6

FOREST FOCUS

JARRAH FOREST — BUSHFIRE SURVIVAL

NATURAL OCCURRENCE OF
JARRAH FOREST IN W.A.

SCALE OF MILES

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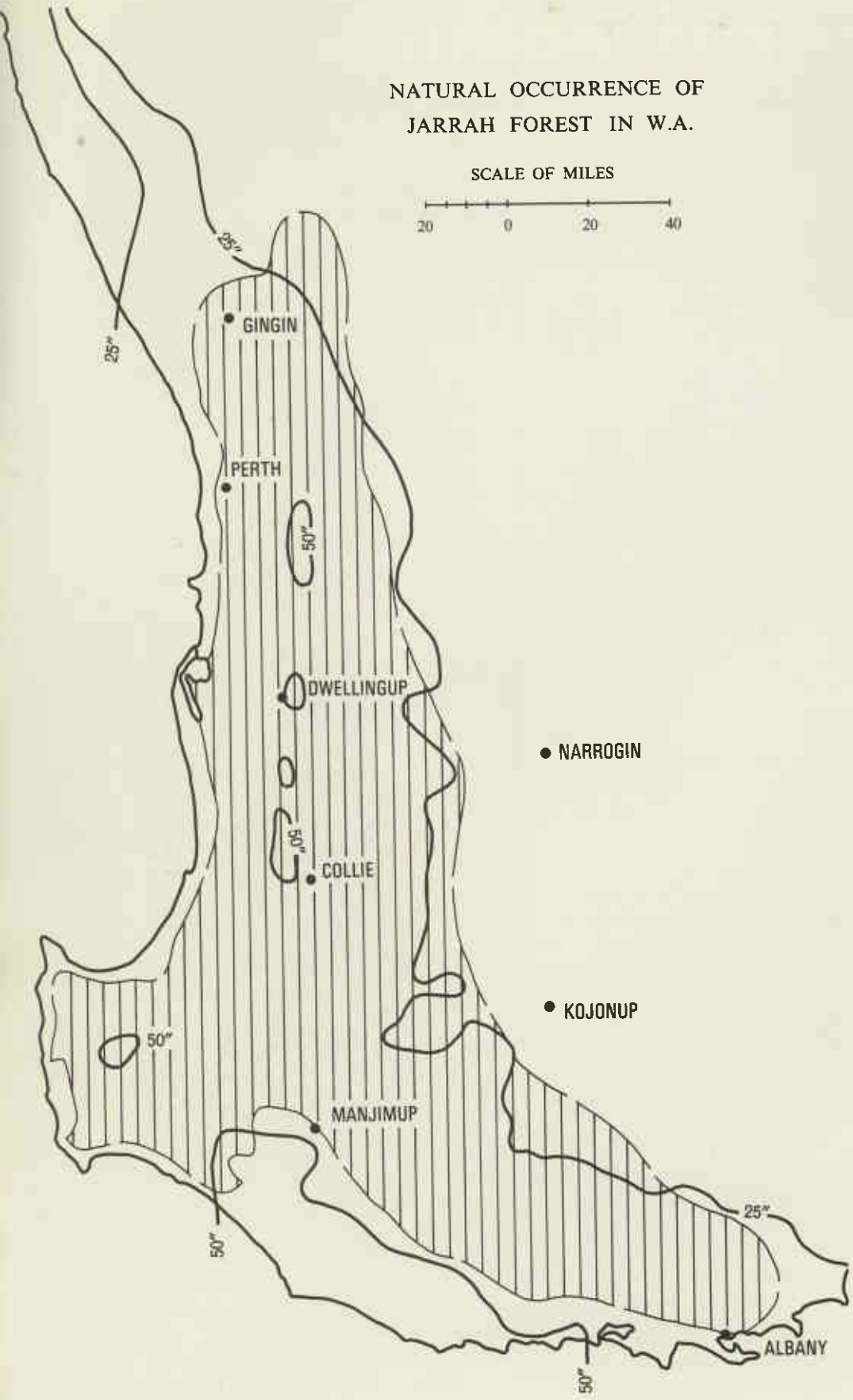

Change of Portfolios

Following a recent re-allocation of portfolios, the Hon. H. D. Evans is now Minister for Forests, together with his other portfolios of Lands, Agriculture and Immigration.

Mr. Evans is no stranger to forestry. As a boy he lived at Pemberton, in the heart of the karri country. In later years he returned to teach at Pemberton for a period of 10 years—the last five as deputy headmaster. Subsequently Mr. Evans was senior master, teaching English at Manjimup Senior High School for five years.

He was elected Member of the Legislative Assembly for Warren in 1968 when the former Member, Mr. J. N. Rowberry, retired.

This map shows the extent of the natural jarrah forest area prior to clearing for agriculture.

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Front Cover

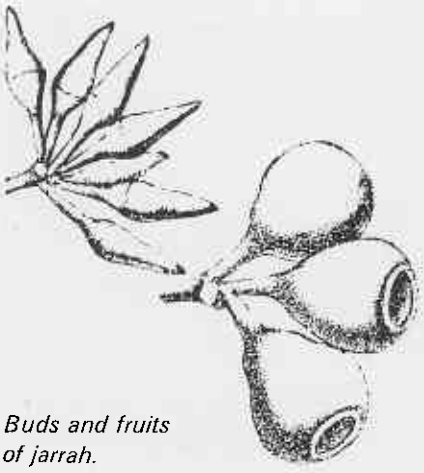
Virgin jarrah forest, in the Dwellingup Forest Division.

Back Cover

Karri (Eucalyptus diversicolor), *see Forestscapes, page* 15.

Omission

The words "Half Size" should have appeared under the heading across pages 10 *and* 11 *of "Forest Focus" No.* 5.



Buds and fruits of jarrah.

FOCUS on the JARRAH FOREST

Jarrah (*Eucalyptus marginata*) is the principal timber tree of Western Australia, producing 33,300,153 cu. ft. of log timber, or 72 per cent of the total log production in the 1970/71 financial year.

Because of its resemblance to the well-known Honduras timber "mahogany" it was given the name of Swan River mahogany by early settlers. It was recognised, however, that as the timber had so many fine qualities peculiar to itself, it warranted a distinctive name of its own, and from about 1860 onwards it became universally known by its aboriginal name—*jarrah*.

Jarrah is a large tree attaining, under optimum conditions, a height of 100-130 ft. with a straight bole up to 50 or 60 ft. and a diameter of 6 ft.

The bark is persistent, reddish-grey, stringy, flat and flaky, with small fissures running vertically. This bark renders jarrah distinct from other south-west trees, except from Albany blackbutt (*E. staeri*) and red tingle (*E. jacksonii*) which also have fairly stringy bark, although less tough than that of jarrah.

The jarrah formation is a high forest with a small admixture of other species, which vary according to topography and quality of the site. Although it lacks the aesthetic qualities of karri forests, jarrah is noted for its remarkable purity as a forest, and the value and utility of the timber it produces. The prime jarrah belt contains a smaller proportion of other species than any other Eucalypt forest in Australia of equivalent area, and is considered to be one of the finest hardwood stands in the world.

Distribution

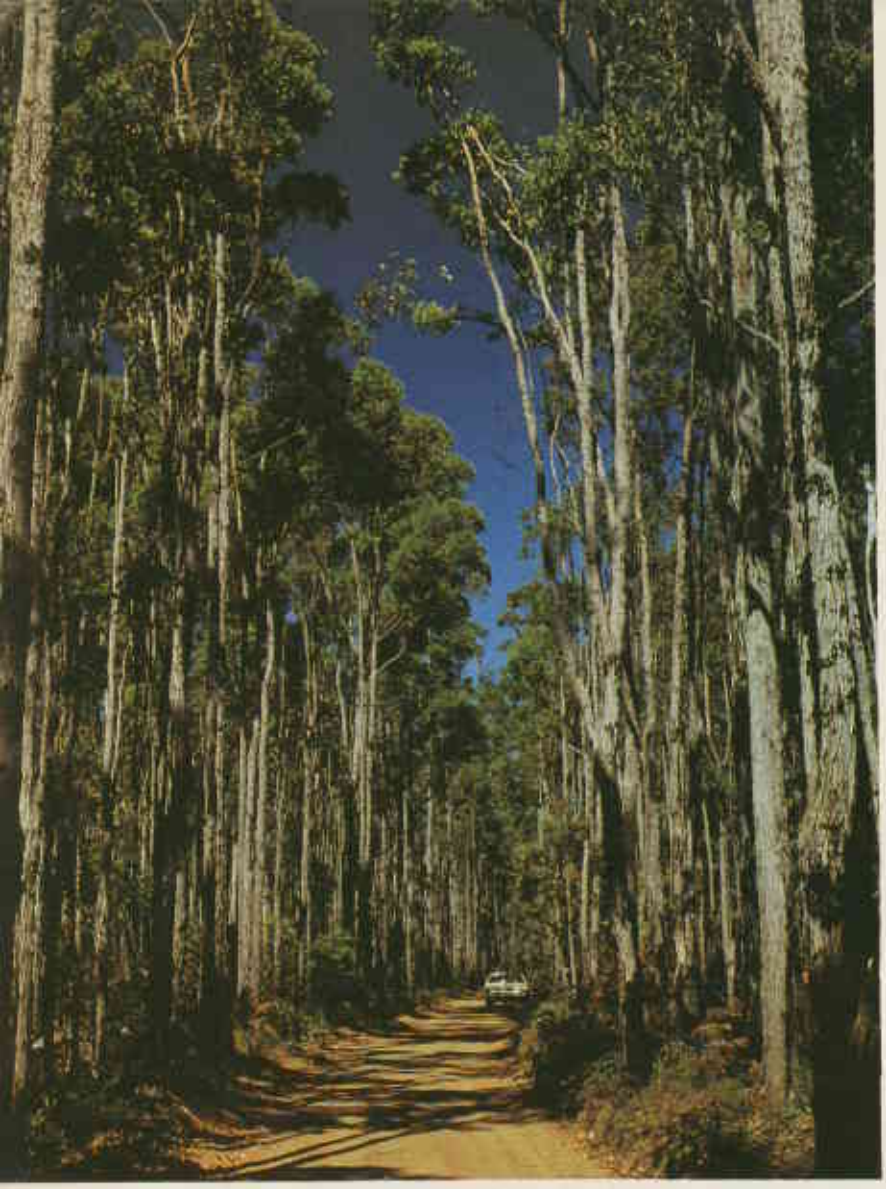
Jarrah was originally found scattered throughout the south-west of the State over some 13 million acres within the 25–50 in. rainfall belt. The prime forest of some four million acres, however, stretches from Chidlow's Well in the north, following the Darling Range to the extreme south of the State and finishing just north of Albany. Most of this is now State Forest.

The species is closely associated with soils of lateritic origin and the best existing forest areas occur on the lateritic gravels of the Darling Range where the rainfall exceeds 45 in. However, jarrah attains its greatest size in the red loam soils of the deeply dissected river valleys. Most of these areas have been cleared of jarrah forest for other land uses.

Distribution is limited to the east and to the north by low rainfall and the species becomes progressively smaller as the rainfall decreases. Eastwards it gives way to wandoo (*E. wandoo*), powder-bark wandoo (*E. accedens*) and York gum (*E. loxophleba*). On the coastal strip west of the Darling Range it occurs in rather open formation as a tree of low height and poor form. Here it is associated with tuart (*E. gompho-cephala*) which replaces jarrah completely on the limestone ridges. In the extreme south of its range it is replaced by karri (*E. diversicolor*) on the better soils, and marri (*E. calophylla*) which also occurs in mixture with jarrah throughout its range. On the southern plains jarrah is a small crooked tree and takes on a mallee form in the harsher environments.

All-purpose timber

Jarrah timber is dense and hard but fairly easily worked. It is red in colour darkening with age to a rich brown with a beautiful grain, and takes a fine polish. It will be readily



Above left: Lightly thinned regrowth jarrah pole stand, 48 years old. Further thinning will be necessary to achieve optimum production of quality timber.

Above right: The natural touch of jarrah timber lends hard-wearing strength and character to this riverside home's balcony. (Photo courtesy of Associated Sawmillers & Timber Merchants.)

Below left: Jarrah is a "natural" for the high quality interior elements at the Captain's Bar and Grill, Fremantle. (Photo courtesy of Bunning Bros.)

Below right: Solid jarrah tables and upholstered jarrah chairs give the necessary serviceability, character and warmth to Mama Maria's restaurant, Perth. (Photo courtesy of Bunning Bros.)

realised that there are few purposes for which jarrah cannot be used, when in addition to beauty of colour and grain, its strength, durability and an amazing resistance to fire are considered. Some trees possess a remarkable fiddleback figure referred to in the trade as "curly jarrah". For beauty of appearance as a furniture wood it has few rivals.

Despite its beauty as a furniture wood, it is used as a utility timber because of its strength, durability and availability.

In the form of piles, stringers and decking it has been employed to such an extent that there is scarcely a wharf, pier or jetty in Western Australia which does not contain a high percentage of jarrah.

It is eminently satisfactory as a building timber, being used in the sawn state for stumps, joists, weatherboards, plates, studs, rafters; while flooring, panelling, frames, doors, windows, interior trim mantelpieces and other furnishings testify to the beauty and suitability of the dressed timber for high grade purposes.

The pleasing figure of jarrah makes it eminently suitable for veneers and increasing quantities are now being used for this purpose for furniture and interior panelling.

Waste timber is universally used in the south-west as firewood, and jarrah forms the chief firewood supply for Perth.

The timber is quite durable and when used for posts or sleepers in contact with the ground it gives a long life of valuable service. The average life of jarrah sleepers in Australia is 20 to 35 years, depending on the locality in which they are used. Jarrah sleepers are readily accepted in many overseas countries and they contribute to a valuable export trade. In the London Underground they are still in use after 50 years of service.

Fifty-three-year-old jarrah regeneration east of Dwellingup. Height of the dominant trees is 80 ft.

A modern logging machine, the rubber-tyred tractor carries one jarrah log and snigs two behind (above), and doubles as a loading machine (below).

Flowering and seeding

New fruiting buds appear in the axils of the leaves of the new summer growth in the December to March period, and if retained, they flower in the following November and December. The fruits mature in time to shed their seed in the following summer, two years after first formation of the bud.

Seed years are not regular and heavy seeding occurs only once every four to six years. Scattered individuals can be found in seed every year, but in a general seeding, some 25 to 50 per cent of the stand will carry a heavy crop.

A marked crown degradation is noticeable during a heavy seeding. Copious flower bud formation is at the expense of the normal crop of leaf buds and when older leaves are shed, the trees are left with extremely thin crowns. These normally rejuvenate during the summer after seeding.

Seed fall is brought about by the opening of the capsules in hot dry weather of mid-summer. Disperal distance is usually taken as the ground distance equivalent to the height of the tree.

Regeneration

Germination occurs in the cool, moist conditions of late May and June. Although many thousands of seedlings may appear on each acre at this time of the year, losses due to insects, fungi, and drought reduce the numbers by up to 95 per cent in the first year after germination.

Mortality among the survivors continues for a number of years and a very small proportion of seedlings live to reach tree size.

A swelling forms at the stem base of the young seedlings. This swelling develops downwards as the seedling ages and forms a hard, woody subterranean lump called the lignotuber. The leafy shoots of this plant grow very slowly in length but rapidly multiply in number to form a small bush. At the same time a large, deeply penetrating tap root is formed.

This bushy form of jarrah becomes almost completely indestructible and is immune to fire. If the leafy shoots are burnt off, more arise from dormant buds on the lignotuber. If these shoots are *not* burnt off periodically they become moribund and the development of the plant is severely retarded.

The jarrah bush appears to be quite incapable of developing into a sapling with a single upright stem until the lignotuber attains a diameter of about 4 in., or until the shoots of the bush reach about $2\frac{1}{2}$ ft. in length and exceed six or seven in number.

The period the plant takes to reach this stage varies considerably. Jarrah seedlings planted into ploughed soil where there is no competition will form a sapling shoot at from three to six years. Under normal forest conditions the period may extend to 15 years or more and on harsh, low quality forest sites this consolidation period may exceed half a century.

Once a single leading shoot appears, it grows rapidly for the first few years, after which height growth gradually declines. A five-year-old sapling is likely to attain a height of 20 ft. or more, and at 10 years will reach 30 ft. on a good site.

For the first few years the sapling shoot is green and fleshy, but by the time it is five to eight years old, thick bark is forming and it can withstand mild fires.

The impetus for the bushy plant to produce a dynamic sapling shoot arises from a reduction in competition. In the virgin forest this comes from the death of a large tree. Bushy plants, previously shaded by the tree, respond to the increased growing space so provided, by forming sapling shoots. In managed forest similar conditions are created by the cutting of large trees for timber production.

Fire in the forest

No account of the jarrah forest would be complete without some mention of fire. The whole forest community, including animals, plants and jarrah itself has developed in an environment which is subject to frequent burning.

Ecologically, the jarrah forest community would be classed as a *fire climax*, meaning that the plant species represented have reached a stable equilibrium with site conditions, and *particularly with fire.*

Research workers have found sound evidence that the forest has been associated with fire for at least 7,000 years. The vast majority of plants in the forest, including wildflowers and jarrah itself, have certain adaptations that enable them to survive fire. In some cases fire is essential for their continued existence: the seed pods of some hakeas and grevilleas can only be opened and the seed released by the high temperatures of a fire. Nearly all the wattles (*Acacia* spp.) need treatment with temperatures around that of boiling water before they will germinate. A very high proportion of the plants in the jarrah forest have woody subterranean rootstocks (or sheathed shoots in the case of plants of the lily family) from which new shoots are formed after a fire.

The Forests Department has learnt by bitter experience the consequences of excluding fire from the forest, and the resultant build-up of leaf litter and dead plants. A succession of severe and uncontrollable wildfires in the period 1948-50 followed 15 years of protection from fire.

We have, then, a situation where the forest community needs fire for its continued health and existence. This is achieved by rotational burning over the forest floor every three to five years with carefully controlled fires in mild weather conditions. Rotational controlled burning replaces the lightning fires and aboriginal hunting fires of the pre-settlement era of the State.

Silvicultural cutting for regeneration

When sawmilling operations are about to commence on any specific area, an advance controlled burn is run through the area in cool weather

Track-laying for the 179-mile Hamersley Iron railway line. The sleepers, mostly jarrah with some wandoo and blackbutt, are 8 ft. long and 9 x 6 in. cross section. Heavy rails (119 lb./yd.) are welded into 1,020 ft. lengths before laying. Train loads of up to 18,000 tons travel at 45 m.p.h. along the track. At 3,520 to the mile (18 in. centres) some 630,000 sleepers were required.

Bushy jarrah regeneration.

to reduce the accumulated inflammable debris.

Next comes the operation of tree marking. Trees which are to be felled for sawmilling are marked by a forest officer who blazes the tree to be felled with an axe, and in a nick cut at the base, identifies the tree with his treemarker's brand. Care is taken to mark all trees so that when felled they cause the least damage to those remaining.

This system allows for the removal of mature or less vigorous elements of the old crop; and in the openings left, regrowth becomes established.

The young vigorously growing trees of the crop are retained in the forest to provide future mill logs.

Following the logging operation, tops (crowns) of felled trees are lopped flat and debris cleared away from the butts of remaining good trees. This debris is burnt in spring or autumn when minimum damage will occur to the remaining stand.

Full protection from fire must be afforded for a period of years until the openings have been satisfactorily stocked with young regrowth of sufficient height to permit the reduction of the fire hazard by prescribed light burning without incurring damage to the crowns. This period of complete fire protection may be from 8-10 years, by which time a total height well in excess of 20 ft. should have been attained.

Jarrah seedling showing lignotuber and strong tap root.

Growth rates

Although the growth rate of jarrah cannot compare with that of karri, it is impressive when the harsh and impoverished conditions under which it grows are taken into account.

The average yield of sawlogs from the whole jarrah forest is in the region of 15 cu. ft. an acre each year. There is a large difference in the rate of growth of the species between the relatively poor northern and eastern sectors of the forest and the prime forest area on the western edge of the Darling Range.

In the former, the trees may grow well under $\frac{1}{2}$ in. in girth each year and annual timber yield an acre may be as low as 5 cu. ft. The prime forests of the high rainfall area produce more than 10 times this timber yield and individual tree growth may exceed $\frac{3}{4}$ in. in girth a year.

The productivity of the jarrah forest is rapidly improving under the careful management regimes now practised. Protection from severe fires alone has resulted in a marked increase in production, and further gains can be expected from the large-scale thinning operations of the last few years.