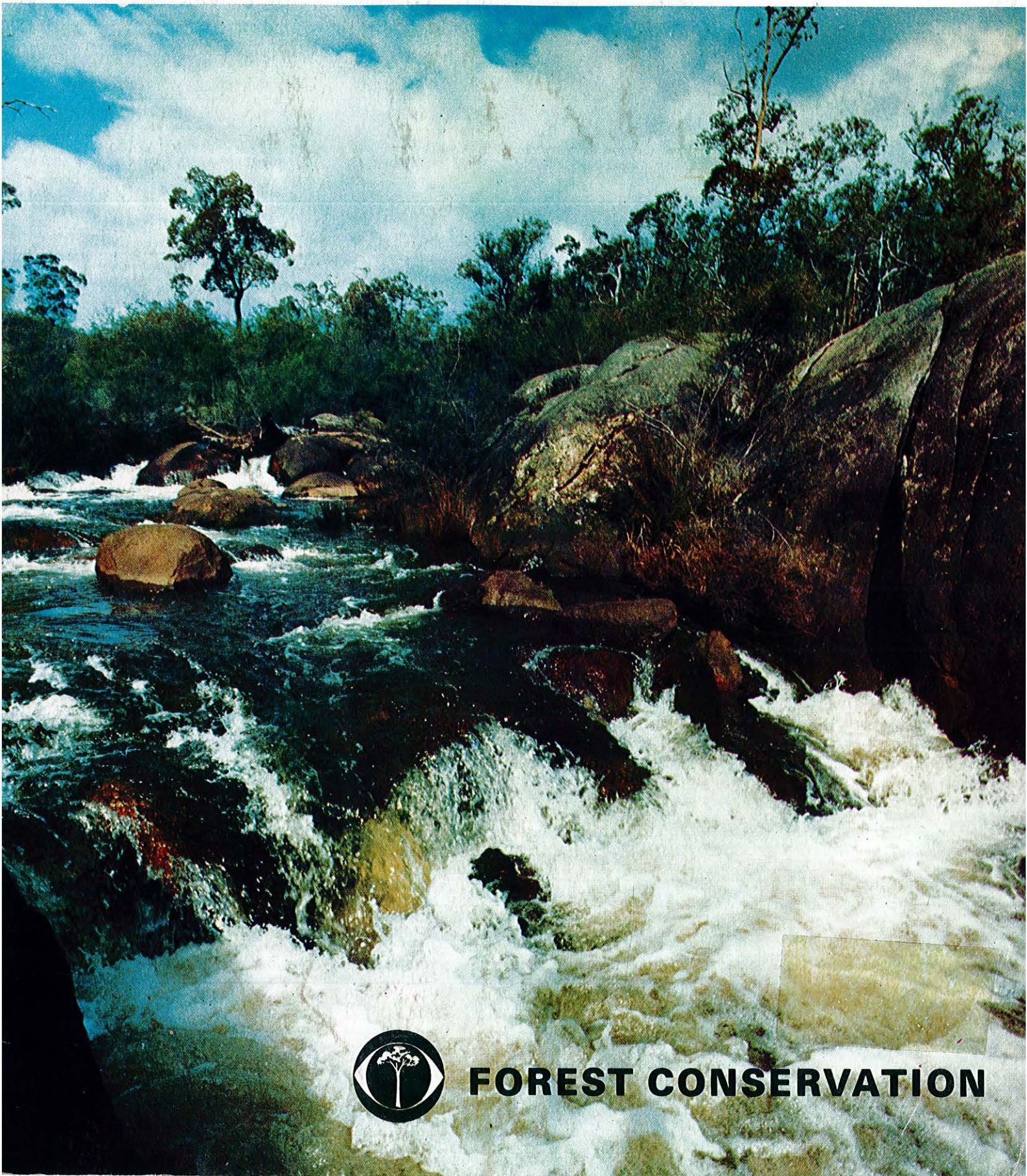
2.

NO. 2

FOREST FOCUS

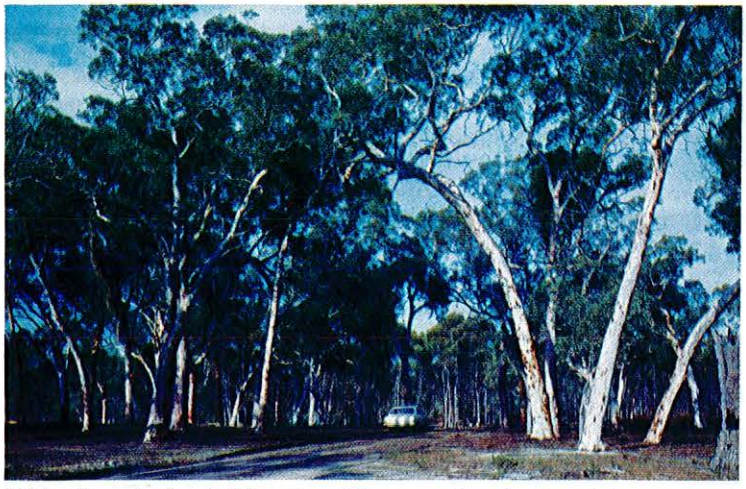


FOREST CONSERVATION

Red-winged Wren (Malurus elegans) *near Albany. In the background is the Albany Bottlebrush* (Callistemon speciosus).

Short-nosed Bandicoot (Isoodon obesulus) *photographed at night near Roleystone while feeding on bread.*

Numbat, or Banded Anteater (Myrmecobius fasciatus) *searching for termites at Dryandra.*



This Powderbark Wandoo (E. accedens) *stand in the State Forest at Dryandra supports an increasing number of numbats.*

Towering karri forest and the Warren River. A forest's indirect values are not widely appreciated.

FOREST FOCUS
Number 2, August, 1970

Published by the Forests Department of Western Australia under the direction of the Conservator, Mr. W. R. Wallace.

Compiled by **Dale Watkins**

FOCUS on Forest Conservation

Front Cover: *Fed by crystal clear streams in its jarrah forest catchment area, the South Dandalup River cascades to the plains below. By 1973 this river will be feeding a water supply reservoir of 45,800 million gallons—6,800 million larger than Serpentine Dam. (Photographed seven miles north-west of Dwellingup.)*

As years go by the world's population is becoming increasingly dependent on forests and forest products. Basic requirements such as timber, plywood, paper, poles and honey are no less important than the more sophisticated requirements of a modern world such as cellulose plastics, rayon and associated synthetics, film, explosives and a growing range of other products derived from wood by chemical or mechanical means.

However, to provide these forest products is only one function of forests. Broadly, there are four main functions of forests, and these could be classified as: productive, protective, recreational and social (see Forest Conservation article).

The forest recreation pictorial (centre colour pages) in this issue of *FOREST FOCUS* has been produced separately as a folder, and is available from the Forests Department, and the Tourist Development Authority.

Back cover: *Pine seedlings, Hamel forest nursery (see page 14). Some of the nine million pines produced by the Forests Department for this year's planting.*

The renown of the goldfields water scheme has long since spread further than the borders of Western Australia. The pumping of water from Mundaring Weir to early mining towns such as Kalgoorlie, 350 miles from the reservoir, an engineering feat of no small magnitude, made life bearable in arid towns where beer was cheaper than water in the early days.

Those who promoted and executed the scheme were no doubt most efficient engineers, however, they were not trained in forestry.

When the weir was nearing completion in 1903, fears—which later experience proved to be groundless—were held that the supply of water would not be sufficient to fill the reservoir.

As a result, it was rashly decided to destroy the forest cover in the immediate neighbourhood of the weir by ringbarking to gain increased water run-off from the slopes.

"Experience in other parts of the world was confirmed in this case. There was a tremendous rush of water causing a big overflow in winter, but many of the creeks which previously ran continuously dried up in the summer, and the water level fell in summer," according to an article in the August, 1920 issue of the *Australian Forestry Journal* by Mr. S. L. Kessell, who a year later was to become Acting Conservator and then Conservator of Forests in Western Australia.

An even more serious effect of this wholesale slaughtering of forest growth was "the increase in salinity of the water flowing into the reservoir, which caused much trouble and anxiety".

The economic loss to the community resulting from the ringbarking of 20,000 acres of jarrah and marri forest should have been in itself sufficient to deter those responsible for the misguided action.

The regrowth of young trees was magnificent, and had there been a forester in Western Australia in the succeeding years the position might have been partially retrieved. However, the regeneration, together with the accumulation of debris, provided ideal conditions for a disastrous blaze and the whole of the 20,000 acres of potential forest was ruined.

The necessity for an abundant supply of pure water for this vast artificial lake indicated the care and control of the Mundaring watershed as one of the first problems to be faced by future foresters.

The present (1969/70) average daily consumption of water in Perth Metropolitan Area is 85 million gallons. This daily consumption rate rises by four to five million gallons each year—so that in 10 years the daily consumption rate will probably be in the vicinity of 130 million gallons.

The Metropolitan Water Supply Department checks water supply reservoirs each day for total salt content, pH value, appearance, etc., and twice a year carries out complete and detailed analyses of water samples.

Concern has been voiced recently from various quarters about the effect the mining boom will have on water supplies. Nobody is prepared to guess just yet what will be the end result of bauxite mining on catchment areas.

The jarrah forest near Jarrahdale has been logged by sawmillers for 100 years, and in addition has supplied poles, piles, fence posts and firewood. The vigorous young pole crop pictured represents efficient forest management in the area.

Values of Forest Conservation

The direct advantages of forests to a nation are fairly well recognised by the majority of people—but their indirect values are not so widely appreciated. In fact some of the most important aspects are of a quality which are understood and appreciated only by those who have devoted long and patient study to the subject.

The values of forests can be broadly grouped into four principal functions in the interests of the community: protective, productive, recreational and social.

Protective function

Forest vegetation maintained in an effective condition is a vital factor in the regulation of stream flow, in the control of erosion, siltation, salinity and other phenomena closely connected with water conservation. Destruction of forest vegetation on watersheds or the reduction of its effectiveness by wildfire or other agency will jeopardise water supplies and increase soil erosion.

Forests promote infiltration of rainwater into the soil, preventing excess surface run-off. They assist in regulating violent floods and controlling stream flow.

It is agreed by scientific men all over the world, who have given attention to the subject, that trees in masses over large areas exert an influence on temperature, humidity and rainfall. In France the evidence collected on the point is quite conclusive. Historians mention many instances where the destruction of forests has totally altered the climatic conditions by converting what at one time were highly cultivated prosperous regions into something akin to deserts.

Glaring examples of overclearing of natural vegetation which come to mind are the North African coast bordering the Sahara Desert, the Dustbowl of America, and the deserts and barren mountains of the Middle East. Nearer home, examples of over-clearing can be found in the Mallee region of Victoria and some of Western Australia's agricultural areas.

The importance of maintaining forests as sanctuaries for conserving indigenous fauna and flora must also be recognised.

For nearly 50 years the Forests Department of Western Australia has managed one of the State's major flora and fauna reserves (State Forests) without detracting from its prime value as a natural resource. In fact, the title "Conservator of Forests" epitomises the functions of the Department.

By nature of their comprehensive training, foresters are competent to handle problems of forest and range management and protection, park lands, watersheds, and areas for recreation and habitat control for both flora and fauna.

A forester's training is evidenced in all aspects of the multiple use of forested lands.

Fire is a major forest conservation problem, because of the nature of the fuel and the weather conditions experienced over six months of the year in Western Australia. By rotational burning under prescribed conditions based on scientific principles, hazard reduction is carried out to protect the forest, adjoining landholders and small townships.

In addition to protecting native flora and fauna from the ravages of major wildfires, these controlled burns are responsible for regeneration of indigenous wildflowers and other understory species which provide food for native fauna.

Forests also serve as windbreaks, reducing the velocity of air currents at the surface of the earth and protecting adjoining fields from searing winds. They provide shelter for crops, stock and game. In general, forests tend to ameliorate extremes of climate.

Productive function

It is unnecessary to emphasise the importance of timber and other forest products in the general economy of a civilised country. Material produced from trees is encountered on every hand. From newspapers and books to the cardboard carton, through the long range of rayons, plastics and chemicals to the more obvious hardboard, plywood and sawn timber—the basic raw material in each case is wood.

Wood has one outstanding advantage—it is a replaceable asset. Its uses are numerous and ever-changing. With intelligent protection, conservation and renewal of the forest resource, the world can assure itself of continuous supplies of wood products.

Apart from wood, which is the major forest product, forests supply a variety of minor products including edible fruits and seeds, rubber, turpentine, tannins, honey, medicinal oils, charcoal, carbon, etc. In Western Australia, honey collection, tannin extraction, charcoal iron and wood chemicals are examples of industry dependent on the forest.

Recreational function

Forests have a definite value in their contribution to national welfare as recreation grounds. In this country, recreation needs must be catered for, and recognition of the value of public forest land as a place to relax is indicated by the demand for national parks in the different parts of the State.

It is fortunate that the main forest areas are located in close proximity to the major centres of population and are therefore readily available to the general public. These areas are easily accessible and well served by roads, which permits a high degree of usage.

In appreciation of this need for forest recreation, the Forests Department has undertaken projects such as the Rainbow Trail and the Cascades (see centre section of this issue), the wildflower sanctuary at Collie, One-Tree Bridge Reserve on Donelly River, and others.

A pilot survey carried out in the Mundaring and Kelmscott forest divisions by officers of the Forests Department indicated that in 1969 an estimated 237,240 people made use of State Forest areas within 35 miles of Perth.

The survey was designed to obtain information on: (*a*) The number of people using State Forests for picnics, sightseeing and other week-end activities; (*b*) Some indication of the habits, preferences and opinions of forest visitors; and (*c*) The proportion of people observed in certain locations within the forest.

The pilot survey has paved the way for future and more precise surveys which should provide useful information in future planning for recreational use of State Forest areas both for developed and undeveloped sites, sightseeing, etc.

Social function

Socially, forests provide several fields of employment, the total of which is a significant factor in a nation's economy.

Primarily, employment is provided in general administration and forest management. Here are included the staffs of the forest services, and the labour required for raising and tending forest crops, research, fire control, ultilization, etc.

It is estimated that one person could be directly employed for every 25 acres of an intensively managed pine plantation from the time of maturity. Our slower growing natural forest areas do not involve such intensive working as this but employment in these forests is still substantial under proper forest management.

The harvesting of forest produce, an operation including logging, sawmilling, pulping and other industries directly associated with the forest requires further labour. Labour is also necessary to transport produce between the forest and processing centres where a further large number of workers are employed in those industries which convert the raw material into marketable goods.

Possibly the classic example illustrating employment created by forests is that concerned with an intensive afforestation scheme involving the Landes district of France in the 19th century. This area, previously a waste of wind-blown sand, increased its population from 70,000 to over 300,000 in a period of 70 years, during which

time 2,500,000 acres of forest were established and worked.

Need for informed thought

There is a widely awakening interest in conservation among Australians, but for the most part it is not a sufficiently well informed interest to be an effective influence on national policy. One of the most important tasks is to appreciate what conservation means in practice, and what sort of decisions have to be made if the present generation is to leave the land as soundly productive and as attractive as it could and should be.

The need is for informed and clear thought on conservation issues which become matters of public controversy, and which are often debated without adequate appreciation of the background facts. Such subjects are mining in forest belts, the Great Barrier Reef, and kangaroos.

Outside the tall forest regions and in the semi-arid grazing lands, the attention of the conservation-minded public has focused on the kangaroo. Due to a considerable amount of research in the past decade it is now possible to weigh the various arguments on this subject against a background of facts.

Kangaroos are more efficient than sheep or cattle in converting vegetable food to animal protein, and their carcasses provide a considerably higher proportion of edible protein in the form of lean muscle. An animal so efficient in this respect, and in its adaptation to the inland environment, is clearly a natural resource whose utilization needs to be more fully explored—possibly on a basis of sustained yield utilization in the way W.A. State Forests are managed.

Far from being destructive grazers, they are particularly well adapted to live under marginal conditions while causing the minimum of permanent damage to the vegetation on which they depend. In contrast, grazing by sheep and cattle has led to a marked degradation of natural vegetation, particularly in the arid and semi-arid regions, and there is little doubt that continued grazing at the same stocking levels will cause still further deterioration.

This has been known for many years and is steadily getting more serious. The advance of the deserts, as it is called, is here with us in one of the most potentially and actually damaging forms in the world. The ecological balance of these regions has been seriously disrupted by uncontrolled and unwise grazing practices.

The one-time chief grazing resource in some marginal areas—the saltbush association—is rapidly disappearing and has gone from wide areas. The mulga, which was an emergency resource in drought times, is often no longer available due to over use and can no longer adequately regenerate.

The ill-conceived practice of flooding stock back on to the first green shoots after drought is wrecking the whole delicate fabric of plants and animals which once kept this land in balance.

Erosion setting in on overgrazed river flats in the East Kimberley region. The amount of topsoil removal can be seen from the exposed tree roots, left foreground. Overgrazing prevents regeneration of indigenous trees and plants which once kept this land in balance.

Wildlife in pine plantations

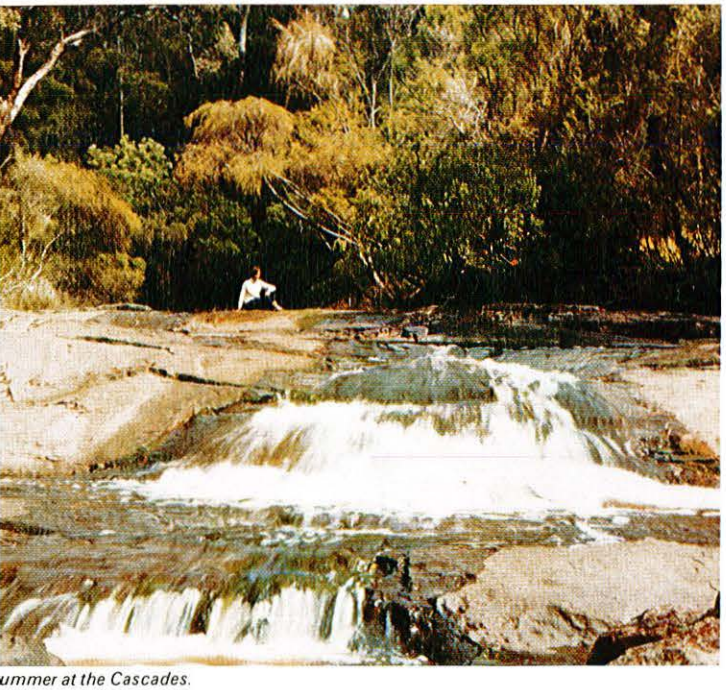
At Comaum Forest, in the south-eastern region of South Australia, great interest has been shown by neighbouring residents and many visitors in the obvious fact that kangaroos, wallabies, emus and wombats are thriving on the pine plantation firebreaks—in spite of, or perhaps assisted by, the 1080 poison.

Wombat gates were put in plantation fences by hinging a piece of welded mesh so that it could be opened by pushing inwards or outwards. These are sufficiently heavy to allow wombats to pass while preventing rabbits doing likewise.

For some years these animals have not been molested, and consequently they delay their departure when approached, eventually moving away into cover—more often into young pine plantations than into adjoining scrub.

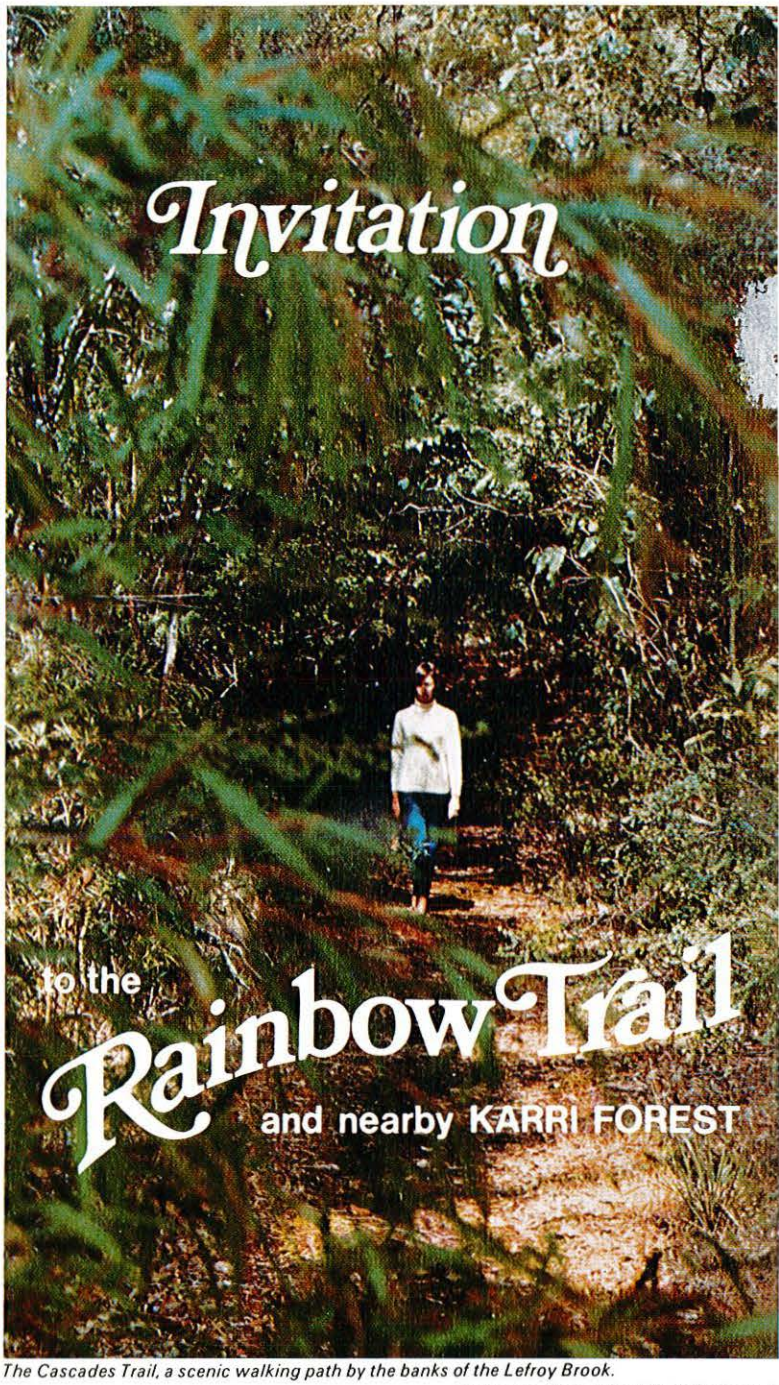
A problem of current concern is that this lack of molestation may lay the animals open to such ease of shooting that slaughter by vandal shooters could occur.

y crossing where Heartbreak Trail meets the Warren River.



ummer at the Cascades.

Dense young karri and undergrowth border a side track.



Invitation

to the

Rainbow Trail

and nearby KARRI FOREST

The Cascades Trail, a scenic walking path by the banks of the Lefroy Brook.

Barbecue-time at Karri Oak picnic spot.

Wind your way along Rainbow Trail . . . through the 7,750 acres of lush, green Big Brook forest . . . stopping on the way at Karri Oak, or the Arboretum picnic spot.

Enjoy a pleasant stroll through the towering young trees—or a vigorous hike following the footsteps of our pioneer timbermen and foresters. The trail commences just one mile west of Pemberton, near the Trout Hatcheries.

Big Brook State Forest consists almost entirely of karri regrowth stands.

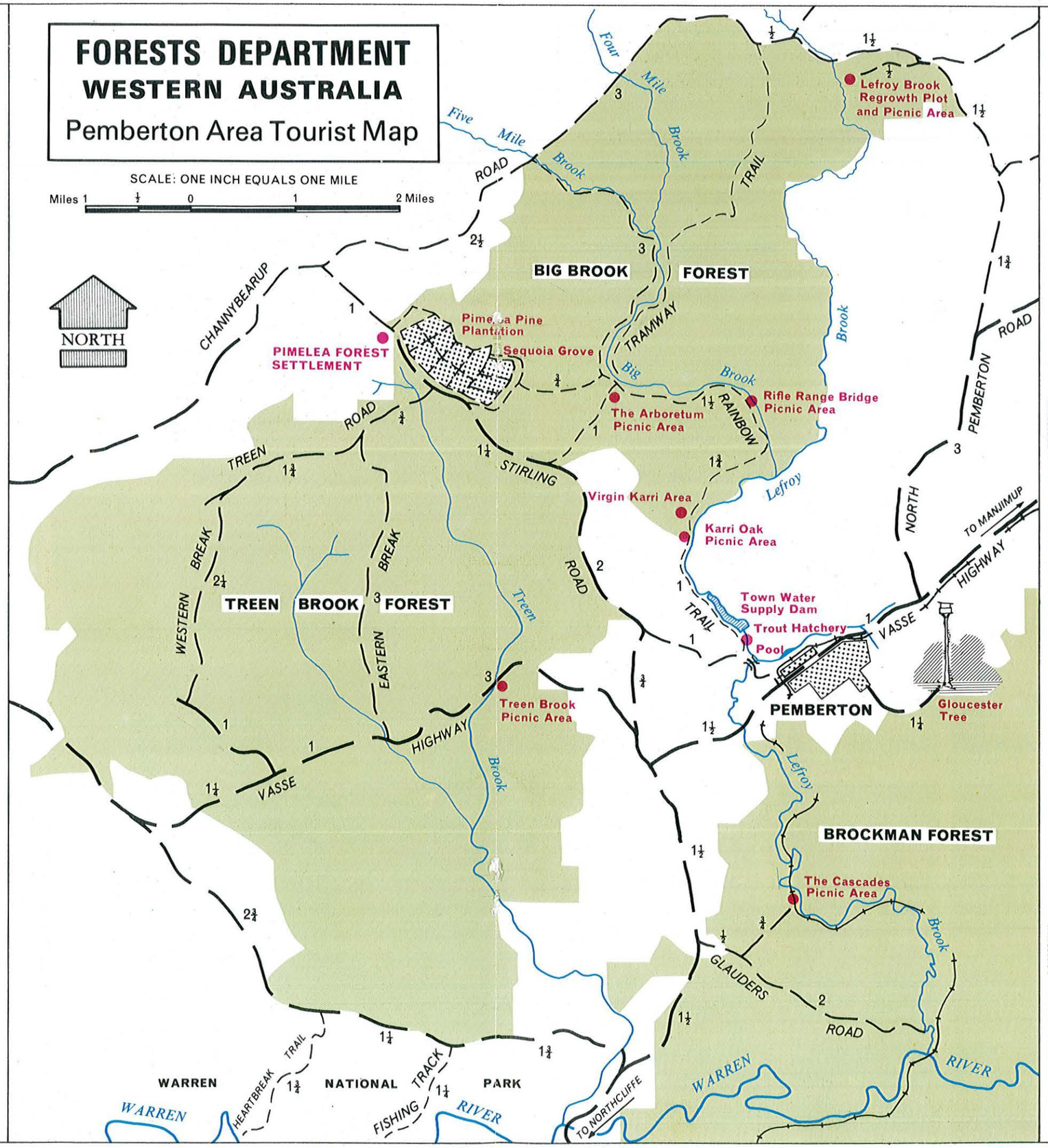
During the years from 1920 to 1928, a number of old wood-burning steam locomotives were employed on "bush tramways" through this forest, hauling giant karri logs to the State Sawmill at Pemberton. Part of the formation for this tramway was converted into what is now the Rainbow Trail, and other parts into the Tramway Trail which runs north through Big Brook forest to Channybearup Road.

Following felling operations, the forest area was regenerated in the summer of 1929-30. Karri seed germinated soon after the first rains in autumn in 1930, and grew into the 150 ft. tall regrowth stands you can see today.

This forest is still classed as immature. Careful tending, protection from wild-fire and controlled burning will be required over the next 80 years, when the cycle of cutting and regenerating will begin again.

Karri, together with the mountain ash of Victoria and Tasmania, is the tallest hardwood in the world. Trees up to 286 ft. high with girths at 4 ft. 3 in. from the ground of 24 ft. have been measured. This eclipses in height all of Perth's present tall buildings and those to be constructed in the immediate future. Some shorter karri trees with girths of 38 ft. have been recorded.

The Rainbow Trail and older sections of the karri forest are a world of their own . . . tall young trees; giant veterans of 700 years; lush green foliage; dew spangled waterbush (netic); flowering vines and plants; and . . . birds everywhere. In the karri blossom season flights of colourful parakeets invade the treetops, screeching their heads off all day long.



FOUR OF THE MANY FLOWERS IN THE KARRI FORES


D. H. PERRY

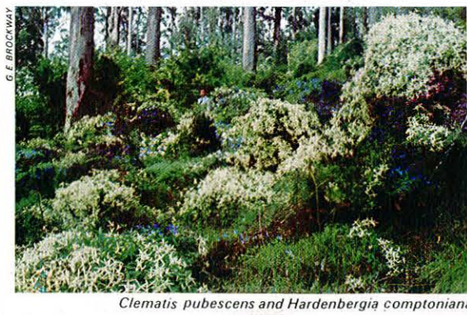
Crowea dentata.


G. E. BROCKWAY

Pimelea rosea


D. H. PERRY

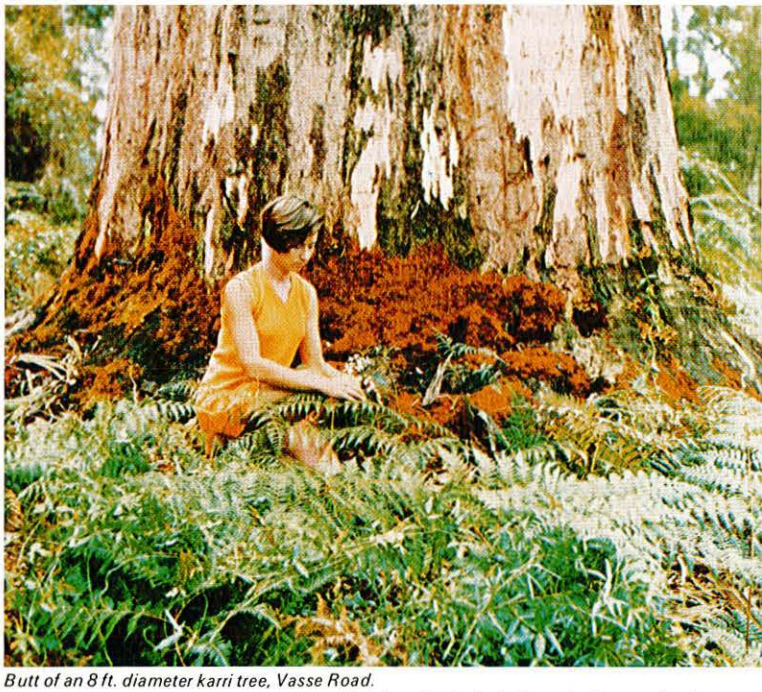
Beaufortia sparsa.


G. E. BROCKWAY

Clematis pubescens and Hardenbergia comptoniana

is area at Lefroy Brook picnic spot supported a wheat crop in 1865. Abandoned as a farm
1867 regenerated to karri after a fire in 1875.

Picnic seats and bench hewn form solid karri logs, at Big Brook Arboretum.



Butt of an 8 ft. diameter karri tree, Vasse Road.

Walking trails branch off the Rainbow Trail.

Rainbow Trail winds through vigorous karri regrowt

Eucalypts—a simplified key to 17 W.A. species

Australia is one of the oldest land surfaces of the world. It is said that many ages ago the continent consisted of a vast undulating plain covered by a comparatively uniform vegetation.

Subsequently the country was subjected to a series of major climatic changes which greatly influenced the vegetation, causing considerable destruction, modification and migration of species and communities. Mountain building, glaciation and inundation of large areas all played their part in producing the present complex pattern of plant life.

Of particular interest is the way in which the southern half of Western Australia has been botanically isolated from the rest of Australia. Here a very characteristic flora has been developed as a result of a desert barrier (including the treeless Nullarbor Plain which was once covered by the sea) limiting migration and intermingling of plants.

Eucalyptus is by far the most important genus of Australian forest trees. Its members dominate 95 per cent of our forest area and spread out over much of the remainder of the country.

Eucalypts have been able to adapt themselves to a wide range of conditions in both tropical summer rainfall and cool temperate rainfall areas—from the deserts to the snows. They occupy both dry and wet sites, even swamps in places, exposed positions and sheltered congenial slopes and valleys, infertile sands, rich loams and intractible clays.

As would be expected in such a widespread genus, a great range in form is exhibited by members growing under different environmental conditions.

A number of eucalypts are of shrubby form and are of interest, in some cases, because of their decorative appearance and drought resistant properties.

Identification of eucalypts is often not a simple task and a single characteristic is rarely sufficient for the purpose.

Over 600 species and variations have been named. Many different eucalyptus species have similar characteristics, and even the identifying characteristics on one particular tree or trees of the same species can vary greatly: e.g. *E. loxophleba* (York Gum) in the key.

A positive identification can generally result only from the careful consideration of a number of features possessed by an individual tree. The most helpful of these are the general size and form; the nature of the bark on the trunk and branches; the adult leaf characters, including venation and oil dots; juvenile leaf forms; flower colour type and size, shape and structure of buds and fruits. Where naturally-occurring plants are concerned, the geographical location and habitat can be of great assistance in their identification as many species are strictly limited in their distribution.

In response to enquiries received by the Forests Department, this article includes a simple key for identification of 17 of Western Australia's more important species, compiled by Forests Department Silviculturist, Frank Batini.

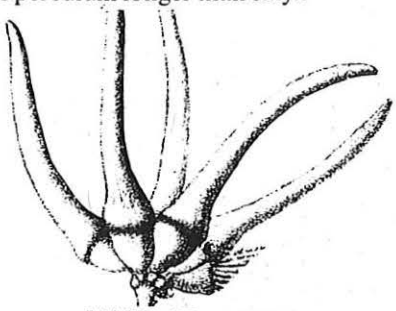
Example for using simplified key:
Assuming we have a tree with a smooth, greyish-white bark, large fruits and exert valves.

Under the major heading "Bark smooth", the specimen fits into the *colour* of bark category *greyish-white*. The large fruit and exsert vales would then place the specimen into the first of the next two categories, which means that it is *E. megacarpa*, or Bullich.

Explanatory notes

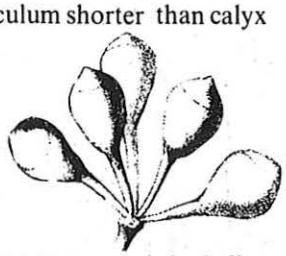
Eucalypt buds consist of the *operculum* which protects the developing stamens and which is eventually shed as these mature; and the *calyx* which develops into the fruit.

Operculum longer than calyx



YATE *(E. cornuta)*

Operculum shorter than calyx



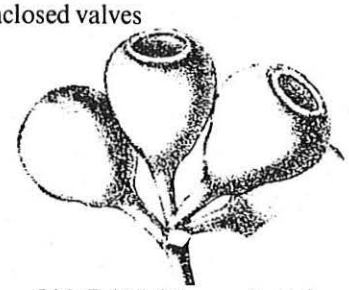
MARRI *(E. calophylla)*

When the seeds are ripe, the valves in the fruit open and the seeds are released. The valves may either be *exsert* or *enclosed.*

Exsert valves

BROWN MALLET *(E. astringens)*

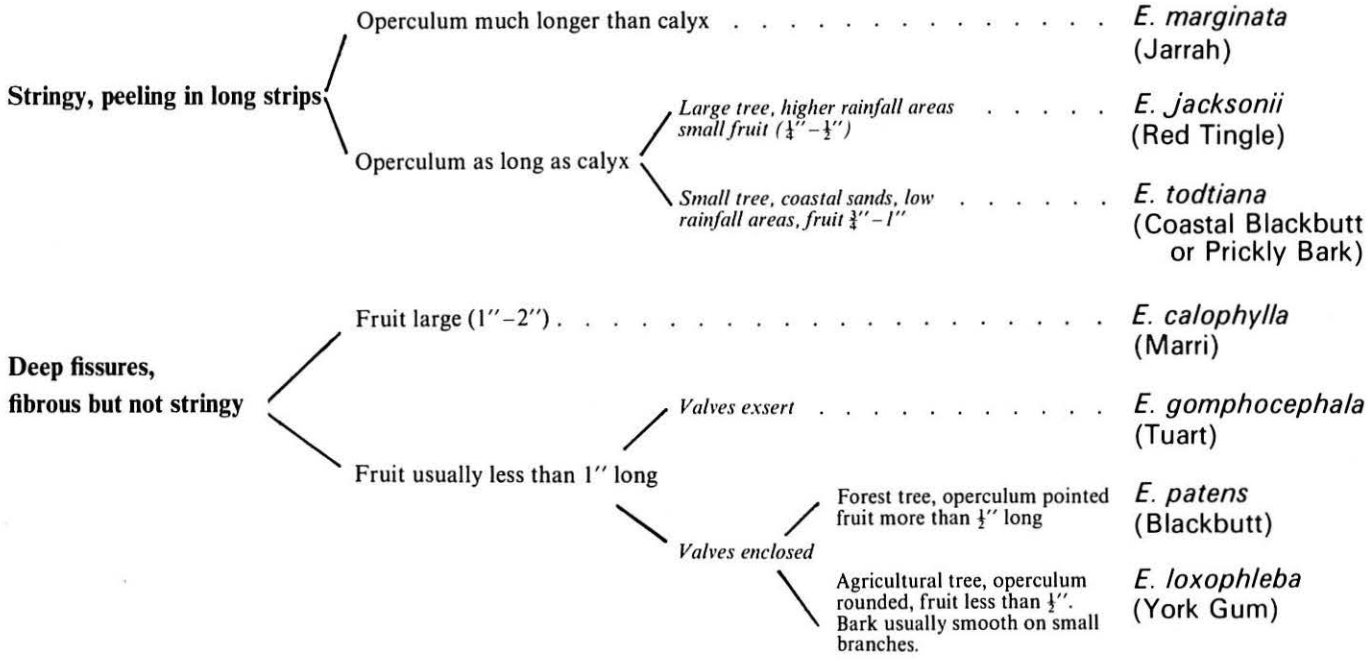
Enclosed valves



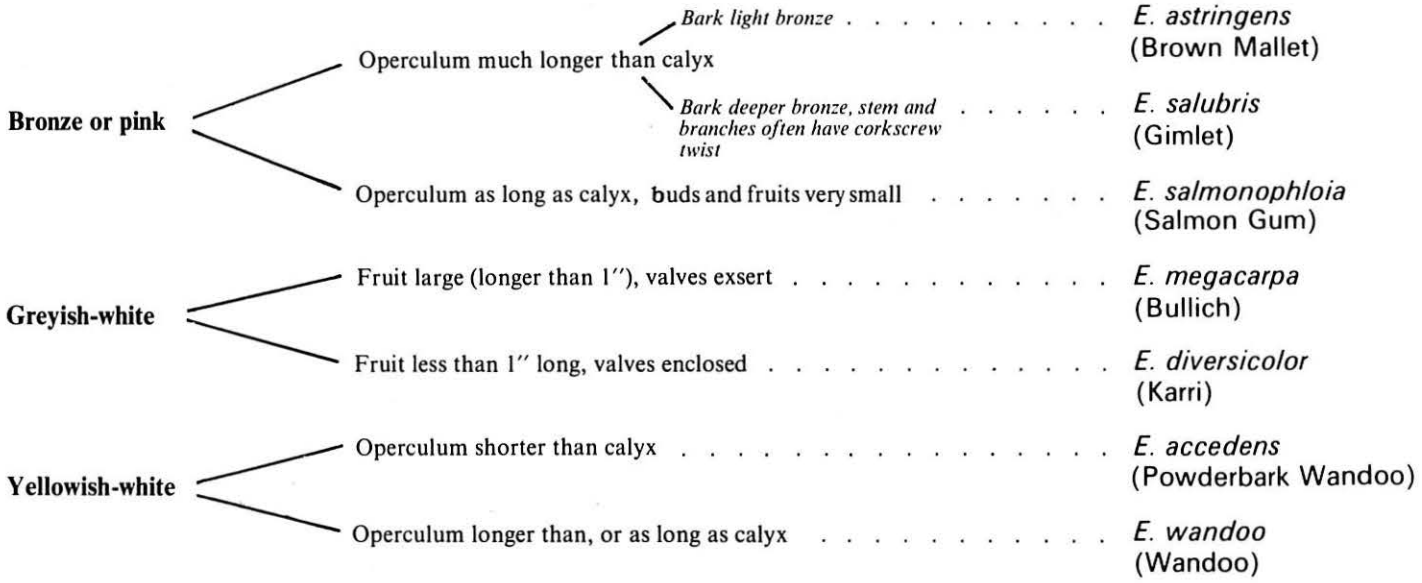
JARRAH *(E. marginata)*

Eucalypts—a simplified key to 17 W.A. species

BARK THICK, ROUGH AND PERSISTENT



BARK SMOOTH



BARK ROUGH ON TRUNK, SMOOTH ON LARGER BRANCHES

Operculum much longer than calyx (4-5 times); distinctive beaked fruit . . . . . *E. cornuta* (Yate)

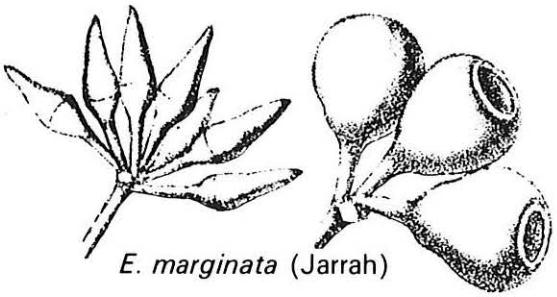
Operculum much longer than calyx (2-3 times), slightly ribbed, bell shaped fruit . . . . . *E. occidentalis* (Flat-topped Yate)

Operculum bluntly pointed, slightly longer than calyx . . . . . *E. rudis* (Flooded Gum)

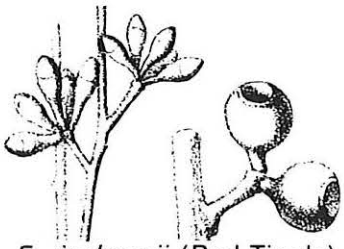
Operculum shorter than calyx . . . . . *E. loxophleba* (York Gum)

Buds and fruits of 17 W.A. eucalypts

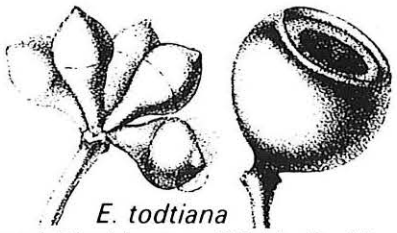
(normal size)



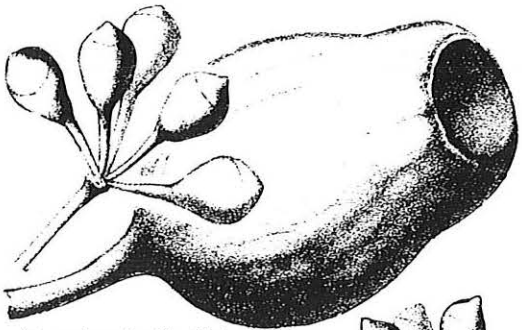
E. marginata (Jarrah)



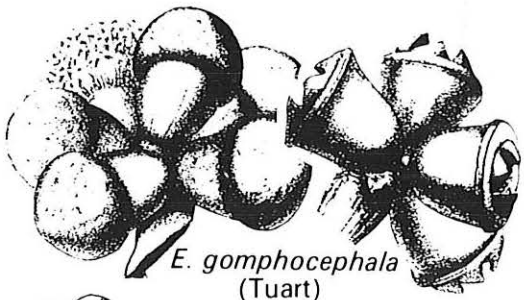
E. jacksonii (Red Tingle)



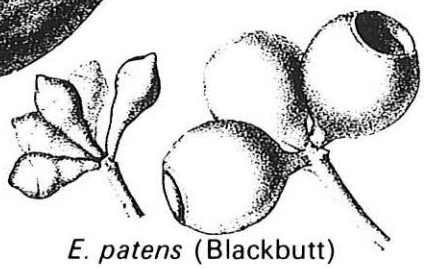
E. todtiana
(Coastal Blackbutt or Prickly Bark)



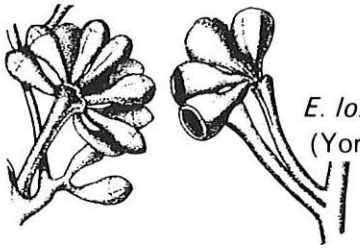
E. calophylla (Marri)



E. gomphocephala
(Tuart)

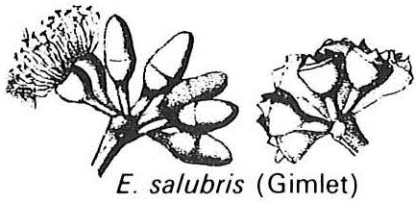


E. patens (Blackbutt)



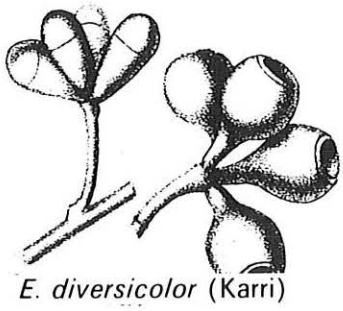
E. loxophleba
(York Gum)

E. astringens (Brown Mallet)

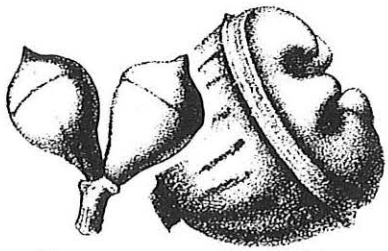


E. salubris (Gimlet)

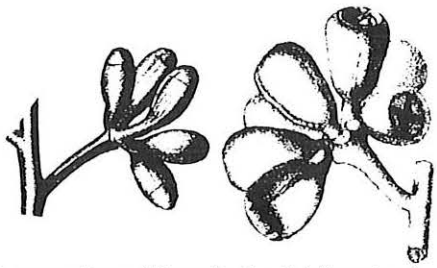
E. salmonophloia (Salmon Gum)



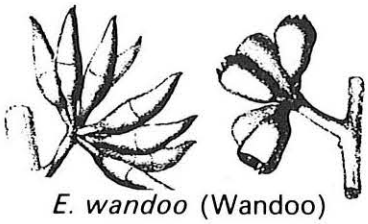
E. diversicolor (Karri)



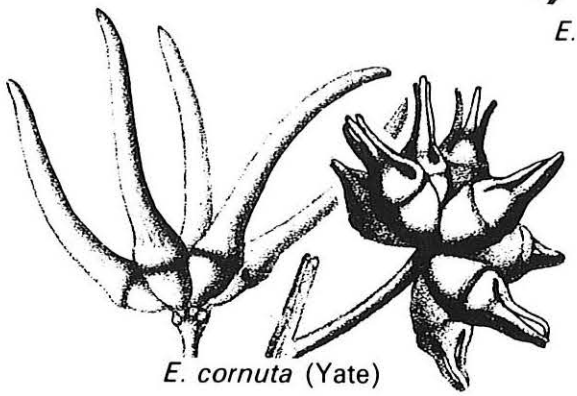
E. megacarpa (Bullich)



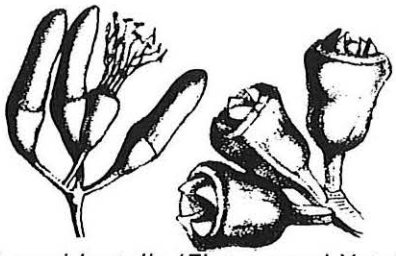
E. accedens (Powderbark Wandoo)



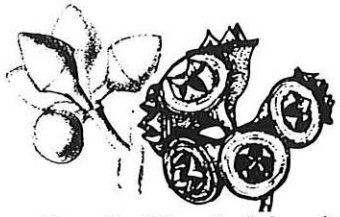
E. wandoo (Wandoo)



E. cornuta (Yate)



E. occidentalis (Flat-topped Yate)



E. rudis (Flooded Gum)

One million acres of softwoods

The planting of one million acres of conifers or softwoods will be achieved in 1970. This represents one-third of the national target figure to be planted by the year 2000.

The target of three million acres of softwoods is based on a sustained national planting rate of 75,000 acres a year.

It is anticipated that each year the States will plant 63,000 acres, the Federal Territories 2,000 and private enterprise 10,000.

As mentioned in the April, 1970 edition of *Forest Focus*, Australia's millionth acres of plantations (mixed softwoods and hardwoods) was achieved in the 1969 planting season.

In Western Australia this year, the Forests Department has programmed a planting of 6,257 acres of pines (*Pinus pinaster* and *P. radiata*) in nine forest divisions, not including at least 813 acres of five or more different species to be planted in trial plots in each of the 12 forest divisions from Wanneroo to Shannon.

An interesting point is that the largest single trial plot is one of 250 acres of pinaster on areas which have been mined for bauxite in the Kelmscott Division.

By far the largest planting (2,508 acres of pinaster) will be north of Yanchep and will be visible from the Lancelin road, while the second largest (1,073 acres of radiata and 60 acres of pinaster) will be in the Nannup/Kirup divisions. These figures do not include trial plots.

In the Dwellingup division 315 acres of radiata will be planted in the Murray Valley, plus 160 acres of pinaster trial plots in other locations. The Murray Valley plantation will reach a final area of about 15,000 acres. Eventually the valley will be flooded by another water supply reservoir, and pines are being planted to obtain the most production from this area in the short time available.

BACK COVER PHOTOGRAPH:

Pine seedlings in the Hamel forest nursery—some of the nine million pines produced this year in Forest Department nurseries.

Contouring plantation roads for soil conservation, Murray Valley.

Tandem planting machine in operation on coastal sands north of Yanchep. Inset shows seedling emerging from the tamping wheels.

This degraded farmland not far from Nannup is now supporting a vigorous stand of young pine trees. The steep, rocky and bracken covered slopes in the background were purchased by the Forests Department for plantation establishment. Easier slopes in the foreground were retained by the farmer.

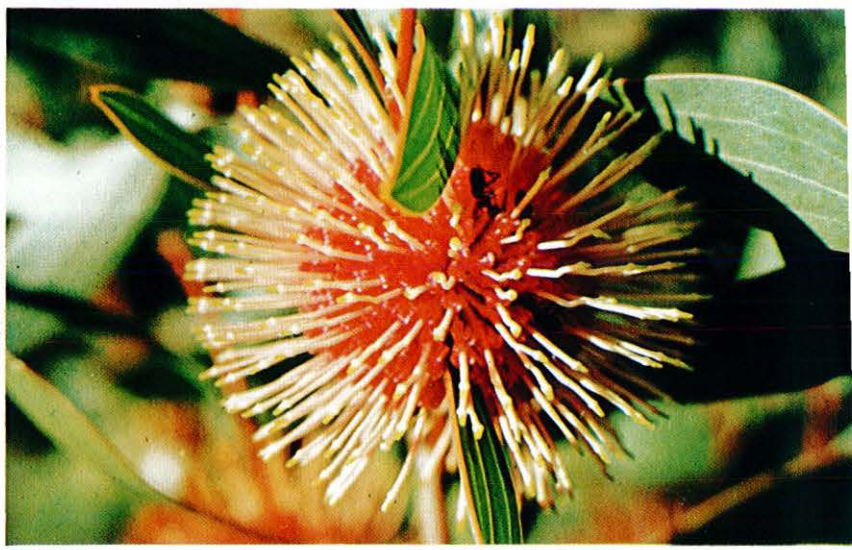
Queensland party sees W.A. forests, flowers, farms

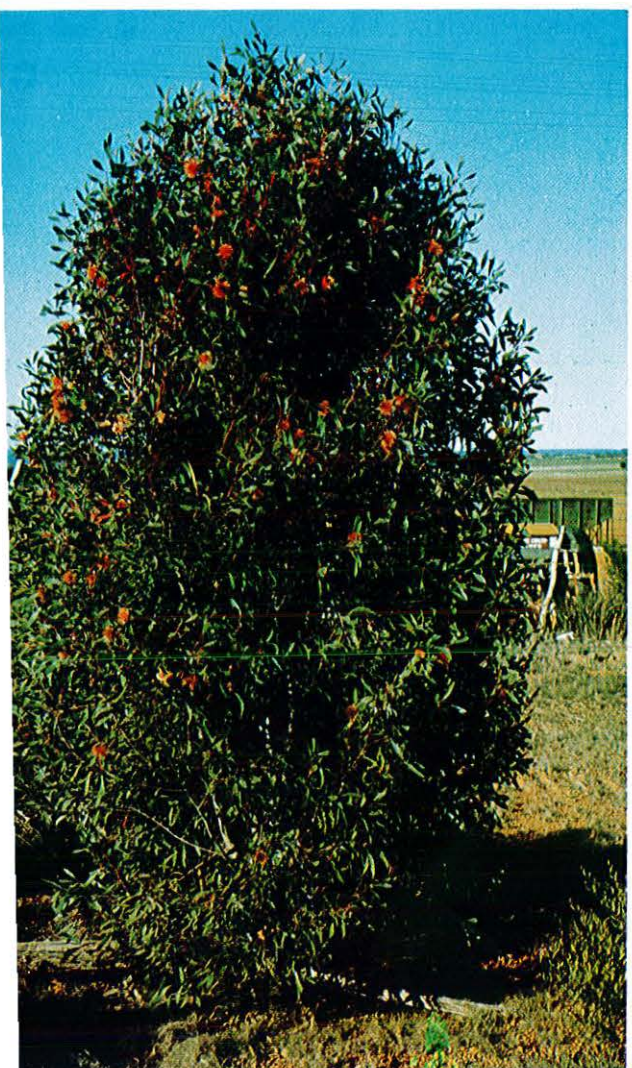
A party of six Queensland Parliamentarians and senior Government officers late last May visited the south coastal and south-west regions of Western Australia in a study tour of hardwood forests, national parks and forest recreation spots, pine plantations and two major Forests Department research centres.

They also visited the Esperance region to examine current practices in farm land development.

The party was composed of the Hon. Vic Sullivan (Minister for Forests and Lands) and Mrs. Sullivan, Mr. Ken Tomkins (M.L.A.) and Mrs. Tomkins, and Messrs. Harold Hungerford (M.L.A.), Cec Haley (Conservator of Forests), Bill Wilkes (Secretary, Department of Forestry and Chief of National Parks) and Brian Heffernan (Land Utilization Board).

The tour was organised by the Forests Department of Western Australia, assisted by the Lands Department for the Esperance region.





Roadside flowering trees

During the tour photographs were taken of flowering trees which grow naturally on the roadside verges. The Four-winged Mallee, top, was taken east of Ravensthorpe, and the Pincushion Hakea in the Jerramungup townsite.

Four-winged Mallee

(Eucalyptus tetraptera)

Attractive when in bud and in flower, and always distinctive because of its large, square fruits (about 3 in. in length) and large, very thick bright green leaves, which are the thickest of any species of eucalypts. The shrub will thrive in poor sandy soils.

Pincushion Hakea *(Hakea laurina)*

A vigorous growing, well shaped tree with foliage resembling the golden wattle, but having parallel veins and a fine red margin. This attractive little tree has proved very successful in warm, dry districts for street and park planting, but will not tolerate a pocket of over-wet soil. It is highly prized on the French Riviera. Above: Close-up of the flower. Note the nectar seeking ants. Left: Healthy roadside tree about 10 ft. high.