Leaf & Branch

Perth's own trees and tall shrubs are hardly known - or grown - by locals. A new book by naturalist Robert Powell aims to change all this. Leaf and Branch, *the definitive guide to Perth's trees and tall shrubs, shows us how to understand and appreciate these local characters, how to collect and grow them, and how to study them and help them survive. Robert not only describes each plant in detail, but wants to change our attitude towards them. The first chapter of* Leaf and Branch, *on the beauty of Perth's trees and tall shrubs, reprinted here in a slightly condensed form, shows a different way of looking at our botanical heritage.*

THE way we see trees and shrubs is conditioned by attitudes we learn. Most books on horticulture are illustrated with spectacular displays of brightly coloured flowers, which we have been taught to recognise as beautiful. Most of nature's trees and shrubs, however, have more modest displays. Furthermore, books emphasise particular features of a tree or shrub, and largely ignore what it looks like as a whole. Where they do mention shape they praise regularity and compactness, whereas most natural trees and shrubs are irregular and diffuse.

With such preconceived ideas we see beauty only in a minority of species. But there are other ways of looking at Perth's trees and tall shrubs - and there is beauty in every one!

THE TREE AS A WHOLE

Look at a tree as a whole and examine the space it occupies. It extends upwards and outwards in different directions. Walk around it and it changes shape and structure from every new angle.

Stand close to the tree and you will appreciate its three dimensions, particularly if the sun is high and parts of the tree are lit up. Stand further away and the tree looks more two-dimensional, especially if the sun is low. If the sun is behind you, the tree looks heavy and solid, with thick, opaque foliage. Look at it against the light at sunrise or sunset, and the tree is a silhouette, delicate and detailed; the foliage is broken into a texture, and twigs normally hidden by foliage are revealed.

The space a tree occupies depends on its shape, and its shape depends on its structure. The *shaft structure* consists of a main trunk with side-branches. Trees with a *splitting structure* have trunks that divide into two or more near-equal stems, which continue to divide fairly equally.

The shaft structure is more typical of trees, the splitting structure of shrubs, but there are many variations and combinations of the two. Often trees have the shaft structure as saplings - which helps them gain height rapidly - but develop the splitting structure with age.

Different species also vary in the degree to which individual trees adhere to the structure typical of the species. The introduced Norfolk Island pine is a good example of *template growth*: all specimens develop the same structure. At the other extreme is *opportunistic growth:* each specimen grows according to its individual circumstances. Saltwater paperbark, for example, may have one trunk or several, and be upright or sprawling.

PATTERN AND DETAIL

Different tree species have characteristic patterns; for example, the foliage of bullich is arranged in tight clumps, whereas that of flooded gum is much more dispersed. Different sizes of leaf affect the texture of the foliage. Some patterns affect others; terminal flower-spikes in banksias cause branching or bending of the stem, and heavy clusters of fruits on some eucalypts, particularly marri, often result in pendulous or wiggly branches. These patterns give the tree harmony and character. The individual variations between parts of the pattern - the precise shape of each clump of foliage, the curve of each branch - produce an abundance of detail. The tracery of dead twigs and branches echoes the patterns of the live parts and also adds detail.

EFFECTS OF ENVIRONMENT

The appearance of trees is affected by the environment. Jarrah on the coastal plain is vastly different in size, shape and structure from jarrah in the Darling Range. Although the difference may be partly genetic, the environment is the major cause.

Jarrah branch weighed down by fruits. The strong new shoots along the branch will result in a bend, as shown by the arrows. ▲▲

This picturesquely stunted chenille honey-myrtle is growing in rocky limestone soil, which has not allowed it to develop fully. Although mature, it is only 1½m tall.▲

Previous page. Powderbarks in early winter. This species can be found in John Forrest, Walyunga and Avon Valley National Parks. Illustrations - Margaret Pieroni

A tree will not grow to full size if the soil is too shallow. Thus many trees growing in coastal limestone or granite areas of the Darling Scarp are stunted.

Coastal trees often have a pronounced lean. Sea winds deposit salt on the foliage, particularly on the seaward side. This kills young shoots and stunts growth on that side, causing a lean. Large trees can be affected up to 10 km from the coast. If a number of upper branches are killed by salt, a tree will often shoot from dormant buds lower down to form additional branches. Thus near the coast trees tend to be lower and more branching.

Climate has a more general influence. Even within the metropolitan region there is enough variation in climate to have an effect. Trees grow larger in the south than in the north, where rainfall is slightly less and temperatures and evaporation slightly higher.

Other forms of life have an important influence on trees and shrubs. Fungi in the inner wood of old trees can cause branches to weaken and break. Insects often alter growth patterns. If leaf-eating insects eat a dominant shoot, other shoots will take over, producing either a fork or a slight change in the branch's direction. Wood-boring insect larvae that ringbark a branchlet have a more pronounced effect. Eucalypts recover by means of dormant bud. Species without dormant buds, such as wattles, divert their energy into other branches rather than form new ones.

Insect attack is thought of as ugly, but is it? Trees virtually devoid of insects in their foliage or branches tend to be symmetrical and regular. Those that support insects may well have basic symmetry, but will have subtle, yet pleasing, irregularities. In a natural stand of trees, some specimens will be attacked by insects more than others, resulting in a greater variety of form and detail. Yet they will harmonise and present a pleasing unity.

Insect attack, in moderation, can actually benefit trees: they have evolved to cope with it. Without insect attack a tree can be burdened by dense foliage or excessively large clusters of fruits.

The environment at each locality is often not uniform. A tree near the top of a coastal dune must endure drier soil and stronger salt winds than a neighbour in a nearby swale.

Often the main influence on a tree is exerted by its nearest neighbours. In a forest, competition for light causes trees to grow tall and straight. In a woodland, the dominant trees occur both singly and in irregular groupings, and therefore vary more in shape. Trees on the edge of a tight group develop most of their branches on the side where they have space. Tree seedlings that germinate in the shade of an existing tree will grow out at an angle until they find light, then bend upwards. Many gracefully leaning trees are produced in this way.

If a tree loses one of its larger near neighbours it will respond to the extra light and reduced competition. If it had been forced to grow at an angle its main growth will change to a vertical direction. New shoots are often put out along the trunk, and grow into strong new branches that eventually form most of the canopy.

ACCIDENTS OF NATURE

Fire can have a dramatic effect on vegetation. In our hot, dry summers, fires can occur naturally, but have become more frequent, and sometimes more intense, since European settlement. One significant factor has been the introduction of exotic grasses.

Some species of tree or shrub are killed by fire. Of those that survive, some are more resistant than others. Even the most resistant can lose branchlets or whole branches. If fires are frequent and intense, trees may not be able to recover fully between fires; hence there are many stagheaded specimens in metropolitan bush areas.

Trees can also lose branches in strong winds or when other trees fall on them. The scars and irregularities add variety and detail.

This bullich has recovered from a severe fire by shooting from the base and from its lignotuber, below ground. Originally a tree with a single stem (its remains are at the right), it is now a mallee, with many stems.▲▲

Burnt candle banksia and common sheoak, Jandakot. The banksia is shooting near the ends of its branches; its crown will soon recover, and the tree will have changed little in shape or structure. The sheoak, however, is sprouting from the trunk and lower branches. Its crown has largely been destroyed and the regrown tree will be very different from the original.▶

Upright Snottygobble

Persoonia longifolia

The casual observer would not guess that this species and spreading snottygobble are related, so different are they in bark, leaves and general appearance. But their flowers and fruits are very similar.

The leaves too, although very different in shape, do have similarities. In both species they are soft and flexible, and mostly held edge-up (like those of eucalypts). They are also arranged in the same way on the stem, being either alternate or crowded (rather than in whorls or opposite pairs).

Spreading snottygobble captures attention by its colour and growth habit. Upright snottygobble is striking too. Its bark is coarse, flaky and colourful. Peel a bit off, and the inside layers are reddish-purple. The leaves are long and somewhat sickle-shaped, and combine in shaggy clumps.

Upright snottygobble has a much simpler form than its relative. It is an erect small tree or shrub 1-5 m high, with few branches.

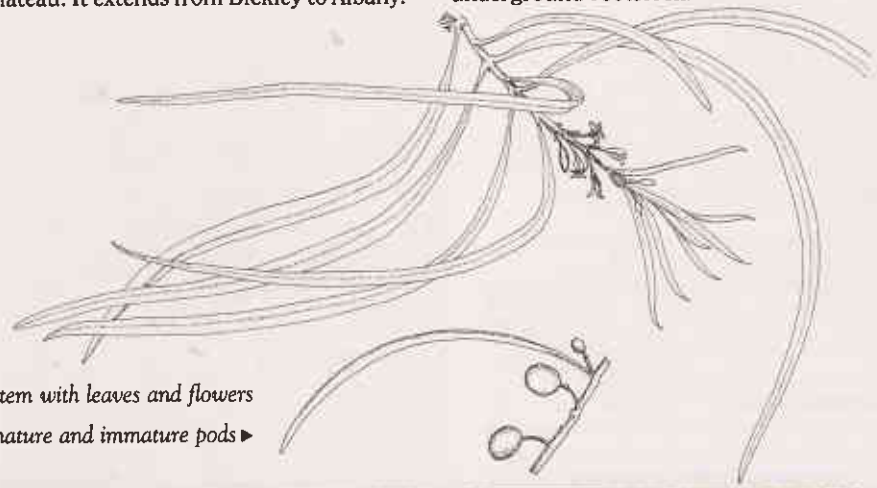
OCCURRENCE AND DISTRIBUTION

Like spreading snottygobble, upright snottygobble grows in the jarrah forest; in the Perth area it is confined to the Darling Plateau. It extends from Bickley to Albany.

ECOLOGICAL NOTES

This species too drops its fruits. After several days on the ground, they change from green to yellow-green, which may increase their visibility to animals that eat them. Scattered saplings seen on roadside cuttings in the jarrah forest indicate that the seed is effectively dispersed.

Like the other species, upright snottygobble survives fire. It resprouts afterwards from the twigs or from an underground rootstock.



stem with leaves and flowers

mature and immature pods ▸

CULTIVATION

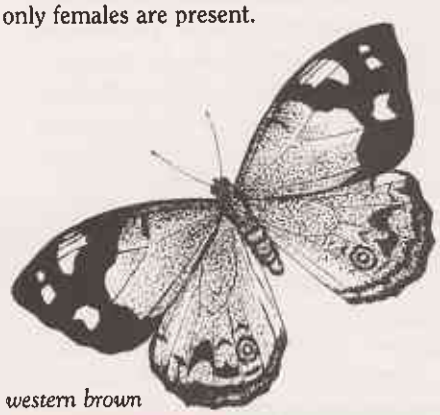
This appealing plant would no doubt be cultivated if only it could be. Seeds have been planted many times, but seldom germinate. They may need to go through the gut of an animal to trigger germination.

COLLECTION AND NAMING

Collected by Robert Brown in 1801 or 1802 from the Albany area. Specific name from the Latin *longus* "long" and *folium* "leaf".

ASSOCIATED FAUNA

Many native bees visit the small yellow flowers in summer, and are probably the main pollinators. Another insect to visit the flowers is the western brown. The sexes of this butterfly have different markings, especially on the forewings; but what is more unusual is that they appear at slightly different times of the year. The first males are seen in October, but it is several weeks before females appear. At the end of the season, in April, only females are present.



western brown

DISTINCTIVE FEATURES

Small upright tree 1-5 m tall, in the jarrah or jarrah-marri forest.

BARK *rough, layered and flaky.*

LEAVES *green, up to 20 cm long, slender, slightly asymmetrical to sickle-shaped.*

FLOWERS *yellow, produced from late spring to late summer.*

FRUITS *smooth, green, round, slightly flattened, about 1 cm long.*

OLD TREES AND SHRUBS

Old trees are complex and individual. Their structure and patterns, and their many interesting irregularities, reveal something of their life-stories.

Some eucalypts can live several hundred years, and are an irreplaceable link with the past. Many of the large old trees we see today were alive before the European settlement of Western Australia. In our rapidly changing world, they offer a different perspective of time.

LOCAL TREES AND SHRUBS

Local trees and shrubs - those that belong naturally to the site - have evolved in the local environment, and respond to it in meaningful ways. Because they are used by many associated insects, they develop much irregularity and detail. These aspects of beauty are less characteristic of non-local trees and shrubs, which are in an alien environment, and generally support fewer insects.

Local plants in combination have a special beauty. In nature, plants that like the same conditions and get on well with one another occur together in a natural community. This interaction makes their appearance harmonious, supplementing the beauty of the individual members. Perth's plant communities are numerous, and the variation between them reflects subtle changes in the environment.

NATURE AS A MODEL

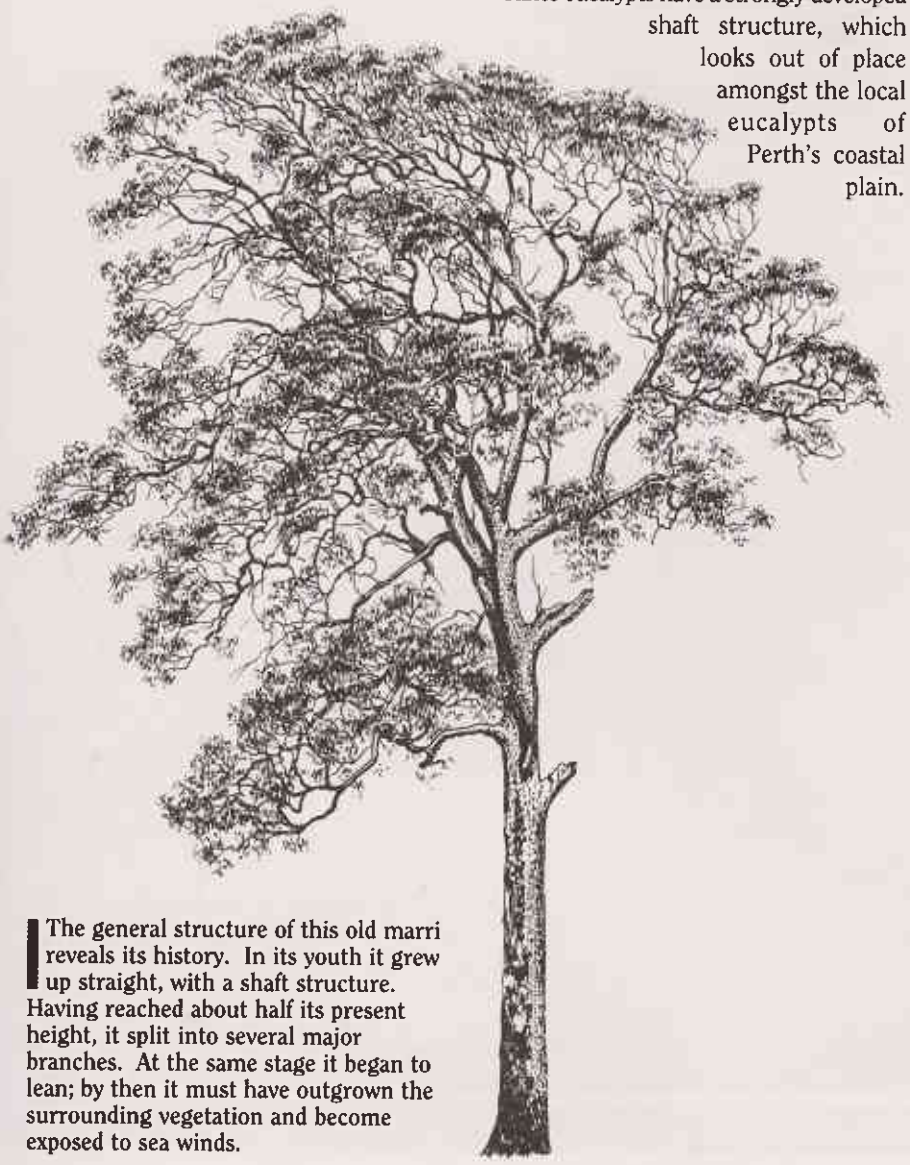
We can use nature as a model for parks and gardens. In many gardens species from quite different origins are often mixed for the sake of variety. The problem with this approach is that such species usually clash visually - and the whole is often unsatisfying. Many eastern states eucalypts have a strongly developed shaft structure, which looks out of place amongst the local eucalypts of Perth's coastal plain.

In a natural remnant of vegetation there will always be both harmony and variety. Even in a stand of trees of the one species, the mixture of ages, the uneven spacing and the insect attack give considerable variation in form and detail; but whether there is one species or many, the plants are members of a natural community and will look well together.

We can retain more trees in our parks and gardens. Where we do plant, we can recreate the harmony of nature by using local species, by imitating nature's irregular groupings and by avoiding the tendency to space trees evenly. Better still, we can let trees and shrubs regenerate naturally and establish their own groupings.

In parks where non-local trees and shrubs are already established, it is still worth while planting groups of local species as reminders of Perth's natural setting.

If we appreciate the beauty of our natural trees and shrubs they will enrich our lives. That appreciation will also help us create a more satisfying and harmonious environment in which to live. ⊡



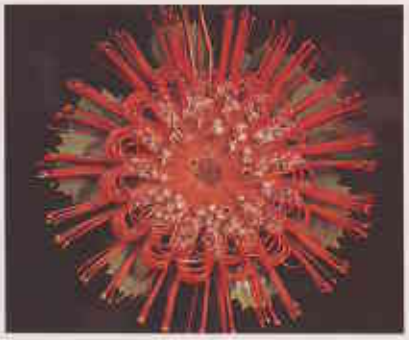
The general structure of this old marri reveals its history. In its youth it grew up straight, with a shaft structure. Having reached about half its present height, it split into several major branches. At the same stage it began to lean; by then it must have outgrown the surrounding vegetation and become exposed to sea winds.

Robert Powell is an expert on local plants, having had a lifelong interest in the local environment. Academic Jane Emberson, botanist Steve Hopper and insect specialist Peter McMillan also made major contributions to *Leaf and Branch*. The book is abundantly illustrated by Margaret Pieroni and Susan Patrick. It is available from CALM offices and all good bookshops and newsagents for $24.95.

In the central Kimberley, a screw-pine-surrounded creek - just one of the threatened areas in this fragile frontier. Turn to page 22.

LANDSCOPE

VOLUME SIX NO. 1 - SPRING EDITION 1990



Public awareness and involvement is vital in the conservation of WA's rare and endangered flora. Page 49.

Ten WA mammal species have become extinct in the last 200 years. What can be done to ensure no more are lost forever? Page 28.

Until 1984 more was known about what was underneath the Nullarbor than what was on top. But with such a vast area to study, where do we start? See page 16.

Forests protect our environment. They also provide timber. How do we strike a balance? Turn to page 35.

FEATURES

REGULARS

SPECIALS

COVER

Dolphins and whales are perhaps the best-known inhabitants of Western Australia's coastal waters. But this unique area is also home to an astonishing range of marine flora and fauna, from sea-turtles and coral reefs in the north to sea-grass banks and great white sharks in the south. See page 10.

Illustrated by Martin Thompson.

Managing Editor: Ron Kawalilak
Editor: Ray Bailey
Designers: Louise Burch/Robyn Mundy/Stacey Strickland
Production: Sandra Mitchell
Advertising: Estelle de San Miguel ☎ (09) 389 8644 Fax: 389 8296
Illustrations: Martin Thompson, Yeon Hee Kim
Colour Separation by Prepress Services
Printed in Western Australia by Kaleidoscope

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