

We thus see that a forest of marketable Karri can be produced in the short term of from 30 to 40 years.

It is certainly a matter of local record that some years ago a resident on the "Warren" lived and partially raised a small family in the hollow of one of these fallen monarchs. It appears that the tree was hollow and fell, and was afterwards further worked out and lined by the enterprising settler as a dwelling for his family until such time as he was in a position to build the modern edifice which now stands not far from the site or remains of the primitive habitation. The old tree was destroyed and effaced from the place by a recent bush fire. This specimen was said to be over 300ft. in length and some 12ft. in diameter at the base.

The "Karri" is strictly confined in its range of locality to the south-western portions of the great South-Western Division of the Colony, or that part of the latter lying between Cape Hamelin on the west and the Torbay Estate, near Albany, on the east. Its geographical confines are embraced within longitudes 115 degrees and 118 degrees east, and latitudes 34 degrees and 35 degrees south.

This part of the country comprises the more humid portions of the temperate region of Western Australia, where I find the annual rainfall is from 35 to 40 inches, so that one may safely classify the species as a tree which delights in plenty of moisture. The region is purely coastal, and is very distinct in its general physical features from anything else in this way in the Colony. The tree seems to be a component part of its surroundings, or *vice versa* as the case may be individually viewed. Here we find immense forests of trees of straight and wonderful size, springing out of a rich soil, deep and spongy, yet the country sufficiently undulating to make it in some parts what may be termed hilly, but not difficult of working by road or tram.

In some instances we find the tree fairly close to the sea-coast, but in such cases it is scraggy, stag-horned and branchy, and therefore not a desirable specimen for the saw mill, or readily convertible into timber for marketable purposes. Still, it is, undoubtedly, essentially a coastal-tree, but yet shy of actual contact with saline particles or of strong direct sea breezes. In this respect, it perhaps also resembles the jarrah, if not the eucalyptus family generally.

In that portion of the Karri area south of the Blackwood River, the country consists of knolls and belts of red chocolate, or partial ironstone-humas soils. Around these eruptions or hills, there are low-lying parts, valleys, or swamps, which usually consist of deep vegetable debris soils, and covered with the usual tea-tree, banksias, and low eucalypti scrubs, backed up by a low inferior scrubby class of jarrah, which gradually intermixes and merges with the Karri.

As a rule, I found that in the Karri country the jarrah is subservient to the former, and therefore is inferior in every physical feature tending to natural competition as a timber tree.

Of course there are ranges and table-lands of this country which dissociate themselves from these remarks, but as a rule the latter are fairly correct.

Again, I found that the soil of the Karri belt at Karridale, or that lying between the Blackwood and the coast of Cape Hamelin, is of an entirely different nature to the other, being of a limestone formation, with the limestone on the surface, and the soil of a sandy calcareous kind. This, so diametrically opposite to the other, is a very remarkable phytological fact for future examination.

From aneroid readings, I found that the best Karri forests (that is as regards size, soundness and health of individual specimens) are to be found at elevations of from 300 to 600 feet above the level of the sea. This I found a fairly correct observation applicable to the whole area.

Of course, in a large area of forest country such as I am now referring to, there are certain parts better than others as regards all of their natural features and surroundings; and, therefore, in coming to a conclusion as regards the best Karri forests which I have seen, I cannot but say that this is upon the Warren River, within a radius of some five or six miles of Mr. Brockman's homestead.

This, undoubtedly, is the best home of the tree, and although there may be places where there are larger members of the species, to my mind the ranges and plateaus upon the Warren River contain the best forests of this remarkable tree.

At Denmark, the property of the Millar Company, the forest of the tree is certainly very fine, and is perhaps more continuous than anywhere else; but the trees are not so high, individually, as those on the Warren.

Karridale, the concession of the M. C. Davies Company, contains some excellent timber of the species, and has the honour of possessing the largest tree of the kind represented in this report. The trees here are certainly of a high-class order in every respect, and will hold their own as regards general possibilities.

The timber is red in colour, and has very much the appearance of jarrah; indeed, so like are the two, that it takes a good judge of both to distinguish each. It is hard, heavy, elastic, and tough, but does not dress, nor can it be wrought, so easily as its contemporary.

It is said that for underground or waterworks the timber is certainly inferior to some other kinds, especially to that of the jarrah, and there can be no doubt about this fact, which has been demonstrated time after time in this Colony. And still it is only fair to say that instances have been brought under my notice where posts and slabs of the timber have been known to have been in the ground for 30 and 40 years with only an ordinary amount of decay. This is certainly very puzzling, and makes one doubtful in regard to the conclusions generally which have been arrived at in regard to this timber.

However, as may be seen from the comparative tests which have been made in regard to its tensile, crushing and breaking strength, it stands as a timber of a very high order indeed. We must, therefore, pending other and more general experiments, look upon the Karri timber as one best suited for superstructural works.

For bridge planking, shafts, spokes, felloes, and large planking of any sort, flooring, general wagon work, beams, it is unequalled in this Colony.

In lateral strength it is very much stronger than jarrah, and for works requiring the bearing-up of considerable weights, such as bridges, floors, rafters, beams of various kinds, it is of great value. In our railway sheds, the wood is now much in use for the construction of wagons of all sorts. It shrinks laterally but not to any great degree in a longitudinal direction. Altogether the timber is a most valuable one.

For street blocking it is most valuable, and for this purpose seems to be equal to, if not better, than its colleague, the jarrah, in that its surface by the wear caused by the traffic does not render it so slippery for the horses' feet. As is well-known, this timber is now largely exported for the London street paving. It is also finding a ready sale in South Africa, for mining purposes chiefly.

#### Tuart.

This is another of the commercial trees of the Colony, and, although comparatively limited in extent, still its importance is great, and hence must have a place in this section of the report.

The technical designation (*gomphocephala*) has reference to the markedly peculiar swelling or hanging-over appearance of the lid of the calyx tube. This is a very marked feature of the species.

Sometimes the vernacular name is spelt "Tooart." It is our rendering of the aboriginal pronunciation of the word.

This is a handsome Eucalypt, and has a wonderfully bright and cheerful appearance in the forest. The bark is of a greyish-white colour, and is smoothly crinkled and persistent throughout. The trees are always clean and bright looking.

In the young stage the species forms a very ornamental tree, and is planted as such in some of the other Colonies. It is straight, well clothed, and has a beautiful bright-green leaf, and in this

respect is not unlike the Karri. When the tree has developed out of the seedling and sapling stages the leaves get more narrow and elongated than formerly.

In height this species attains sometimes to 150 feet, and in circumference to more than 22 feet at the base. In some cases the trees run up to 70 and 80 feet without a branch, but, as a rule, they have heavy tops with boles about 40 feet to the first branch. As a rule they do not form a dense forest, but appear to like plenty of individual room, although this observation may be only one of conjecture from the present appearance of what remains of the forests of the tree.

I am inclined to think that the species is a fairly quick grower, and, by cultivation, could be made to attain the size of a fair tree in from 30 to 40 years' time. A sapling which I had cut down gave the following measurements:—

Extreme height ... ..	88 feet.
Length of bole to first branch ... ..	43 feet.
Diameter at base ... ..	15 inches.

I could not count the concentric rings, but put the tree down as of about 35 years of age.

In general appearance, the trees resemble very much what are known in the Eastern Colonies as the "box."

The tree is confined in its natural habitat to the limestone belts lying along the coast between Perth and Busselton. It seems to grow nowhere except upon this calcareous formation, and is not, so far as my observations go, in any case, found even slightly outside of these.

This calcareous strip of country is intermittent in places, and is hardly, if ever, more than two to three miles in width; but, in all cases, it is quite close to the sea, and in some instances runs into the coastal sandhills.

I think that the tree is purely gregarious, and does not intermingle with any of our other timber trees, except perhaps in places sparsely with a stunted form of the jarrah. With the banksias and melaleucas it is of course intimately associated, but these only form the undergrowth of the forest which it creates.

The soil formation of the limestone belt referred to is a sandy loam of considerable fertility, with a subsoil of a rather retentive nature. Upon this the Tuart seems to feed and thrive well.

Of course, from these natural proclivities, we must classify the tree as a purely coastal one.

The real home of, or the place where the Tuart is found in its perfection as regards size, health, and soundness of timber, is in the neighbourhood of Wonnerup Station. Here the tree is to be seen at its best. No doubt there are other spots where fine trees are to be seen, but for quantity and general excellence the place indicated is undoubtedly pre-eminent. This lies about fifty feet above sea level.

The timber of this species of Eucalypt stands classified as the strongest, heaviest and toughest in Western Australia.

It is extraordinarily hard, and so interlaced in the grain that it is difficult to split. It is said to season without much shrinkage or splitting. There are some wonderful, apparently correct, records in connection with it. It has the quality of resisting the changes of weather, and altogether is a timber of a high standard.

Some of the uses to which it is now applied are railway wagons, buffers, engine bearers, keelsons, stern posts, bridge supports, dockgate frames, wheelwright's work generally, shafts, and most other works where great strength, solidity, and hardness are requisite.

The wood is of a yellow-whitish color, and so dense that it is difficult to work. It is doubtful as to its resistance to white ants or the teredo. I have seen a log of the timber badly destroyed by the former. Another case represented a slab which had been lying exposed to the weather and white ants for over 20 years without any injury.

### Sandalwood.

This, although only a small tree or shrub, is an important factor in the timber industry of Western Australia, and therefore has a place in the description of those forest products which have assisted to build up the export trade of the Colony.

This species is somewhat peculiar in its appearance, and certainly has more of the character of a large bush than that of a tree proper. It has a low depressed habit, and consequently decidedly branchy and heavily topped. It is seldom found more than 15in. in diameter, and from 12ft. to 18ft. in height, with stems about 8ft. to 10ft. in length. In a good many cases, however, stems have been found measuring over 18 inches in diameter and 12ft. in length, these weighing from 3cwt. to 6cwt. Trees have been cut which produced timber weighing more than half a ton.

This tree is found fairly distributed over the inland parts of the Colony, except in the south-western portion of it, grows most freely on barren, sandy soils, and is frequently intermixed with the wandoo, york gum, and morrell. It is not gregarious.

From Mr. J. Moore, J.P., of Bunbury, I have received the following interesting details of the early days of the sandalwood trade. It appears that the first wood was delivered in Perth by the farmers of the eastern districts, about 50 years ago. This they exchanged with the merchants for goods.

This was then shipped to Singapore and China.

Although the principal shipments of the wood took place from Fremantle and Albany, large quantities were exported from Bunbury, from which port the first shipment took place in 1849, the timber being brought there by teams belonging to Messrs. Elliott & Clifton.

For the wood, the farmers received from £7 to £8 per ton, the merchants realising about 15s. per ton profit.

The trade then languished for nearly 20 years, when it made a fresh start by the farmers sending their teams out in the summer time to cart the timber into port, which had been procured by parties of cutters during the previous season. In this latter enterprise I understand that Mr. George Rich, of Bunbury, was prominently associated, and that it was he, with his men, who cut the sandalwood track through the virgin jarrah forest to the Williams.

Altogether, I understand that about 20,000 tons of the material have left the port of Bunbury to date.

About 1882 the trade practically ceased, owing to a decline in price caused by the Chinese market being overstocked; in consequence of which, the merchants were encumbered with large quantities in stock.

At the present time there is a revival in the trade, and all the old stocks along the Great Southern Railway are now fast disappearing through the port of Albany, which is destined, I think, to be the chief shipping place for the trade.

At present there is, however, a considerable quantity of the wood being exported from Fremantle. This is being cut between Northam and Southern Cross and upon the goldfields.

In order to allow the young trees in the cut-over portions of the Sandalwood country, to come up and grow to maturity, the Government lately set apart a considerable area of this, upon which Sandalwood cutting of any kind whatever is prohibited for the next two years. This will enable the crop of this tree to be maintained for future operations. The area thus closed from cutting is a very large one indeed, and includes all that portion of the colony from which Sandalwood timber has been obtained during the last forty years or more. The young trees upon it are showing here and there all over the ground, and thus the renovation of the forest by natural reproduction is now assured; consequently there is no fear of the tree becoming exterminated.