WESTERN AUSTRALIA
FORESTS DEPARTMENT

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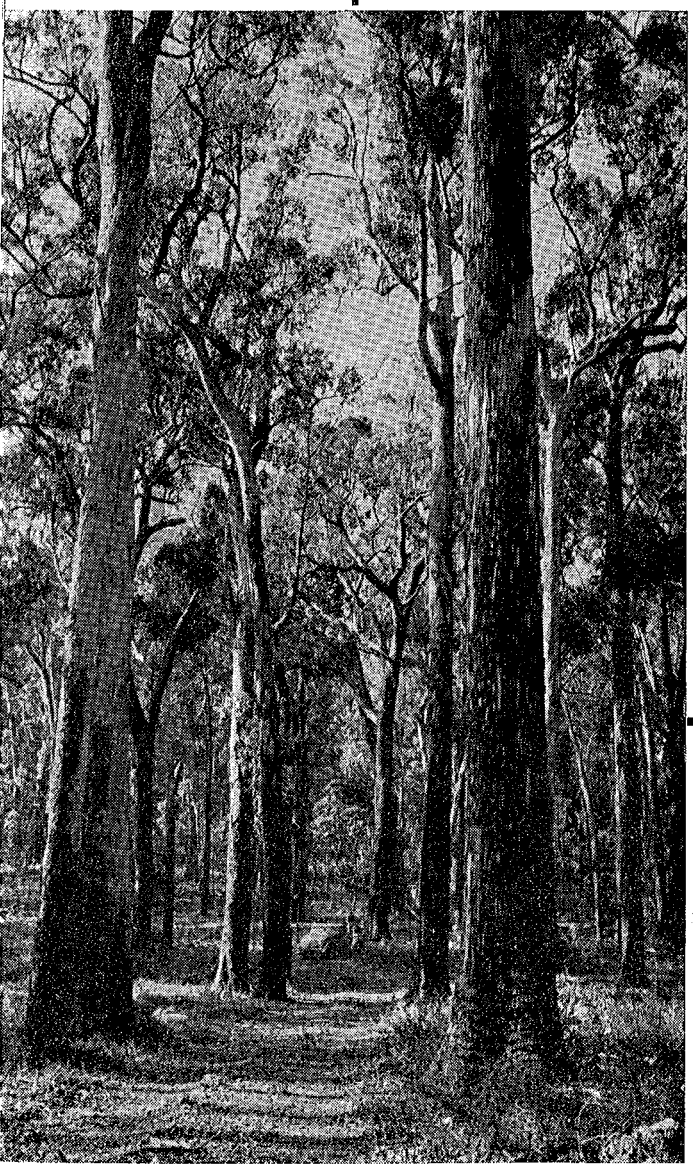
JARRAH



Jarrah Forest
Dwellingup
W.A.

JARRAH

(Eucalyptus marginata Sm.)

Introduction

The jarrah forest of the south-west of Western Australia is probably the purest, most compact, and most valuable belt of hardwood forest in the world. The knowledge that jarrah existed in extensive forest areas in the south-west part of New Holland, influenced to a large extent, the British authorities in founding the Swan River Settlement. Jarrah formed the universal building material of the early settlers, and exports of the timber which commenced in 1836, brought in the necessary money to tide the young Colony over many a trying and anxious period. The early flour mills around Perth were constructed of jarrah and the machinery and shafting inside them, including the cog-wheel, were also of that timber, as was the huge wind wheel which propelled the whole. The hardy pioneers of the early thirties were so impressed by the quality and beauty of this timber which served them so well, that they gave it the name of "mahogany." Jarrah—the tree became known by its aboriginal name of Jarrah about 1860—has in the meantime secured a universal reputation for durability, and although prized by the engineer, has also been used with distinction by the cabinet maker.

Habit and Distribution

Jarrah is a large tree, attaining a height of 100-130 feet with a straight bole of 50-60 feet, and a diameter up to 6 feet.

Although it is to be found scattered throughout the south-west of Western Australia, growing on an area of some 13,000,000 acres within the 25 to 50 inch rainfall belt, the total area of prime jarrah forest is limited to about 3,000,000 acres.

The laterite soils of the prime belt are of low agricultural value, being largely uncultivable ironstone ridges, and practically the whole of the prime jarrah forest has been included in the dedicated State Forest of over 4,000,000 acres under the control of the Forests Department. The main forest forms a compact belt some 20 miles wide and 200 miles long, stretching along the Darling Range from the latitude of Perth in the north to Manjimup in the south. In virgin stands, the volume of mature timber suitable for milling may reach 5,000 to 6,000 cubic feet per acre, but the average is nearer to 1,000 cubic feet per acre.

Timber Properties

In mature trees the colour of the truewood varies from a light to a dark reddish brown when first cut, darkening with age to a rich mahogany colour. The sapwood varies from ¼ in. to ¾ in. The grain is slightly interlocked but is more or less fissile on the back. Gum veins and pockets may occur in the tree, more particularly in trees on the eastern fringe of the forest, but their incidence in the sawn timber is limited by strict grading rules.

Density:

Green	73 lb./cu. ft.
Air dry (12% M.C.)	54 lb./cu. ft.

Shrinkage:

- 12% M.C. before reconditioning:—

Tangentially	7.4%
Radially	4.8%

Strength Group:

C.S.I.R.O. strength group C.

Seasoning:

Jarrah seasons readily by air or kiln drying and the modern kilns in operation ensure that it can be marketed at all times of the year. Warping due to sloping grain is the main cause of degrade in seasoning and some care is required to prevent checking in wide boards. In air drying large sections, it is advisable to coat the ends to prevent end checking. It takes about 7 days to kiln dry 1 in. back sawn wide boards from 30% M.C. and 4 days for narrow boards and quarter sawn stock. Stock 2 in. thick takes 19 days from 30% M.C. Kiln drying green stock takes 19, 16 and 45 days respectively.

Durability:

One of the principal characteristics of jarrah is its durability in the ground. The life of jarrah sleepers in Western Australia ranges from 20 to 35 years, averaging about 25. In South Australia they have a life of 35 years and in more temperate climates, such as New Zealand, where weathering and sun-cracking are not so severe, an average life of 40 years is attained.

Telephone poles and fence posts of jarrah are commonly used and give long service.

Jarrah piles resist marine borer attack quite well in the south-western waters of Western Australia, the average life ranging from 15 to 25 years.

Resistance to Fire:

On account of its fire-resisting properties, the use of jarrah, both for strength members and interior trim undoubtedly tends greatly to reduce the inflammability of a building. In beam and column work it has already been amply demonstrated that jarrah is far superior to unprotected steel. As a fire resistant timber, jarrah has been approved for use by the London County Council.

Calorific Value:

Figures for the calorific value of jarrah on the basis of tests carried out by the Government Analyst are:—

Percentage of Water (on oven-dry basis)	British Thermal Units
Dry wood	8,820
20	7,150
40	6,000
60	5,100

The calorific value of Collie coal is not much greater than that of dry jarrah, being between 9,000 and 10,000 B.T. units.

Processing Qualities:

The timber machines, nails and glues well, takes an excellent polish and holds paint very well. It is also a good carving timber.

Uses

In Western Australia jarrah is used for a great variety of purposes, including many for which softwoods are considered essential in other countries.

In the form of piles and decking it has been employed locally and overseas, and there is scarcely a wharf, pier, jetty or bridge in Western Australia in which jarrah has not been extensively used. As a building timber it is eminently satisfactory, being used in the sawn state for stumps, joists, weatherboards or siding, plates, studs, rafters and laths, while flooring, lining, frames, doors, windows, mantelpieces and other interior trim testify to the beauty and suitability of the dressed timber for high-grade purposes. In large buildings, jarrah makes excellent beams, columns and rafters.

A further use for jarrah is found in ship building. It is on Lloyd's list of timber suitable for building ships, and in the first half of the Colony's existence was used largely for planking and decking overseas, coastal and river vessels. At the present time, it is used to a considerable extent for river craft of many kinds and for coastal vessels such as the pearling luggers of the north-west coast. During World War II it was used for the construction of a number of 400 ton vessels for use in the islands north of Australia.

Availability

Supplies can be readily obtained from Western Australian sawmillers and their agents in other Australian States and overseas. Large sections and lengths up to 35 feet can be obtained. Jarrah is produced in greater quantity than other Australian species, the sawn output in 1960-1961 being almost 12 million cubic feet.

Grading Rules:

The world wide reputation of jarrah as a timber suitable for many uses has been established by careful selection at the sawmills. With a view to standardising the established practice of the trade in this respect, grading rules have been prepared specifying in detail the quality of timber which is recommended to be supplied for the principal uses for which jarrah is sawn. These rules have been published as Bulletin 56 of the Forests Department under the title "Grading Rules for Jarrah, Karri and Wandoo," and the Australian

Standards Association has adopted them as Australian Standards. They cover, *inter alia*, sleepers, crossarms, mine guides, wagon scantling, flooring boards, structural timbers, end-matched flooring, milled lining boards, weatherboards, wide boards and joinery timbers. The Forests Department maintains an Inspection Branch and will carry out inspections at the request of either buyer or seller. When applying for inspection, it is necessary to state the standard specification published by the Department under which inspection is desired.

Jarrah Strength Properties

(Tests on small clear specimens)

	Green	12% M.C.
Density	73 p.c.f.	54
Static Bending, centre loading—		
F.S. at prop limit	6440 p.s.i.	10,200
Mod. of Rupture	9880 „	16,200
Mod. of elasticity x .001	1480 „	1,880
Work to max. load	9.8 i.p.c.i.	12.9
Work total	21.5 „	20.6
Compression Parallel—		
F.S. at prop limit	4240 p.s.i.	4,120
Max. crush str.	5190 „	8,870
Mod. of elasticity x .001	1700 „	1,990
Compression Perpendicular—		
F.S. at P.L. on 6x2x2 spec. Radial	1160 „	1,600
F.S. at P.L. on 6x2x2 spec. Tangential	1290 „	1,900
F.S. at P.L. on 2x2x2 spec. Radial	851 „	960
F.S. at P.L. on 2x2x2 spec. Tangential	1070 „	1,370
Hardness, Janka ball test—		
Radial	1300 p.	1,910
Tangential	1270 „	1,920
End	1390 „	2,070
Torsion—		
F.S. at prop limit	845 p.s.i.	1,230
Max. Tors. Shear Str.	1610 „	2,560
Mod. of Rigidity x .001	102 „	150
Shear—		
Max Stress:		
Radial	1330 „	2,100
Tangential	1320 „	2,170
Cleavage—		
Max. Strength:		
Radial	360 p.i.	427
Tangential	385 „	464
Impact Bending Strength—		
Denison:		
Radial	125 i.p.	110
Tangential	127 „	124
Izod:		
Radial	9.2 f.p.	7.4
Tangential	10.2 „	8.1
	Before reconditioning	After
Shrinkage, green to 12% M.C.		
Radial	4.8%	4.6
Tangential	7.4%	6.7

Prepared under the direction of A. C. HARRIS—Conservator of Forests

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