BULLETIN NO. 9
(3RD EDITION).

Western Australia.

FORESTS DEPARTMENT.

SHORT DESCRIPTIVE NOTES

OF THE

PRINCIPAL TIMBERS OF WESTERN AUSTRALIA.

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Issued under the authority of the Minister for Forests:
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PERTH:
BY AUTHORITY: FRED. WM. SIMPSON, GOVERNMENT PRINTER.

1927.

U 6477/27

DESCRIPTIVE NOTES ON PRINCIPAL TIMBERS.

JARRAH (*Euc. marginata*).

Jarrah is the principal timber of Western Australia. Though it is found scattered throughout the South-West of the State over many millions of acres within the 20 to 45 inch rainfall belt, the Prime Jarrah Forest extends over only 2,500,000 acres, extending along the Darling Range from the latitude of Perth right down to the extreme South of the State, in the neighbourhood of Albany. As the tree grows to a height of 100 to 120 feet, with a clean bole of 50 to 60 feet and a diameter of 72 inches, large sizes of timber free from blemish are obtainable.

Mechanical and Physical Properties.

		Mean.
A.	Transverse Bending Test (Beams of 20 sq. in. sectional area and at 12 per cent. moisture)—	
	Modulus of Rupture, lbs. per sq. in.	15,000
	Modulus of Elasticity, lbs. per sq. inch	2,080,000
B.	Compression Test along the Grain (ratio 24/1)—	
	Crushing Strength, lbs. per sq. in.	7,700
C.	Compression Test along the Grain (ratio 12/1 and under)—	
	Crushing Strength, lbs. per sq. in.	9,100
	Modulus of Elasticity, lbs. per sq. in.	1,490,000
D.	Compression Test along the Grain (half-length of specimen loaded)—	
	Fibre Stress at 3 per cent. deformation, lbs. per sq. in.	2,500
E.	Shearing Test along the Grain—	
	Shearing Strength { Method of Double Shear, lbs. per sq. in.	1,050
	Shearing Strength { Method of Single Shear, lbs. per sq. in.	2,010
F.	Density—	
	Green, lbs. per cubic foot	68
	Dry (at 12 per cent. moisture), lbs. per cubic foot	55

Working Tests.

1. *Sawing.*—Cuts easily along and across grain with both power and hand saws.
2. *Planing.*—Smooth surfaces are easily obtainable with power and hand planes.
3. *Boring.*—Tools cut cleanly but are rather hard to turn in larger sizes.
4. *Nailing and Screwing.*—Nails and screws hold exceptionally strongly, but screws must be well bored.
5. *Mortising and Dovetailing.*—Cuts well, forming strong joints.
6. *Working with Gouge and Chisel.*—Hard, but cuts well, and is often used for carved work.
7. *Turning.*—The wood turns well to a smooth surface.
8. Strong joints are obtainable.

9. *Polishing.*—Polishes exceptionally well and is often used without a filler.

10. *Varnishing.*—Glossy surface readily obtainable.

11. *Staining.*—On account of its beautiful colour the wood is rarely stained.

Jarrah has a world-wide reputation on account of its durability. Timbering in the houses built when the Colony was first established is still sound to-day, and the post and rail fences of the early settlers are still standing. Its strength and durability make it very suitable for all classes of structural work, while in the form of sleepers, paving blocks, bridge and wharf timbers and power and telegraph transmission poles, it finds wide application. A further advantage of Jarrah is its high quality of resistance to fire. It is on Lloyd's list of shipbuilding woods.

The timber of Jarrah is beautiful in grain and colour, can be readily worked, and finishes and polishes well.

It is essentially a furniture and cabinet wood, but its wonderful durability, combined with the plentiful supplies available, led to its extensive use in the early days for the purposes mentioned above, and the suitability of Jarrah for higher grade purposes was lost sight of. In furniture, interior trim, carving, cabinet work, cooperage, etc., it gives excellent service, and for this purpose the consumption is steadily increasing. Commercial drying kilns of modern design are operating in the State and produce an excellent seasoned product.

The tree regenerates freely, and extensive regeneration operations are now being undertaken for the perpetuation of supplies.

KARRI (*Euc. diversicolor*).

This tree is the largest and the second most important in the forest. It occurs in a limited area—some 250,000 acres being estimated as the extent of the Prime Karri Forest—in the South-West of the State. Karri is a magnificent tree, both from the standpoint of the timberman and of the tourist, for it attains a height of over 200 feet, while the long clean bole has a length of 100 to 140 feet and a diameter of 8 to 10 feet.

Mechanical and Physical Properties.

		Mean.
A.	Transverse Bending Test (Beams of 20 sq. in. sectional area and at 12 per cent. moisture)—	
	Modulus of Rupture, lbs. per sq. in.	17,300
	Modulus of Elasticity, lbs. per sq. in.	2,680,000
B.	Compression Test along the Grain (ratio 24/1)—	
	Crushing Strength, lbs. per sq. in.	9,400
C.	Compression Test along the Grain (ratio 12/1 and under)—	
	Crushing Strength, lbs. per sq. in.	10,200
	Modulus of Elasticity, lbs. per sq. in.	2,030,000
D.	Compression Test across the Grain (half-length of specimen loaded)—	
	Fibre Stress at 3 per cent. deformation, lbs. per sq. in.	2,800
E.	Shearing Test along the Grain—	
	Shearing Strength { Method of Double Shear, lbs. per sq. in.	1,050
	Shearing Strength { Method of Single Shear, lbs. per sq. in.	1,800
F.	Density—	
	Green, lbs. per cubic foot	72
	Dry (at 12 per cent. moisture), lbs. per cubic foot	58

Working Tests.

1. *Sawing.*—Cuts readily along and across grain with both power and hand saws.
2. *Planing.*—Smooth surfaces are obtainable, but with power planes radial surfaces sometimes pick up slightly.
3. *Boring.*—Tools cut cleanly, but are rather hard to turn in larger sizes.
4. *Nailing and Screwing.*—Nails and screws hold exceptionally strongly, but screws must be well bored.
5. *Mortising and Dovetailing.*—Cuts well, forming strong joints.
6. *Working with Gouge and Chisel.*—The timber works fairly well, except for a slight tendency to tear on the quarter grain.
7. *Turning.*—The wood turns fairly well.
8. Strong joints are obtainable.
9. *Polishing.*—Satisfactory results are obtained.
10. *Varnishing.*—A glossy surface is obtainable.
11. *Staining.*—As it has an excellent colour, the wood is not stained.

Karri timber closely resembles Jarrah in appearance, but while it is stronger, it is less durable. For this reason, where Karri is to be used in contact with the ground, it is powellised, and when thus treated its durability is improved and it becomes highly resistant to white ants. Besides being on Lloyd's list of ship-building timbers, Karri is used for wooden pipes, wagon scantling, and trans-mission-line poles and cross-arms. The powellised Karri railway sleeper is well known throughout the Southern Hemisphere, and on the Great Western Railway, linking South and Western Australia, it has proved itself superior to all others. Another process, called "Fluarising," is now being used extensively, and is recommended in preference to powellising, especially under moist conditions. Karri, on account of its very high beam strength and its long clean lengths, is used extensively in superstructural work, and for this purpose it is steadily coming more and more into favour. It makes excellent flooring on account of its strength and wearing properties, and is also used for furnishings, furniture, and interior trim. For these higher grade purposes, it can be kiln-dried ; and suitable drying schedules for all sizes have been developed.

Karri regenerates itself well, and it forms the only forest of the State that carries a dense undergrowth of shade-bearing species. Young Karri has been proved as a raw material in paper manufacture, and the Karri bark carries a high percentage of tannins.

WANDOO (*Euc. redunca*, var. *elata*).

This tree is to be found growing in the South-West portion of the State on the edges of the Jarrah belt. It grows in open savannah forests, frequently mixed with Jarrah and Marri. The tree attains a height of 100 feet, with a bole of 30 to 40 feet and a diameter of 4 feet.

Mechanical and Physical Properties.

		Mean.
A.	Transverse Bending Tests (Beams of 20 sq. in. sectional area and at 12 per cent. moisture)—	
	Modulus of Rupture, lbs. per sq. in.	16,100
	Modulus of Elasticity, lbs. per sq. in.	2,190,000
B.	Compression Test along the Grain (ratio 24/1)—	
	Crushing Strength, lbs. per sq. in.	9,100
C.	Compression Test along the Grain (ratio 12/1 and under)—	
	Crushing Strength, lbs. per sq. in.	10,900
	Modulus of Elasticity, lbs. per sq. in.	1,750,000

		Mean.
D.	Compression Test across the Grain (half-length of specimen loaded)—	
	Fibre Stress at 3 per cent. deformation, lbs. per sq. in.	4,500
E.	Shearing Test along the Grain—	
	Shearing Strength { Method of Double Shear, lbs. per sq. in.	1,310
	Shearing Strength { Method of Single Shear, lbs. per sq. in.	2,680
F.	Density—	
	Green, lbs. per cubic foot	79
	Dry (at 12 per cent. moisture), lbs. per cubic foot	71

Working Tests.

1. *Sawing.*—Hard, but cuts cleanly along and across grain.
2. *Planing.*—A smooth surface is only obtainable with a fine cut.
3. *Boring.*—Hard, but cuts cleanly.
4. *Nailing and Screwing.*—Fastenings hold exceptionally well, but must be bored.
5. *Mortising and Dovetailing.*—Satisfactory.
6. *Working with Gouge and Chisel.*—Rather difficult.
7. *Turning.*—Satisfactory.
8. Strong joints are obtainable.
9. *Polishing.*—Satisfactory.
10. *Varnishing.*—A glossy surface is readily obtainable.

The wood is very hard, strong and durable. It is greatly prized for railway wagon underframes, and for this purpose is used on the State railways in preference to steel. In large sizes its "work" with changing weather conditions is infinitesimal, and it has the further advantage of being quite free from corrosive action on iron. Bolt holes, after 20 years' wear, still show the auger marks distinctly. Wandoo is used for bridge and wharf construction, wheelwright and millwright work, knees of boats and shipbuilding generally. As small turnery it is used in the form of spokes, bobbins, insulator pins, etc.

MARRI (*Euc. calophylla*).

Marri is to be found throughout the Jarrah belt, and is most plentiful on the better alluvial soils. It reaches a height of 100 feet, with a bole of 40 to 50 feet and a diameter of 6 to 7 feet.

Mechanical and Physical Properties.

		Mean.
A.	Transverse Bending Test (Beams of 20 sq. in. sectional area and at 12 per cent. moisture)—	
	Modulus of Rupture, lbs. per sq. in.	16,600
	Modulus of Elasticity, lbs. per sq. in.	2,590,000
B.	Compression Test along the Grain (ratio 24/1)—	
	Crushing Test, lbs. per sq. in.	8,100
C.	Compression Test along the Grain (ratio 12/1 and under)—	
	Crushing Strength, lbs. per sq. in.	9,300
	Modulus of Elasticity, lbs. per sq. in.	1,980,000
D.	Compression Test across the Grain (half-length of specimen loaded)—	
	Fibre Stress at 3 per cent. deformation, lbs. per sq. in.	2,200

		Mean.
E. Shearing Test along the Grain—		
Shearing Strength	Method of Double Shear, lbs. per sq. in.	1,150
	Method of Single Shear, lbs. per sq. in.	1,850
F. Density—		
Green, lbs. per cubic foot		72
Dry (at 12 per cent. moisture), lbs. per cubic foot		56

Were it not for the presence of gum veins, this timber would be one of the most valuable in the State. Its properties, as far as higher grade purposes are concerned, are very similar to those of Jarrah, and it has the advantage of greater strength. Its colour is a pale straw, and its beauty is often enhanced by a waviness in the grain. It makes excellent shafts and is used for the heavy poles of the large whims. It has been found very satisfactory for axe handles and small turnery, as in small sizes it is free from gum. This gum or kino yielded by the species contains a high percentage of tannin, and has been used for tanning since the early days. Its use for this purpose would have been more extensive but for the red colour imparted to the leather. Means of decolourising the kino have now been found, and experiments are at present being carried out on the stimulation of the flow of the gum from the trees. It is anticipated that by this means an inexhaustible supply of tannin will readily be obtained.

TUART (*Euc. gomphocephala*).

The small strip of coastal plain between Lake Pinjar on the north and Busselton on the south holds all the Tuart forest. The tree grows only on limestone, and the best forest is to be found between the Capel and Sabina Rivers, where some 6,000 acres of first-class tuart have been reserved as State Forest. Tuart has a height of 100 feet, with a bole of 35 to 45 feet and a diameter of 7 to 8 feet.

Mechanical and Physical Properties.

		Mean.
A. Transverse Bending Test (Beams of 20 sq. in. sectional area and at 12 per cent. moisture)—		
Modulus of Rupture, lbs. per sq. in.		17,900
Modulus of Elasticity, lbs. per sq. in.		2,560,000
B. Compression Test along the Grain (ratio 24/1)—		
Crushing Strength, lbs. per sq. in.		8,900
C. Compression Test along the Grain (ratio 12/1 and under)—		
Crushing Strength, lbs. per sq. in.		10,700
Modulus of Elasticity, lbs. per sq. in.		1,900,000
D. Compression Test across the Grain (half-length of specimen loaded)—		
Fibre Stress at 3 per cent. deformation, lbs. per sq. in.		4,000
E. Shearing Test along the Grain—		
Shearing Strength	Method of Double Shear, lbs. per sq. in.	1,320
	Method of Single Shear, lbs. per sq. in.	2,500
F. Density—		
Green, lbs. per cubic foot		78
Dry (at 12 per cent. moisture), lbs. per cubic foot		68

Working Tests.

1. *Sawing.*—The timber is hard, but cuts cleanly along and across the grain.
2. *Planing.*—Power and hand planes give smooth surfaces.
3. *Boring.*—Hard, but clean.

4. *Nailing and Screwing.*—Should be bored, but hold well.
5. *Mortising and Dovetailing.*—Satisfactory.
6. *Working with Gouge and Chisel.*—Hard but clean.
7. *Turning.*—Turns well.
8. Strong joints are obtainable.
9. *Polishing.*—Polishes well, and often without filler.
10. *Varnishing.*—A glossy surface readily obtainable.

The timber is pale yellow in colour and has a dense interlocked grain. It resembles Wandoo in mechanical properties and holds the same high place for railway wagon under-carriages, etc. It has recently come into favour for motor wagon and motor 'bus framing, and in this guise it has proved itself eminently satisfactory. Tuart is also suitable for wheelwright work and coachbuilding generally. As with Wandoo, supplies of Tuart from Crown lands are reserved for use in Government railway work.

The Forests Department conducts a sawmill in the State Forest of Tuart at Wonnerup, and here a quantity of timber equivalent to the yearly increment of the forest is converted annually. The Department has available a quantity of small-sized scantlings which remain after cutting the larger sizes for the Railway Department, and this material has proved suitable for felloes, spokes and small wheel stock, and for small turnery such as insulator pins, clothes pegs, clubs, bobbins, etc.

RED TINGLE TINGLE (*Euc. Jacksoni*).

Although the small area in which it occurs renders this tree of minor importance, the timber is undoubtedly one of the finest in the State. The tree is to be found between the Bow, Frankland, and Deep Rivers, in the extreme South-West corner of the State, but does not extend far inland. Though not unlike Jarrah in appearance, it is considerably larger, growing to a height of 180 feet, with a diameter of 10 to 13 feet.

Physical and Mechanical Properties.

		Mean.
A.	Transverse Bending Tests (Beams 2 inches square, at 13 per cent. moisture)—	
	Modulus of Rupture, lbs. per sq. in.	14,200
	Modulus of Elasticity, lbs. per sq. in.	1,950,000
C.	Compression Test along the Grain (ratio 3/1)—	
	Crushing Strength, lbs. per sq. in.	8,200
E.	Shearing Test along the Grain)—	
	Beam Shear (tested as short beam), lbs. per sq. in.	2,800
F.	Density—	
	Green, lbs. per cubic foot	60
	Dry (at 12 per cent. moisture), lbs. per cubic foot	46

Working Tests.

1. *Sawing.*—Cuts easily along and across grain with both power and hand saws.
2. *Planing.*—Smooth surfaces are readily obtainable with power and hand planes.
3. *Boring.*—Bores well with all tools.
4. *Nailing and Screwing.*—Both hold well.
5. *Mortising and Dovetailing.*—Cuts well, forming strong joints.

6. *Working with Gouge and Chisel.*—Satisfactory.
8. Strong joints are obtainable.
9. *Polishing.*—Polishes exceptionally well.
10. *Varnishing.*—Glossy surfaces are obtainable without preparation.
11. *Staining.*—Being of a very pleasing rose shade, the timber is not stained.

The timber has been found satisfactory for bridge piles and superstructure, but, on account of its light weight, pleasing appearance, and good working properties, it is considered too valuable for these purposes. It is well suited for furniture and cabinetmaking. On account of its remoteness from trade routes, the forest has not been exploited, and it is therefore important that the comparatively small area containing this valuable product should be reserved, in order that the timber may be used only for the high-grade purposes for which it is so eminently suited.

YELLOW TINGLE TINGLE (*Euc. Guilfoylei*).

This tree, although very similar to the Red Tingle Tingle in appearance, attains a height of only 80 to 120 feet, with a diameter of 3 to 4 feet. It is found on the fringe of, and at times penetrating into, the Red Tingle Tingle Forest.

Physical and Mechanical Properties.

		Mean.
A.	Transverse Bending Tests (Beams 2 in. square, at 14 per cent. moisture)—	
	Modulus of Rupture, lbs. per sq. in.	19,400
	Modulus of Elasticity, lbs. per sq. in.	2,820,000
C.	Compression Test along the Grain—	
	Crushing Strength, lbs. per sq. in.	10,000
E.	Shearing Test along the Grain—	
	Beam Shear (tested as short beams), lbs. per sq. in.	2,900
F.	Density—	
	Green, lbs. per cubic foot	80
	Dry (at 12 per cent. moisture), lbs. per cubic foot	62

Working Tests.

No tests in this direction have been carried out, but the indication is that the timber resembles Tuart in this connection.

The timber has been found satisfactory for piles and bridge superstructural work, and from a study of the strength properties, it will probably prove suitable for all purposes for which tuart is now used.

SANDALWOOD (*Santalum cygnorum*).

At the present time this species may be found growing as a small tree to a height of 12 to 16 feet, with a diameter of 6 to 8 inches. Before it had been so extensively exploited, specimens reaching a height of 25 feet, with a diameter of 10 to 12 inches, were common in areas of better rainfall, now cleared and cultivated for the production of wheat crops. The tree has now practically ceased to exist in the Wheat Belt, and present supplies are often hauled in 50 to 100 miles to the railway lines running to gold-mining centres of the interior.

The wood is a light yellow in colour, and the heartwood is strongly aromatic. It is this latter property which has led to its extensive use by the Chinese in the manufacture of "Joss sticks" for burning in religious ceremonies. In addition, much sandalwood is used for fancy carved woodwork, the making of trinket boxes,

and a host of other small articles. Up to the end of June, 1927, 393,175 tons of sandalwood, of a value of £4,381,579, had been exported from Western Australia. Export commenced in 1845.

Until the last few years, the total output of sandalwood from Western Australia was exported to the Far East, but, after considerable experimental work, a local firm have succeeded in producing a sandalwood oil of the best quality for all uses, including medicinal. The export value of sandalwood oil, which was £3,704 in 1920, rose to £47,800 for the year 1926-27.

NATIVE PEAR (*Xylomelum occidentale*).

Native Pear grows along the sand-plain country between the Darling Range and the coast, and is found in small scattered clumps or as isolated trees. It has a height of 20 to 25 feet, with a short bole and a diameter up to 12 inches.

Mechanical and Physical Properties.

		Mean.
A.	Transverse Bending Test (Beams of 10 sq. in. sectional area and at 12 per cent. moisture)—	
	Modulus of Rupture, lbs. per sq. in.	7,700
	Modulus of Elasticity, lbs. per sq. in.	845,000
F.	Density—	
	Green, lbs. per cubic foot	56
	Dry (at 12 per cent. moisture), lbs. per cubic foot	46

The tree yields a deep red wood with a beautiful figure and, consequently, a most ornamental appearance. It is a very fine furniture and cabinet wood, and, when finished with a wax surface, resembles moiré silk. Like sheoak, the tree suffers badly from fire, and it is therefore difficult to obtain trees of a diameter greater than 12 inches.

RIVER BANKSIA (*Banksia verticillata*).

This tree occurs along the banks of the larger rivers and streams in the South-West, and is rarely found growing far away from running water. It attains a height of 50 to 60 feet, with a bole of 15 to 20 feet and a diameter of 2 feet 6 inches.

Mechanical and Physical Properties.

		Mean.
A.	Transverse Bending Test (Beams of 10 sq. in. sectional area and at 12 per cent. moisture)—	
	Modulus of Rupture, lbs. per sq. in.	10,300
	Modulus of Elasticity, lbs. per sq. in.	1,150,000
F.	Density—	
	Green, lbs. per cubic foot	59
	Dry (at 12 per cent. moisture), lbs. per cubic foot	35

The timber of this tree is light in colour, and is much prized for furniture on account of the beauty of the grain. The medullary rays are large and thick, so that, while radial surfaces have a particularly fine figure, tangential surfaces are equally, if not more, beautiful.

SHEOAK (*Casuarina Fraseriana*).

Sheoak is to be found scattered throughout the length and breadth of the Jarrah Belt, but does not occur in the drier regions. The tree attains a height of 40 to 50 feet, with a bole of 10 to 15 feet and a diameter of 2 feet 6 inches.

Mechanical and Physical Properties.

		Mean.
A.	Transverse Bending Test (Beams of 10 sq. in. sectional area and at 12 per cent. moisture)—	
	Modulus of Rupture, lbs. per sq. in.	12,000
	Modulus of Elasticity, lbs. per sq. in.	1,360,000
F.	Density—	
	Green, lbs. per cubic foot	60
	Dry (at 12 per cent. moisture), lbs. per cubic foot	52

The timber of this tree makes an excellent furniture and cabinet wood, as it possesses a beautiful colour and a pronounced grain due to the large medullary rays. It makes a split shingle of extraordinary durability. Sheoak shingles taken from one of the early cottages of the colony, after 83 years' service, were found to be in a splendid state of preservation. The wood is a favourite with the cooper, on account of the very small percentage of failures experienced in bending, as well as its durability and its high resistance to abrasion.

BLACKBUTT (*Euc. patens*).

Small patches of this species occur in the Jarrah Belt, in the gullies and pockets of alluvial soils between laterite hills. It is not plentiful. The tree attains a height up to 100 feet, with a bole of 40 to 50 feet and a diameter up to 6 feet.

Mechanical and Physical Properties.

		Mean.
A.	Transverse Bending Test (Beams of 20 sq. in. sectional area and at 12 per cent. moisture)—	
	Modulus of Rupture, lbs. per sq. in.	14,200
	Modulus of Elasticity, lbs. per sq. in.	2,000,000
F.	Density—	
	Green, lbs. per cubic foot	69
	Dry (at 12 per cent. moisture), lbs. per cubic foot	54

The timber is not unlike Jarrah in properties, but is of a pale yellow colour, and, though durable, is not the equal of Jarrah in this respect. It is useful for many purposes, particularly farm implements and railway truck building, and it is also used to a certain extent for furniture.

SALMON GUM (*Euc. salmonophloia*).

A tree ranging from 80 to 100 feet in height, with a bole of 40 to 50 feet and a diameter of $2\frac{1}{2}$ to 3 feet. Its gleaming, salmon-coloured bole and bright shining leaves make it the most conspicuous tree in the savannah forest of the agricultural and lower rainfall districts.

Mechanical and Physical Properties.

		Mean.
A.	Transverse Bending Test (Beams of 20 sq. in. sectional area and at 12 per cent. moisture)—	
	Modulus of Rupture, lbs. per sq. in.	20,100
	Modulus of Elasticity, lbs. per sq. in.	2,500,000
F.	Density—	
	Green, lbs. per cubic foot	70
	Dry (at 12 per cent. moisture), lbs. per cubic foot	66

The timber is extremely dense, and the second strongest in Australia. It has, up to the present, been used for mining purposes only, and has played a very

important part, together with Mulga (*Acacia aneura* and *Acacia stereophylla*) and Gimlet (*Euc. salubris*), in the development of the goldfields of the State.

MORRELL (*Euc. longicornis*).

Throughout the savannah forest of the 10 to 12 inch rainfall belt, in the South-West of the State, this tree is to be found. It attains a height of 60 to 90 feet, with a bole of 30 to 40 feet and a diameter up to 4 feet.

Mechanical and Physical Properties.

		Mean.
A.	Transverse Bending Test (Beams of 20 sq. in. sectional area and at 12 per cent. moisture)—	
	Modulus of Rupture, lbs. per sq. in.	16,900
	Modulus of Elasticity, lbs. per sq. in.	2,400,000
F.	Density—	
	Green, lbs. per cubic foot	73
	Dry (at 12 per cent. moisture), lbs. per cubic foot	64

The timber is dark brown in colour and is hard and dense, with an interlocked grain. It is used for wheelwright work, tool handles, etc., and is also useful as a mining timber.

YATE (*Euc. cornuta*).

This tree is found at Busselton, the Donnelly River coast, Lake Muir and Mt. Barker district, and attains a height of 50 to 60 feet, with a bole of 25 to 35 feet and a diameter of 3 feet.

Mechanical and Physical Properties.

		Mean.
A.	Transverse Bending Test (Beams of 20 sq. in. sectional area and at 12 per cent. moisture)—	
	Modulus of Rupture, lbs. per sq. in.	21,500
	Modulus of Elasticity, lbs. per sq. in.	2,800,000
F.	Density—	
	Green, lbs. per cubic foot	79
	Dry at (12 per cent. moisture), per cubic foot	71

The timber is light coloured and of exceptional strength, probably one of the strongest timbers in the world. The mean tensile rupture stress is 24,200 lbs. per square inch, but for one test-piece the breaking load was equivalent to a stress of 17½ tons per square inch. It is used for wheelwright work generally, and is preferred where the strongest shafts and frames for carts are required.

YORK GUM (*Euc. foecunda*, var. *loxophleba*).

York Gum grows in open savannah forests, and is to be found in the 20-inch rainfall belt. It is most common about Bolgart, Toodyay, Northam, York, and Narrogin to Broomehill. The tree has a height of 40 to 60 feet, a bole length of 10 to 15 feet, and a diameter of 18 to 24 inches.

Mechanical and Physical Properties.

		Mean.
A.	Transverse Bending Test (Beams of 20 sq. in. sectional area and at 12 per cent. moisture)—	
	Modulus of Rupture, lbs. per sq. in.	14,500
	Modulus of Elasticity, lbs. per sq. in.	1,800,000

F. Density—	Mean.
Green, lbs. per cubic foot	77
Dry (at 12 per cent. moisture), lbs. per cubic foot	67

This wood is dense and hard, with an interlocked grain. The latter property seems to be largely responsible for its being by far the best nave and maul wood in Australia. It is also used for felloes and other wheelwright and wagon-building purposes. The wood is yellow-brown in colour and has a beautiful mottled figure.

RASPBERRY JAM (*Acacia acuminata*).

This tree occurs through the higher rainfall agricultural areas, and its presence is taken as an indication of good soil. The tree is only a small one, with a height of 15 to 20 feet, a short bole, and a diameter up to 12 inches.

Mechanical and Physical Properties.

A. Transverse Bending Test (Beams of 10 sq. in. sectional area and at 12 per cent. moisture)—	Mean.
Modulus of Rupture, lbs. per sq. in.	15,300
Modulus of Elasticity, lbs. per sq. in.	2,360,000
F. Density—	
Green, lbs. per cubic foot	73
Dry (at 12 per cent. moisture), lbs. per cubic foot	62

The tree derives its name from the remarkably strong scent possessed by the wood, which resembles that of crushed raspberries. The timber is hard and extremely durable, fence posts after 70 years showing no sign of decay. The colour is very similar to that of the Eastern States Blackwood (*Acacia melanoxylon*), and, as the grain is good, the timber is prized for cabinet work. The wood turns well, and very pleasing effects in small turnery are obtainable by utilising the contrast of the light yellow sapwood with the dark heartwood.

By Authority: FRED. WM. SIMPSON, Government Printer, Perth.