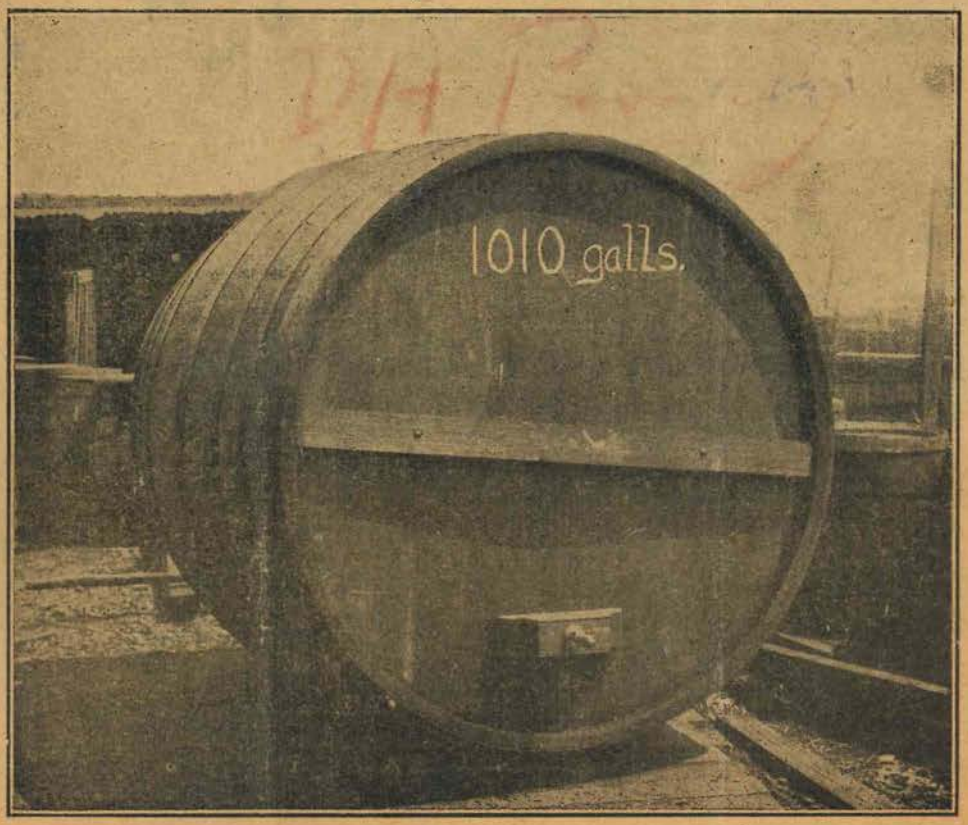
QUARTERLY

JARRAH

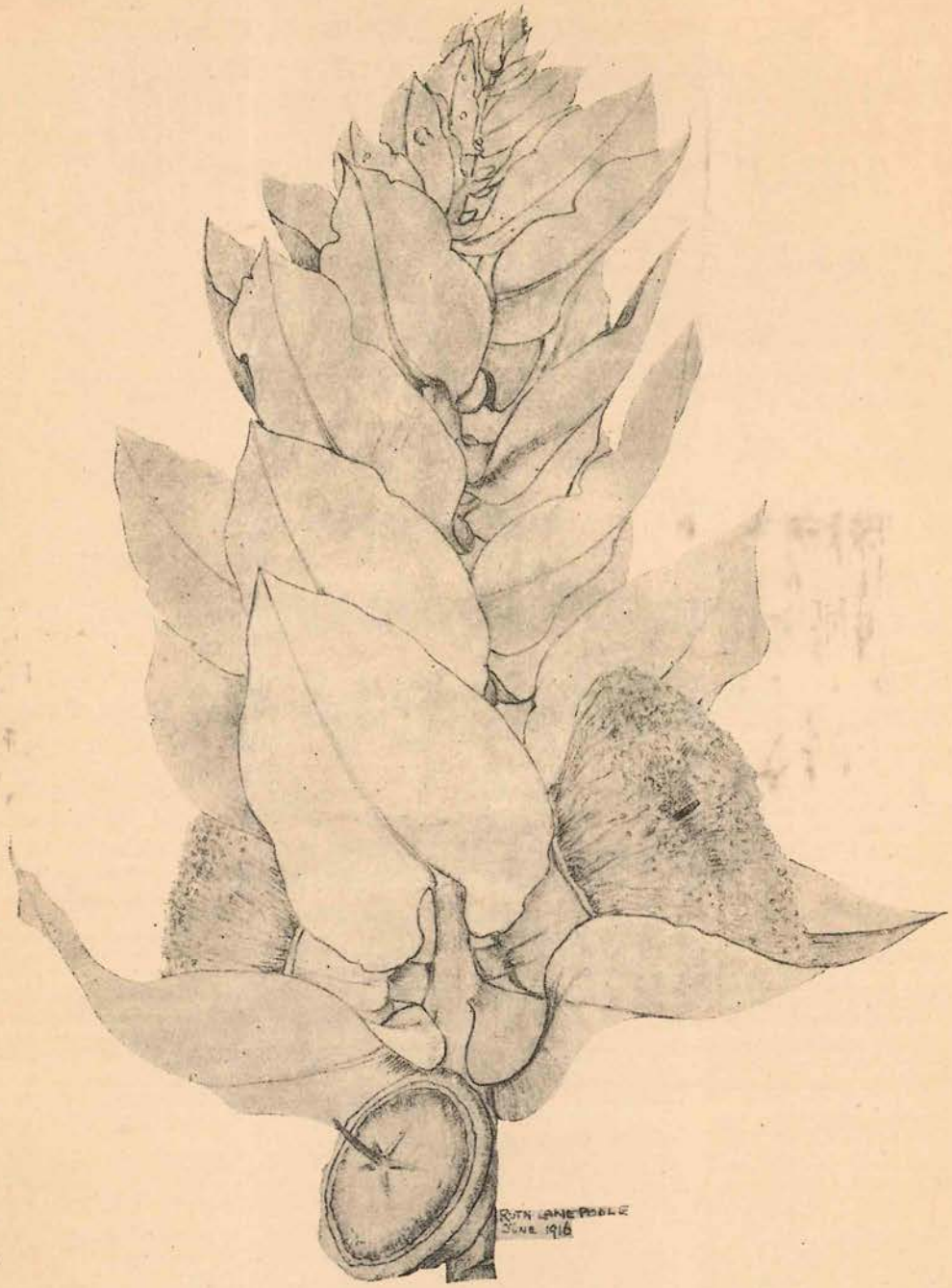
THE OFFICIAL JOURNAL of the AUSTRALIAN FOREST LEAGUE

PERTH WESTERN AUSTRALIA

Edited by J. S. Ogilvie, Hon. Secretary of the League



End View.—Wine Vat made entirely of Jarrah. The capacity is 1010 gallons.



"Rose of the West." Eucalyptus Macrocarpa (blue gum).

ISSUED QUARTERLY

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Jarrah

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Correspondence and contributions on forestry matters are invited from members of the League and others interested in forestry and cognate subjects. "Jarrah" has no politics. It knows only forests and forestry, but it will gladly welcome the assistance of patriotic politicians in its propaganda. Questions on matters relating to forestry are invited and will be answered, and suggestions for increasing the usefulness of "Jarrah" will be carefully considered. No responsibility is accepted for opinions expressed or conclusions arrived at by contributors or correspondents.

All communications should be addressed to:

THE EDITOR, "JARRAH,"
WEST AUSTRALIAN CHAMBERS,
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PERTH.

War Service Homes of Wood.

IN every Australian State the Repatriation authorities are engaged in housebuilding enterprises on behalf of returned soldiers. In America, Canada, France, Belgium, and Great Britain, similar activities are in progress. In the four countries last named the building schemes contemplate the employment of wood, a material to all intents and purposes banned for house construction in cities and towns within the Commonwealth. America and Canada have both adopted wood as a building material to a degree which has developed a special architecture adapted to wood construction. Whole towns and the residential quarters of others are of wood, and its adoption in the matter of houses for returned men is in keeping with common usage. In France, and Belgium, too, the wooden dwelling is by no means a rarity, more particularly in the provincial departments. In their case also use and wont were reinforced by the urgency of the circumstances. An enormous number of houses have to be provided in the shortest possible time, and wood meets this requirement better than any other material used in house construction. Britain's need for the rapid provision of War Service Homes was no less urgent than that of her friends, but, barring the way to the adoption of wood, particularly in towns, there stood certain out-of-date municipal by-laws, which declared that timber shall not be used for outside walls or roofs in buildings. These by-laws are getting on for three centuries old, and date from shortly after the Great Fire of London. As a very large number of wooden houses closely packed together were then destroyed, the unimaginative British official complacently assumed

that the wooden building held too large possibilities in the way of fire risk, and forthwith forbade its erection in towns, and his successor has ever since strictly adhered to a tradition largely founded on a misunderstanding of the facts of the case. War's aftermath has brought with it a reconsideration of the whole question, with the result that the Ministry of Health in England (in charge of the Building Scheme) has issued regulations abrogating the archaic by-laws and permitting the erection of wooden structures in towns, villages, and the rural areas.

The British pioneers of Australia transplanted British ideas to the new soil, and among them the fallacy that wood as a building material involves a risk which must not be lightly run in Australian towns. With American and Canadian experience as an object-lesson and Britain's tardy admission that the risk from fire from wooden structures has been largely overestimated, it would seem that the time has come when Australian governments and civil authorities should reconsider their attitude in the matter.

We have in Western Australia the finest building timbers in the world, and in employing them the Repatriation authorities would not only be assisting the timber trade, but would be able to provide more accommodation, at less cost, than would be the case if any other material were employed. Economy alone should dictate timber, and economy is a factor that should receive earnest attention in any public scheme at the present juncture.

A Notable Shingle Roof.

The illustration on another page shows a part of the roof of the Town Hall of Perth. The Perth Town Hall was built in 1868, and the jarrah shingles then put upon the roof have done duty ever since. This roof is one of the best examples of shingling in Australia, and is a fine testimonial to jarrah as a shingle material.

A Forest Policy for Australia.

(By C. E. Lane-Poole.*)

* Diplomé de l'École Nationale des Eaux et Forêts, Nancy; Conservator of Forests, Western Australia.

OF the many national assets that together we are wont to call our natural resources, there are few which hold so important a place in the economy of the nation as the forest. It differs from most other resources because, though under unsound management it certainly is exhaustible, it is nearly always replenishable, while, if it is utilised on sound sylvicultural principles, the forest becomes an inexhaustible asset. It is customary to look upon the mineral fields, be they gold or base metals or coal, the mother of industries, as the most valuable natural resources of the nation. Yet the mineral fields are all exhaustible, and a time will come when the last ounce of gold and the last ton of coal will have been won from the soil. In this the mineral fields differ essentially from the forest. The actual wealth of a mine may be regarded as a finite quantity, while the wealth of a forest is infinite. So long as the commercial profits of the undertaking are to a large extent utilised within the boundaries of the country, the work of winning the mineral from the ground is one which may well be left to the unrestricted activities of private enterprise. It is to the advantage of the nation to reap the whole golden harvest and utilise the wealth it yields to develop the commerce and industries which must follow in the wake of the mining industry. With the forest the position is entirely different. It happens all too frequently that forests are handed over to a private individual or to a company who treats it as one would do a mine, reaps all the crop, and leaves the area devastated and useless. Private commercial enterprise knows no other motive than private gain; it sees no further than the profits of to-day. If it looks forward at all, it is only as far as the time taken to write off its depreciating assets. The forests in such hands are naturally doomed; and so it is that no nation that has given the matter thought has allowed its forests to fall into the hands of the private individual or corporation.

From the earliest times the forests have been regarded as the property of the community in general, the reason being that the forest is an everlasting source of wealth, and is not the property of one generation alone, but of the nation for all time. The Romans were quick to realise this fundamental principle, and Justinian's Pandects lay down that the cutting of the coppice must be conducted by the timbermen as by the father of a family (*sicut pater familias caedebat*), and the large timber trees were to be reserved for the State's use.† The community could utilise the timber crop, but in such a manner that those who followed after them would find a supply sufficient for their needs alone, and they again would leave sufficient, and so on down the ages, the forest would continue to yield its unfailing crop of timber. The early laws differ only in degree from those that are in force in the forests of Europe to-day. The basis of all methods of forest management is the same, viz., a restriction of the cutting so as to assure a continuity of supply.

In addition to the obvious value of timber, which has been felt from the beginning of time, the forests were found to have another value, which was almost as great, and this is their influence on the surrounding conditions of climate, water, and soil. Forests exert a beneficial influence by reducing the extremes of heat and cold, they increase the precipitation to a slight extent, while in mountainous country they act as great water storers, holding up the surplus of water which falls from the sky and letting it out slowly in the form of springs, so maintaining a constant flow in the rivers of the plains. The devastation wrought in the forests of the Alps and Vosges by graziers was followed by such appalling results that France learned a lesson never to be forgotten. Erosion of the hill sides, formation of torrents, destructive floods wiping out whole farms and villages were some of the results. The destruction of the forests of Algiers and certain other parts of Africa and Asia has been followed by the invasion of the desert sands, and vast areas of agricultural land have been rendered unproductive. Had Justinian's law been followed, and the cutting conducted as though by the father of a family, then they would only have cut what the forest would have replaced, and none of the disasters would have followed. Instead, France is spending millions on her Reboisement des Montaignes, and in Algiers recourse is being had to the planting of Australian eucalyptus to restore the forest conditions and stem the invasion of the desert.

With the knowledge of the true *role* of the forest there came the realisation in many countries that the area of forest still remaining was inadequate for the needs of the community. The result was that the cutting laws were made more restrictive, and the tending of the woods became an urgent necessity. Colbert's cry, "*La France perira faute de bois,*" led the way in that country towards the adoption of a sound forest policy, with the result that France did not perish through lack of wood, but her forests went far to enable both her own countrymen and the British to defeat the Germans. Sad inroads have been made into the forest wealth of France since 1914, and her forest working plans have been broken. Without those forests it would have been difficult, if not impossible, to keep the Allied Armies on the Western Front in the field. Colbert was followed by other foresters; and all the nations who were not actually on the threshold of their development took steps to reserve what forests they possessed for the national good. The cult of forestry became slowly recognised, and the care of the forests became the charge of skilled men, whose duty it was to stand between the timberman and the nation and apportion the timber crop in such a manner as to benefit the whole community for all time, and not only the present day converter of the wood. The forester laid down working plans for the management of the forests, and these were based on sound sylvicultural principles, and extended over long periods. The plans restricted the amount of timber that could be felled annually, and the amount permissible was, of course, the *possibilite*, or the quantity that the whole forest would grow in a year. The position of the felling section for each year was fixed; the operations necessary to assure the regeneration and proper growth

† Ulpian VII., *ad edict. provinciale.*

of the best species on the cut-out areas were laid down. In this way a maximum of forest produce was assured; and yet only the forest interest was cut and utilised, the forest capital remained intact. In the utilisation, waste was, as far as possible, eliminated, which was a comparatively easy matter with a large timber-using population to cater for.

Yet, with all this care and forethought, a country like France soon found itself unable to supply its own needs in timber, and was forced to import large quantities. Germany, too, who had perfected a particularly fine, if somewhat rigid, forest policy, and who possesses no less than 30,000,000 acres of forest, has also been obliged to rely on imported wood to make up the deficiency of her local supplies. There arose the question then of how great an area in comparison to the total area of the country it is necessary to keep under forest for the supply of timber for the general needs of the community. This matter has been thoroughly investigated, and it has been laid down that an area of forest equal to one-quarter of the total extent is the bare minimum necessary in a well-developed country. There are not many countries that possess this proportion of forest to-day, forest policies in most instances having come too late to save the necessary area. The result has been that most of the older countries have become large importers of timber, and are dependent on two sources of supply. Countries like Russia and Scandinavia, that have an excess of forest, and countries which have not reached their full development, and where forests, in consequence, are large in proportion to their population, such as Canada and other British Dominions, also countries along the West African coast.

In those British Dominions, where forests occurred in large areas they were naturally regarded by the early pioneer as obstacles to settlement, and were in most instances greatly destroyed before a market for the timber was found. When an outlet was discovered, and saw-mills and the lumbering business generally came to be established, the young nation, that had always regarded the forests as its natural enemy, very naturally welcomed this means of clearing the land. The mills were to be the forerunner of settlement, and every encouragement was given to the lumber company to take up large areas of forest and develop an export trade. Concessions were granted on terms which we to-day can only regard as most generous; leases were taken by the saw-miller on a practically peppercorn rental, and he was regarded almost in the light of a philanthropist. Even to-day the larger milling companies still take up the attitude that they have been, and are, the saviours of the State, and have done it an incalculable benefit through the clearing of land, the circulation of money in wages, and the purchase of produce. In reality, such concerns have destroyed a large proportion of the national wealth by forcing an export market for the timber before the local demand had grown sufficiently to absorb the smaller sizes and other timber not ordered from overseas. Such timber, through the lack of any local market, and the impossibility of stacking and storing it, has been burnt. The saw-millers of the Dominions were not slow to seize on their opportunities, and soon it was not a case of cutting timber on agricultural land to assist land settlement, but cutting timber anywhere and everywhere. Their road was made easy for them, for the pioneer population continued to encourage them, until finally they became so well established, and wielded so strong an influence with local Governments, as to make their position unassailable.

The forests were treated as mines, whose wealth is exhaustible and not replenishable, and the science of forestry was lost sight of in the endeavour to saw up all the crop in sight. It was often argued, and is to-day in New Zealand, that the local timbers grow too slowly, and are not worth any form of conservative cutting, but recourse must be had to exotics. Instead of ascertaining the actual growth per acre per annum of the forest, and allowing that quantity of timber, and that only, to be cut, the whole forest was attacked, and the crop reaped as quickly as possible. The unfortunate part is that the saw-miller in his inroads on the virgin forest only takes the best of the crop; he chooses all the fine-grade mill logs, all the straightest piles for harbor work, and cleanest poles for

telegraph and other purposes. He leaves the forest in a deplorable state; the percentage of over-mature and dying trees, which in a virgin forest is always great, is naturally increased; while the best of the timber, which should have made the future forests, goes in piles and poles. The fires following the logging operations are a further menace, and it is often the case that whole forest regions have been destroyed through this cause. Thus, while we see the older countries embarking on a policy of careful utilisation, under which the forests yield a perpetual crop of timber, the young countries, profiting by the older ones' need for lumber supplies, embarked on a system of reckless exploitation.

(To be Continued.)

Checking in Timber When Drying

AT various timber plants in this State preparations are in use for coating the ends of sawn timbers to prevent checking and cracking while the timber is drying. "Jarrah" has had several enquiries regarding these. The matter is treated with great fulness by Mr. H. D. Tiemann, in his "Kiln Drying of Timber," and the following particulars are taken from his book, and may be found of use:—

"A suitable coating must be impervious. The mixture must not melt off at the temperature used in the kiln or of the air, must adhere to the green wood, and must not be too brittle when dry. A good coating consists of a mixture of black powdered japan and lamp-black, to which a little linseed oil is added to prevent its checking. This may be thinned with turpentine before applying. Another excellent coating consists of—

Resin (good quality) ..	100	parts by weight
Lamp-black	7	,, ,,
Linseed oil	7 to 10	,, ,,

The resin to be melted at as low a temperature as possible, the oil then added, and the lamp-black thoroughly saturated into a sticky liquid. On no account should the mixture be allowed to boil, since that will make it froth and the coating will be full of air bubbles and not impervious. Keep well stirred in suitable kettle and dip the ends of the sticks at 220deg. to 240deg. F. The coating when dry should be perfectly smooth and shiny, and ⅛in. to ¼in. thick. Do not use paraffin in the dry kiln, as it melts at a very low temperature, and the resin mixture cannot be successfully applied over paraffin.

"Another mixture which has been found to give excellent results is as follows:—

30 per cent. of 160deg. C. pitch.
70 per cent. of resin.

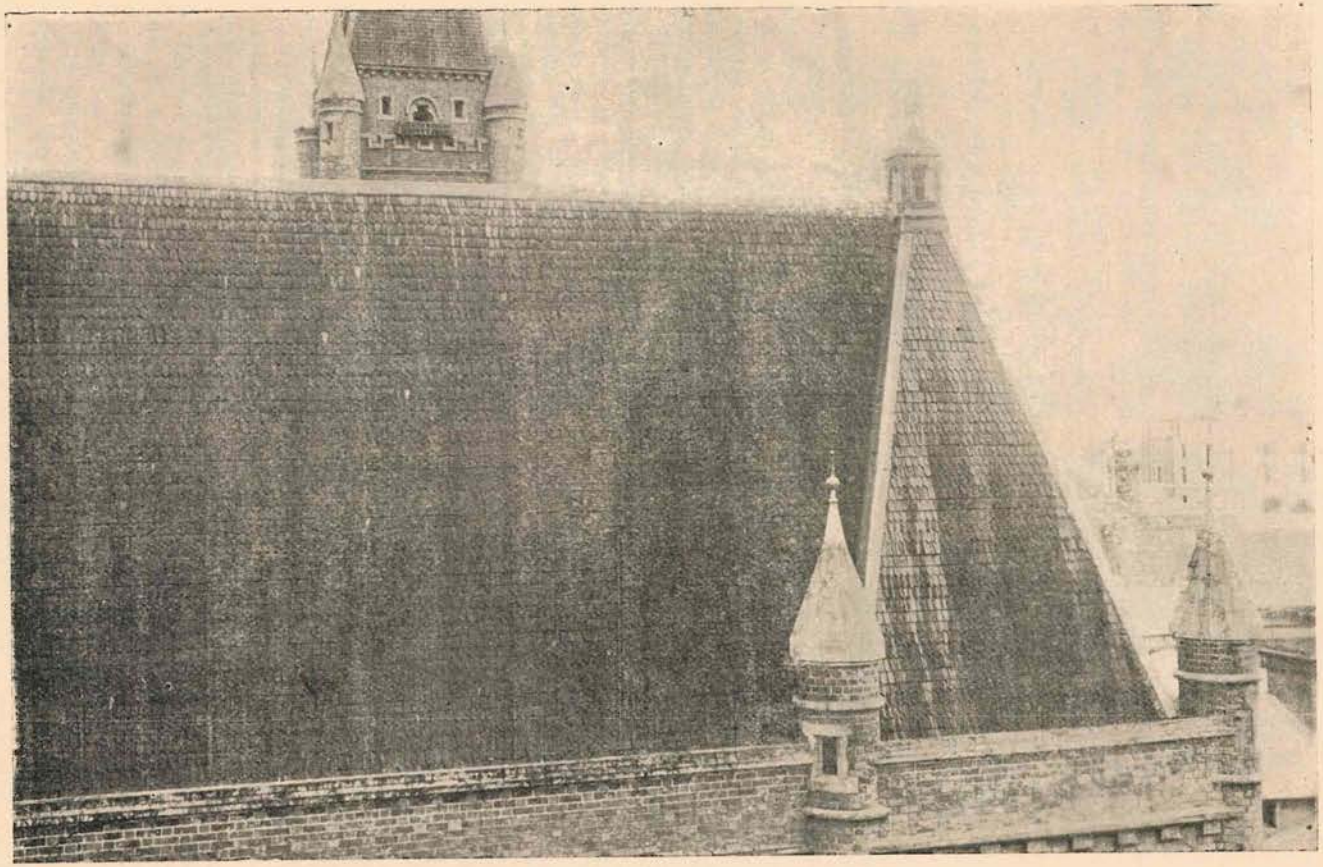
May be brushed on or dipped."

The Eucalypts Abroad.

Is Australia's Monopoly Passing?

THE question has been asked—Will the time ever come when Australia will cease to be the monopolers in the production of Eucalypts ? A glance abroad and a careful observation at what is being done in the matter of Eucalyptus cultivation in other parts of the world seem to suggest that the time will come when Australia's monopoly will be nothing more than a mere memory. The reflection is scarcely comforting to the proper pride which Australians should have in their country and its indigenous products. It may, however, afford satisfaction to users abroad of Australian timbers, who foresee in Australia's lack of active forest conscience a time when the areas within the Commonwealth now covered with a fine growth of Eucalypts will have dwindled to mere shadows of their former selves, to be assured that, when Australia's supplies have failed, other countries may be able to meet all demands. Only those Australians whose business brings them into contact with the question are able to form adequate notions of the extent to which Eucalypt culture is carried on in other lands.

The French were amongst the first to discover the value of the Eucalypt as a timber tree. Writing on the subject nearly 20 years ago, M. Paur Charpentier, an Officer of the French Mint, says:—"The Eucalyptus globulus, of the Myrtaceoe



Shingle Roof of the Perth Town Hall, built in 1868.

family, is of Tasmanian origin, as well as of the eastern portion of the province of Victoria (Australia), where it is known by the designation of blue gum-tree. This species of tree was introduced into Algeria in 1857, since which time plantations have been multiplied, and it is now found upon the whole of the littoral of the Mediterranean. Its rapid growth, and the extraordinary development of the Eucalyptus globulus, make its cultivation very important. Generally, the wood of trees which grow rapidly is light and soft; it changes promptly under the influence of air and damp. It is not so, however, with the wood of the Eucalyptus, which is heavy, hard, and very resistant to the action of air and water. Moreover, it is not liable to attack by insects. The great usefulness of the wood of the Eucalyptus arises from these diverse qualities; it presents the advantages of the wood of oak, and can even be substituted for 'tawn' and teak wood. It is consequently largely employed in naval constructions. The majority of the steamers which travel between Australia and Europe are constructed with this wood. The renowned soundness of the whalers of Hobart Town is due to the employment of this wood. Eucalyptus plantations spread aromatic emanations through the atmosphere which are beneficial to the health; these emanations are due to an essential volatile oil, which is very abundant both in the leaves and in the bark. Eucalyptus essence is oxydenated; it is formed primarily by eucalyptol. This product boils and distils at 170deg. C.; it is slightly soluble in water, though very soluble in alcohol. Fatty and resinous bodies dissolve easily in eucalyptol, which makes it very useful in the manufacture of varnish. The bark of the blue gum-tree contains both tannin and the aromatic principle of the leaves; employed in the preparation of leathers, it transmits to them a very agreeable characteristic odour, their preservation being thus ameliorated. At the side of Eucalyptus globulus, another very useful species may be noticed, namely, Eucalyptus gigantea. This tree is likewise of very rapid growth; its wood is very resistant, being three times more so than that of the oak of Riga or Hungary. Its wood, which is hard and very easy to split, is useful in cooperage work, as well as for the making of laths, and a sort of wooden tile for the covering of houses. The usefulness and value of this tree consist especially in the abundance and quality of its fungo-fibrous bark, which serves as a very useful material in the manufacture of paper, bleaching very easily. The Eucalyptus is a native of Australia. A hundred varieties have been naturalised in Algeria. Each of them can be appropriated to a special soil. Thus the Rostrata and the Tereticornis grow in the low and marshy plains, exposed to inundations in winter, but the soil of which is deep; the Cornuta, Resinifera, Diversicolor, and Globulus are destined for ravines and damp valleys, in good soil; the Marginata and Meliodora are adapted to high and dry localities and to the mountainous and stony parts; the Obliqua and Bucoxylon grow better in elevated situations and without shelter, where vegetation is meagre, where winds and drought often occur, etc."

In the United States of America the value of the Eucalypt as a timber tree has been widely recognised and its cultivation is going on systematically. "In general," writes Mr. Gifford Pinchot, formerly Chief Forester of the United States, "Eucalypts may be successfully planted in the sections of the United States suitable for the culture of citrus fruits. They are grown in nearly all the agricultural sections of California, along the coast of Southern Oregon, and to a limited extent in Arizona, New Mexico and Western Texas. Several species have also been planted in Florida and along the Gulf Coast. Eucalypts have been planted most extensively in California, and there the value of different species may best be determined. The rate and habit of growth of the Blue, Sugar and Grey Gums and a few other species make them superior to other Eucalypts and recommend them especially for commercial plantations. Blue Gum, one of the best commercial species, has been the one most widely planted. Its requirements, characteristics and methods of propagation are typical to these and other timber Eucalypts."

Since Cyprus came under British Rule forestry has occupied a prominent place

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SOUTH
270
250
BASELINE 1

in the programme of rehabilitation. Acting on the advice of Mr. D. E. Hutchins the Eucalypts have received prominent attention and have been largely planted. Reporting on the matter in 1914 the principal Forest Officer of Cyprus gave some very interesting details as to the extent of the work done. As showing how readily the Eucalypt adapts itself and flourishes in Cyprus, he quotes cases of trees which had already attained a height of from 94 to 106 feet with girths of 10 to 11 feet. It should be mentioned that wattle culture also is being largely entered into in Cyprus. Among the Eucalypts planted in Cyprus is Karri (Euc. diversicolor).

In South Africa every Province of the Union is growing Eucalypts. The story of how Natal adopted the Wattle and has cultivated it with such success that it now forms the basis of an enormous trade is well known and need not here be repeated. It would seem as if the forest authorities throughout the South African Union were imbued with a whole-hearted enthusiasm for Eucalypts, for every Province is growing them largely and increasing its activities. It is only a question of time when South Africa will be able to supply her own requirements in the way of hardwoods, and the time will come when it will be in a position to cultivate an export trade. The following figures from the annual report of the Forest Department of the Union of South Africa for the year ending March 31, 1918, will give some idea of the extent of Eucalypt cultivation in the Union. In the year named 301,414 cubic feet of Eucalyptus timber was removed from the forest and railway sleeper plantations. From the same report it is gathered that during the year 66,293 cubic feet of Jarrah and Karri were imported. The inference from these figures is unmistakable, and it seems quite evident that the time is not far distant when South Africa will, as has already been said, produce all the hardwoods that she requires.

The Eucalypt, imported from Australia of course, is now largely cultivated all over India wherever the climatic conditions are suitable. The Australian tree takes most kindly to the Indian environments. In a recent annual report of the Board of Scientific Advice for India, it is stated that the main annual increments of Eucalypts are 527 cubic feet per acre per annum in the case of high forest, and of 815 cubic feet in the case of 7-year-old coppice, showing that the Eucalypt utilises the productive capacity of the soil to the extent of forming in the case of coppice over 16 tons avoirdupois of wood in one year per acre.

Ebony in Western Australia.

In the *West Australian* of the 11th November appears the following paragraph:—

> "Ebony in the North-West.—During a visit to the North-West, from whence he returned recently, the Conservator of Forests (Mr. Lane-Poole) was interested to find ebony growing as far south as Pember Bay. The trees that he saw were not, he stated yesterday, very large, but they were known to grow as far north as Parry Harbour, and were found down the coast as far as Pember Bay. He could not say what quantity of ebony was to be found in the area between those points. He had ordered a ton to be sent down to Perth in order to ascertain whether there was any market for it."

The existence of Ebony in the North-West has been known for a long time, but no attempt has been made hitherto to determine the quantity or ascertain the quality of the local product. If the result of Mr. Lane-Poole's visit should go to show that this valuable timber exists in sufficient quantity to form the basis of a trade, a valuable addition will have been made to our knowledge of our own resources and a new industry will be brought into existence. Something like a score of woods are classed under the general term "ebony" and the widely separated countries which are the homes of this indicate that the wood is not confined to any particular region. Among the countries producing it are America, West Indies, West and Central Africa, and the East Indies.

Trees and Timber in Early Perth.

(By Sir Edward Stone, K.C.M.G., Lieut.-Governor of Western Australia.)

SIR Edward Stone was so good as to furnish the following interesting reminiscences at an interview with a representative of "Jarrah."

"Talking of trees," said Sir Edward, "the first public ceremony on taking possession of the site upon which Perth now stands was performed in August, 1829, when a large jarrah tree which stood on the site about where the Post Office Savings Bank now stands was cut down. The next public event was the holding of church service under a tree in Hay-street, opposite the site of the offices lately occupied by Stone and Burt. I really do not know much about the timber industry in those days, because I was not interested. I know that in those early years the sawyers did all the felling. We had no timber mills in the early days. The sawyers used to come to a big tree that they thought was worth falling, and they dug a tremendous trench called a saw-pit. They felled the tree and dug the saw-pit underneath it, one sawyer being on top of the tree and the other in the hole. They sawed up the trees in that way. We advanced by degrees. There used to be some sawpits in various parts of the suburbs of Perth and some on the top of Mt. Eliza up King's Park way. The timber was carted to its destination in bullock whims.

The exotic trees planted around Perth, I should think, came in the early sixties. Those willows all along where the Brewery now is and round about there were planted in the fifties. They were brought by a Mr. Stokes from St. Helena in the vicinity of Napoleon's Tomb. Mr. Stokes subsequently established the well-known Stanley Brewery.

I think I was the first person to introduce the pepper-tree into Western Australia. I have a pepper-tree which I think is the largest in W.A., with the exception of one I saw at Mr. Maley's place at Greenough Flats. These trees were brought from Melbourne by me over forty years ago, when they were about the size of my finger. I think the nurserymen began to introduce them afterwards. As far as my trees are concerned, they seem to have a peculiarity of branching out. The butt grows up only a short distance and then branches out into two enormous branches, more like the butts of trees. In fact, one is so hidden by plumbago plants that I thought there were two separate trees there, but my gardener says it is all one tree. It forks out into two very thick forks and gets smaller as it grows up. I have a very large pine tree which was grown from seed planted by my mother. The seed came from Capetown, where there is a very fine avenue of similar pines from the main street right up to Government House.

It is some years since the Town Trust commenced planting trees about the streets of Perth. There used to be a very fine avenue of lilac or white cedar trees extending along St. George's-terrace and Adelaide-terrace. These formed a very shady walk; their bright fern-like foliage and lilac flowers used to be admired by everyone who visited the city. I have two very fine ones opposite my house which are now some sixty years old, but those in the streets seem to have been injured by the tar-paving of the footpaths. Subsequently they started planting lemon and orange trees up Mount-street, which were to bring in a revenue to the Council. These began to die off before they had begun to grow to any height, and they had to be dug out. The mulberry trees were introduced here for the sake of silk culture, and we used to have very interesting exhibits in the Town Hall. I do not know why it fell through. There used to be excellent fruit gardens along the Mounts Bay Road in the early days. It was a great rendezvous, and on Sunday afternoons there were little sheds where one could go in and enjoy the fruit, which was magnificent.

About Sandalwood.—I remember a good deal about this industry. Sandalwood then was get-at-able within a reasonable distance of the Eastern Districts, and was brought down to Perth after work on the farm was over. The settlers used to rely a great deal upon sandalwood in those days. They used to bring their cart-loads of sandalwood down and take their supplies back about once a year. Sandalwood realised a good price, and there was a great export trade up to China and Singapore, and a great quantity of very fine sandalwood was obtainable then, not like the little stuff that is got now.

It is very remarkable the effect that fire has upon the seeds of the indigenous vegetation here. I will give you an illustration of that. I had land on the top of the hill at South Perth facing the river fenced in and cleared which I put a fire through. The next year the kangaroo paw came up like wheat, as thick as can be all over. Before that one could not see a sign of a root of it. In fact, there was not a root there, the seed had been lying dormant in the ground waiting for a fire.

Paperbark.—There were a lot of paperbark trees at the bottom of the Mount, and a good many blackboys (grass trees) on the slopes of Mt. Eliza. This paperbark was used a great deal by the natives for carrying their fish and gilgies in. On the point going round the Mount there were a number of enormous boulders that had fallen away from the hill and had rolled into the water, and when building-stone was valuable these were all broken up, and used for building purposes. The early settlers camped on the high ground where the

Town Hall now stands and got their water from the Supreme Court Gardens, which was a very wet place in those days, springs running in every direction.

The first service of the Church of England in Perth, as I have said, was held under a tree in Hay-street, opposite the site of Stone and Burt's. I can remember that tree when I was serving my articles; it was just in front of the window. There used to be another tree with an enormous butt standing in the street just this side of Mr. Morgans' house, where the Education Department now is. It was so big that it took up a good portion of the footpath, and left a very slight passage for people to pass through.

In my young days all the boats plying on the Swan River were built of jarrah. Some very fine jarrah was to be found in the vicinity of Perth, and particularly in the Ironstone Ranges. All the jarrah grown in very dry ground seemed to be proof against the white ants, and I have given to the Museum a piece of trellis that my father had here, and which must have been at this house for 50 years. There is also a portion of a fence (which is now at South Perth) which must have been in the ground some 54 years.

Regarding the boats, it was some time before we had little passenger river steamers. The "Lady Stirling" was the first. I think she arrived here about 1859. When I arrived back from England I came up the river in a pulling-boat, owned by two well-known identities—the Messrs. Caporn. They used to ply up and down the river carrying light cargo and passengers between Perth and Fremantle. The first steamer we had plied between Perth and Guildford, and was called "Puffing Billy," because she made such an extraordinary noise. She was a stern-wheel boat, and called Solomon Cook, who had his foundry about where Boan Bros. is now. The boat's nose stuck right up in the air, and the stern was down very low. Guildford was an important place was made by a very ingenious man here in those days, because they had a small convict prison there, and the supplies were numerous. There were convict parties on the roads between Guildford and Toodyay and Guildford and York, so that the stores at Guildford did a good business.

I remember the Town Hall being built. The roof is of shingles, and is a splendid example of our timber. The curved girders for the ceiling were made at Fremantle and carted up to Perth. I expect they were done by convict labour. Owing to their great size there was much difficulty in negotiating their transit along the narrow road alongside the river. I don't think we sufficiently appreciate the noble proportions of the interior of the roof, which has always been much admired by strangers who know anything of architecture. It certainly is a splendid advertisement for our timber. There was also some splendid timber in the roof of the old Cathedral, the joists or girders stretching from wall to wall the whole width of the building, being of great size. I remember a house, which was made of wood, near the river. I have never been able to ascertain whether it was occupied by the Governor in the early days or not. First of all, the Governor occupied a tent, and I fancy the house in question must have been built for him afterwards.

I recollect a mill at the top of Mill-street. There was a great flow of water down there. I am under the impression that the cogwheels were of wood. When I was at Northampton a couple of years ago I saw some wooden cogwheels which had been used at the Gwalia Mine, and which were in an excellent state of preservation. I believe the municipal authorities intended to preserve them for exhibition purposes as showing the strength of our woods. With regard to the Causeway, I think some of the old piles are still left, although strengthened by fresh ones driven after the Causeway was raised to its present level. Originally it was much lower, but after the flood of '62 the whole structure was raised. I think one of the piles was sent Home to the Paris Exhibition, and was in a wonderful state of preservation. The Causeway was erected in very early days. Old Mr. Tichbon, who is now over ninety, took part in its construction. The Canal that goes under the bridge and extends for a considerable distance was built by private labour, with what are known as "Irish" shovels. A good deal of the bridging was done in convict days. The Canning Bridge is of jarrah. It has been raised of recent years, but it is one of the oldest bridges here.

The first jetty was put down in Perth a very long time ago. There were only two regular jetties that is to say, at the foot of William-street and at Mill-lane, but the William-street jetty, built in 1842, where the cargo boats used to go sometimes, was very short. They put the wooden head-piece on afterwards. There were no facilities for landing passengers from the pulling boats, and they used to carry the passengers ashore, just opposite the Esplanade Hotel.

The man who passes a war lie along knowing it is a lie is a traitor. And the man who passes it along without knowing it is a lie is a plain darned fool.

The first walnut we read of in history is Humpty-Dumpty.

They want collapsible houses in France. Seems like Russia ought to be just the people to furnish them.

Forests Products Laboratory.

Why the Delay in Establishing?

THE necessity of a Forests Products Laboratory in this State need scarcely be stressed. One has only to be but slightly acquainted with the magnificent work done by Institutions of the kind in India, the United States and Canada to understand how great a part a laboratory here would play in the economic development of this State. There are, as has been explained before in this journal, a number of important avenues awaiting exploration through the agency of a Forests Products Laboratory. We know, for instance, that our forests are rich in materials for the extraction of essential oils, in which direction practically little or nothing has so far been done. Then, again, there is the great question of Tan Barks—a field of vast extent which also still awaits exploration. There is also the question of paper production. There is every reason to believe that the timbered areas of this State contain many substances suitable for the manufacture of paper; some of these, such as young Karri, have been partially investigated already in a foreign laboratory, but full enquiry calls for urgent and further consideration in a local institution. To put it in another way, our forests hold within them immense possibilities in the way of production beyond that of mere raw timber, but nothing effective can be done until we have in our midst an institution fully equipped for carrying out to finality all these investigations.

The Federal Government, through the Commonwealth Institute of Science and Industry, took the matter up and had decided that the forests within the Commonwealth were of sufficient extent and importance to warrant the establishment of several laboratories, and a decision was arrived at that one of these should be in Western Australia. The late Dr. F. M. Gellatly, Director of the Institute of Science and Industry, visited this State some nine months ago and discussed the question with those in authority. After examining several likely sites it was decided that the institution should be located on portion of the University Grounds at Crawley, and the authorities of the University gave their consent. Negotiations between the Federal Government and that of this State resulted in a tentative agreement being arrived at, of which arrangement the following are the salient points:—

(1) The Western Australian Government in consideration of the importance of the forests of that State were desirous that a Forests Products Laboratory should be established in Perth on ground forming a portion of the University site at Crawley.

(2) The Western Australian Government will set aside and reserve an area of about 20 acres, being portion of the University land, and a draft of a lease to the Commonwealth Institute of Science and Industry will be prepared, and Western Australia also will make provision for £5000 towards the expense of establishing such a Forests Products Laboratory.

The Commonwealth Government, on its part, under the tentative arrangement agrees:—

(1) To build and establish a laboratory on that site.

(2) To supply all necessary equipment, scientific instruments, machinery and plant required for the conduct of research work into forests products.

(3) To provide the salaries of the Superintendent and an adequate staff of research officers.

(4) To maintain the laboratory in working order and supply all materials that from time to time may be necessary.

In order that the fullest information as to the organisation, equipment and method of working of a Forests Products Laboratory might be obtained, Mr. I. H. Boas, M.Sc., A.I.C., of the Technical School, was sent on a mission of enquiry to Eng-

land, the United States and India. His enquiries, it is understood, have been most thorough and he will shortly return to Western Australia, and with the information that he has gathered it will be possible to begin work almost immediately if the premises and equipment were in existence. It is understood that the completion of the tentative arrangement between the two Governments has been delayed by the Federal Government pending the passing of a Bill for "An Act relating to the Commonwealth Institute of Science and Industry." The Bill has been before the Federal Legislature for some little time, but in view of the ending of the Federal Session and the near approach of the general election further consideration of it has been postponed until the assembling of a new Parliament. This interruption is much to be regretted, as it threatens to put back for a considerable time the inauguration of an Institution whose establishment is urgently called for. It is difficult to follow the reasoning of the Federal authorities in this matter or to understand why the postponement of the Bill should necessitate putting back the date for the inauguration of a forests products laboratory here. The Commonwealth Institute of Science and Industry has already under proper authority carried out a great deal of very valuable work and entered into quite a number of scientific activities. Why it should not enter upon another sphere of endeavour until the Bill above referred to has become an Act is difficult to understand. The question at issue is so important to this State that we are of opinion that Mr. Mitchell's Government would be amply justified in pressing the Federal authorities for an immediate completion of the arrangement tentatively entered into. The Western Australian Government, it cannot be doubted, is still willing and anxious to give definite form to its share of the bargain, and there seems to exist no definite reason why the Federal Authorities should not be equally willing.

Timber Sales Policy.

The function of forestry, sylviculturally, is to sow and grow; commercially, to harvest and to market the State's timber crop.

To the forester the sylvical aspect has been always of more absorbing interest than the commercial, and it is natural, therefore, that it should have secured the greater measure of his attention. But not the most academic of sylviculturists can afford to neglect indefinitely the commercial side of forestry, for the timber market more or less determines the trend of forest practice. Thus sylviculture depends upon intensive utilisation; but intensive utilisation depends upon the log buyer, and the progress of forestry in the final analysis depends upon forest revenues.

Hitherto, forestry in Queensland has operated commercially along the crude lines of stumpage auctions. Beyond that it has relied upon the theory of competition for the adjustment of values. In practice, however, competition has been neither equal nor unrestricted. The timber-sales policy was commercialised during the year, and provision was made for departmental harvesting and marketing. Contracts were arranged with the State sawmills for the delivery at the mills of 4,000,000 superficial feet per annum of pine logs at ruling rates.

Forest Service log price-lists (upsets) were prepared, and are now being issued periodically in accord with market movements. The administration of timber sales in the Maryborough, Atherton, and Bundaberg districts was taken over from the Land Commissioners by the Forest Service during the better part of the year.—*Queensland Forest Department Report for* 1918.

Norway intends to help out the restoration of the devastated part of France, in the front zone by planting a belt of Norwegian forest trees. Much enthusiasm has developed for the scheme, and it is intended to begin work this spring. It comprises the planting of 250 acres annually for five years. The idea is to send a forestry party of about 50 Norwegians, fully equipped with trees, tools, tents, and stores, so as not to impose the slightest burden on France. The tentative zone for planting the belt of trees is from Ardenne towards the Belgium frontier, behind Arras, where there formerly was fine forest; but action will be taken in accordance with the desires of the French.

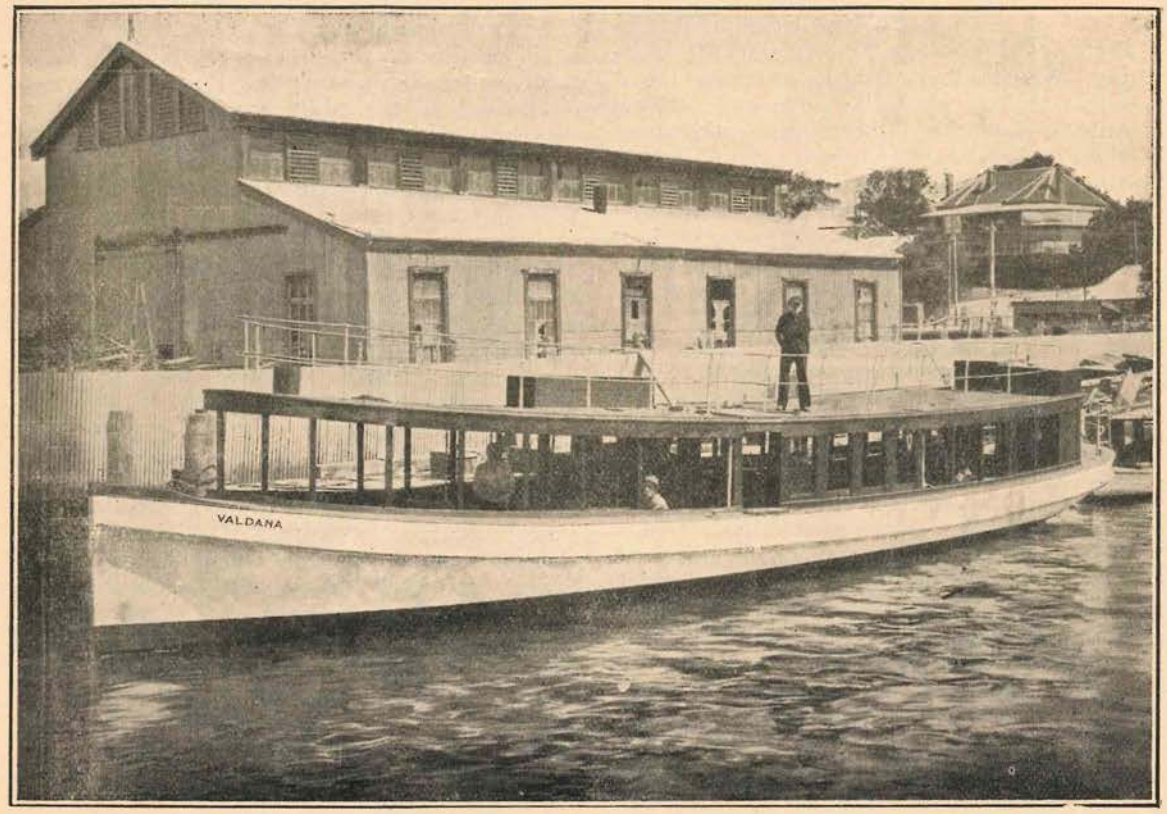
Karri Forests v. Land Settlement.

SPEAKING in the Legislative Council on the 5th December, the Hon. John Nicholson made the following illuminating references to the Denmark settlement, at the same time stressing the bearing which that disastrous experiment ought to have upon the Government's new scheme of cutting up first-class karri forest country between Pemberton and Nornalup and elsewhere into agricultural holdings:—

"On the 26th March of last year the Conservator of Forests was requested to make a further report. He mentions how the property had been acquired, and points out that the vendors of the property, Messrs. Millar, had adopted a procedure unique in the annals of saw-milling, as they ringbarked the karri forest on a face. That is to say, they killed all the living trees, and felled those which they considered merchantable, leaving the remainder standing. The Conservator did not ascertain the reason for this, but reports that, from a forestry standard, it was justified because of the splendid growth of seedlings which sprung up and would have formed a new forest which, in time to come, would have provided a fine, even stand of marketable timber. The Conservator goes on to say:—

"'Unfortunately, there is very little of this first re-growth left, as the Government of the day tried to convert it into agricultural areas. The following method was adopted in converting the land; the seedlings which had sprung up after Millars' ceased operations were slashed down, and the area subdivided into a number of holdings. The old railway was reserved as a road. The cost of the work over and above the purchase price was £109.806. The condition of the forest after the slashing had been effected must have been deplorable. It is obvious that for every seedling that was slashed down from four to six suckers grew up. This is well shown on the areas not taken up, such as Karri Sucker Hill. The steps taken to convert this forest country into an agricultural settlement were open to criticism as shown by the opinion expressed by Mr. A. R. Richardson, then Minister for Lands, in a letter to the Premier (File 7128-96). "That there is not a very great extent of first class land in the concession, but that a certain amount of settlement would follow the acquisition of the property by the State, but the heavy initial expense of clearing and getting the soil into a good condition of cultivation would retard selection to any large extent." From an inspection of the area, I should say it would have been quite possible to have picked out all the really good agricultural land, and alienated it without damaging to any great extent the karri forests. Lots were thrown open in 1909 and 119 settlers took up lots at prices ranging from £15 to £400 per lot. Very little rent was paid. To-day there are only 50 in occupation, and 28 holdings have been abandoned. It has been demonstrated that karri land without any expenditure of money whatever, with no care or forestry treatment, will grow this valuable timber at the rate of 100 cubic feet per acre per year. The age of maturity of the species has not yet been ascertained, but it may be put down at a maximum of 100 years. We may, therefore, expect without any expense of sylvicultural operation 100 x 100, or 10,000 cubic feet of timber (200 loads) to the acre at maturity. Much more than this has actually been cut from an acre by the State saw mills at Pemberton on virgin forests, so that 10,000 cubic feet may be regarded as a moderate estimate for an even stand of karri. This is the country that has been given to the settler at £1/8/ per acre. With proper forest management the rate of growth will be far higher than 100 cubic feet per acre. In South Africa karri has shown a yield of 400 to 500 cubic feet per annum per acre, and that country is now taking £26,000 annually out of the thinnings of her eucalyptus plantations.'

"It would be a simple matter to develop the argument and show what Western Australia has lost in actual cash through this attempt to convert valuable forest country into a poor farming settlement. The deed has been done, and it is therefore useless for me to labour the point. All I wish to point out, however, is that, before any similar schemes of land settlement are developed, for example Nornalup, the question of the value of the land from a timber point of view should be thoroughly investigated."



A Jarrah Motor-Launch.

The illustration on this page shows the new motor-launch "Valdana," built by Messrs. Lawrence, of Perth. The craft is 67 feet in length with a beam of 13 feet 6 inches and a depth of 5 feet. The hull, including the main and flying deck, is wholly of jarrah. The suitability of jarrah for shipbuilding purposes has been recognised ever since the foundation of the colony, and a very large number of vessels constructed wholly of it were launched in the earlier decades of Western Australia's existence. Nearly half a century ago jarrah received recognition from the British Admiralty, and about the same time it was placed on Lloyd's List as a timber suitable for shipbuilding.

Blackbutt.

(*Eucalyptus Patens.*)

This valuable tree in too many cases is not regarded with that interest and attention which it deserves. It is found mainly on the best or good agricultural land, and farmers too often see in it only something that must be removed as quickly and thoroughly as possible.

The timber is of high value in many respects, and on that account should not be ruthlessly sacrificed. The supply of jarrah is getting more limited year by year, and the time is not far distant when it will be found necessary to place restrictions upon its wholesale exportation. Many of the uses to which jarrah is put can be satisfactorily filled by what may be called our second-class timbers, and of these blackbutt is one of the best for purposes which require strength and toughness, and the farmer who uses the tree to fence his property in preference to buying timber is doing an economically sound action.

Blackbutt lasts well in the ground. An instance of this was found some years ago at Dingup, where slabs were used 20 years ago in the construction of a cattle-yard, and these were quite sound when taken up, with the exception of a little decay between wind and water. Fencing posts of blackbutt have been taken out of the ground in good condition after 50 years' service. Farmers would do well to protect blackbutt as far as possible, not only for their own use but for sale. It is certain that when first-class timbers become scarce, and therefore dear, blackbutt and others of the second order will come into demand.

Comparative Strengths of Western Australian Timbers and Oregon.

Some short time back a graphic illustration of the comparative strengths of oregon and seven hardwoods indigenous to Western Australia was prepared in the Forests Department: Included in the graph is the following formula, from which, given the maximum fibre stress at elastic limit of any timber, the load-limit may be found, for other spans and other sizes of timber than those shown in the graph:—

W = Max. ld. at elastic limit. f = Fibre stress at elastic limit.

l = Span B = Breadth D = Depth

$$\text{Then } \frac{Wl}{8} = \frac{fBD^2}{6} \quad i.e. \quad W = \frac{4}{3}\,\frac{fD^2}{l}\,B = 1$$

Max. ld. W_1 for a beam x" deep by y" wide on a span of l' ft.

$$W_1 = \frac{Wy\left(\frac{x}{D}\right)^2}{\frac{l'}{l}}$$

Example: 3" x 2" beam of Jarrah on a 15ft. span.

From the table a 6" x 1" beam on a 10 ft. span gives W 4140 lbs.

$$\text{Then } W_1 = \frac{4140 \times 2 \times \left(\frac{3}{6}\right)^2}{\frac{15}{10}} = 1380 \text{ lbs.}$$

Or

W (from table) for 8" x 1" beam on 20ft. span = 3700 lbs.

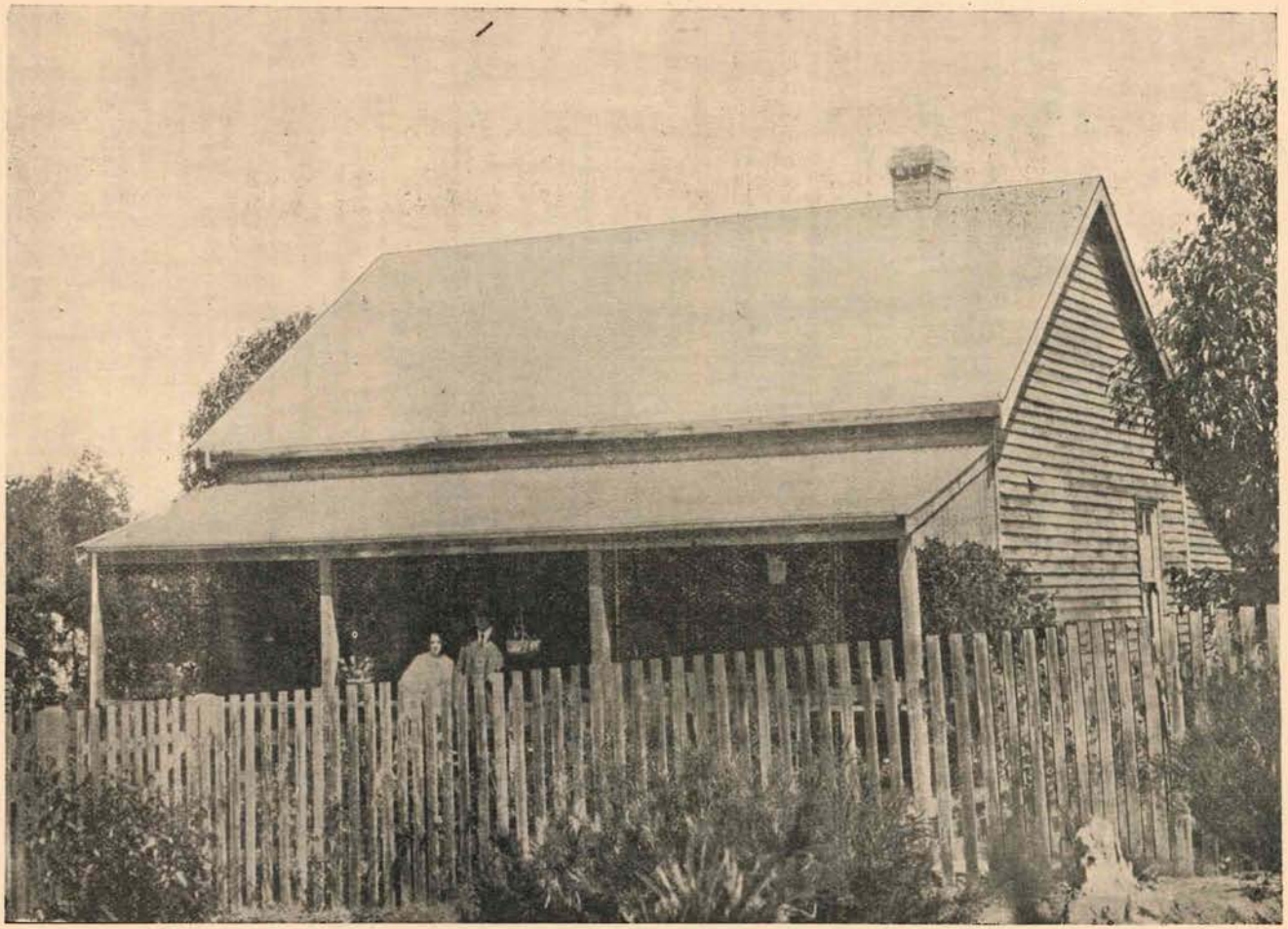
$$W_1 = \frac{3700 \times 2 \times \left(\frac{3}{8}\right)^2}{\frac{15}{20}} = 1380 \text{ lbs.}$$

Applying the formula to certain sizes of timber in common use, the following useful table has been compiled:—

TEN FOOT SPAN.

Species.	Max. Fibre Stress at Elastic Limit.	Load to Produce Maximum Fibre Stress. 5x3	5x2	4x3	5x1½	4x2	4x1½	Ratio between W.A. Hardwood and Oregon
Oregon	4800	3911	2610	2507	1958	1621	1253	
Yate	17000	14200	9450	9050	7100	6050	4550	3 5
Tuart	15900	13250	8850	8500	6650	5650	4250	3.3
Wandoo	13650	11400	7600	7300	5700	4850	3650	2.9
Karri	13550	11250	7500	7200	5650	4800	3600	2.8
Marri	12600	10500	7000	6700	5250	4450	3350	2.6
York Gum	11000	9200	6100	5850	4600	3900	2950	2.3
Jarrah	10300	8600	5700	5500	4300	3650	2750	2.2

"Jarrah" is indebted to Mr. Thos. P. Cullity, B.E., formerly of the Forests Department and now in charge of Messrs. Millars' timber seasoning plant at Yarloop, for the information here given.



Worker's Cottage at a State Sawmill in W.A.

Through Red Gum and Karri.

(By W. Siebenhaar.)

I HAD heard so much of the wonderful karri forests that I was determined to see something of that most exalted group of giants of the vegetable kingdom. So, when I was at Bridgetown for a holiday some ten years ago, I at once made enquiries as to the best means of carrying my resolution into effect. Having travelled a great deal on the wings of the imagination, I naturally disdained so prosaic a conveyance as an aeroplane, a motor, or a trap, and preferred to trust entirely to the fleetness of Shanks' pony. I took with me an umbrella.

Thus armed, I strode through the picturesque dell in which Bridgetown nestles amid tree-covered hills, until I reached the pond-like river-pool of the Blackwood; I crossed the bridge, and turned Southwards. My information was to the effect that the proper karri-forest only began about thirty miles from Bridgetown, but that a good patch of the timber was to be found four miles to the South of Allnutt's farm, which in its turn was four miles to the South of the township. As usual, I was to experience that a bush mile is equal to two ordinary miles, for each of the two distances was nearer eight than four miles. However, the pleasure of the walk was worth this slight disillusionment.

Up the hill now rose the bush track which I followed as directed, almost all the time through the sombre and impressive redgum country, the solid yet stately trees rising straight as columns of a Greek temple with airy roof, often to a height which I estimated to be at least 100 feet. The fiery red gum-patches on the brown bark seemed to glow in the twilight depth of the forest. Suddenly, from the bush-tangle to the left, a large bird appeared to fly up, and my fancy saw the vision of a gigantic eagle. But, as the weird shape descended in the open of the track, and rose again phantom-like to its former height to come down once more at least twenty feet further, I recognised the quaint grace of a large kangaroo, which in less than a minute vanished in the leafy gloom on the distant right.

Deeper and deeper into the silent forestland I pressed often fearful that I might lose my bearings in the side-tracks that tempted me with alluring vistas. And then, at last, after some six miles of marching, I saw the sylvan darkness breaking and subsiding, and emerald slopes shone in patches of sunlight among the shadows of broken clouds. Nothing is more beautiful than these gleams of sunlit grassland in the midst of the forest. I was nearing the homestead, and presently the track became a road, and from its next turning the distance revealed a roof in the midst of bright-green paddocks. The old-fashioned farm-house was in sight.

It was half-past twelve, and the afternoon sky was already clouding more thickly. I knocked at the front door, intending to ask for further directions as to the way to the karri forest. But the kind lady in charge would hear of nothing so inhospitable as allowing me to pass on my long walk without having the midday dinner with the household. The owner was away, but the manager and some young lads were there, just coming in for the day's chief meal. The manager, a systematic and careful man, very kindly drew a rough sketch for me of the track, the gates to pass, and other landmarks. So after dinner, about half-past one, I resumed my journey.

The sky was darkening, and an occasional wind-puff rustled ominously through the dead and dying timber, here nearly everywhere ringbarked. I kept a sharp look out for dangerous looking trees, and went on rapidly. I passed the forest sawmill, indicated on the sketch, and went on without losing time. But now the rain began to fall, and with no appearance of passing over soon. I knew by this time that I had a sixteen mile walk before me if I wished to carry out my plan before I got back to the farm. It was August and darkness would set in early. I reluctantly realised that the best thing was to return and give up my project, at least for the day.

My kind hostess insisted on my staying the night, when I might have another try the next day. I gratefully accepted the offer.

Tea and a game of bridge, and we all went to bed in good time, but only after I had made all sorts of enquiries about these remarkable forests. Two statements I now remember. First, that when some of the huge trees have been destroyed to make room for agricultural enterprise, the thousands of gallons of water which when alive they absorbed can find no other outlet than by forming wells and flooding the slopes and lower ground. Secondly, that redgums have been known to be struck by lightning at the top, and gradually burnt downward, the process of their fire-death occupying no less than eighteen months.

Next morning, after breakfast, I made another start, although it soon began to drizzle. It was a curious experience to defy the desert and the elements armed with nothing more formidable than an umbrella, but this time I was determined that nought except force majeure would stop me. Already on the previous day I had at once noticed the change in the nature of the country from North of the farm to South of it. The redgum tracts through which I had passed before arriving there were higher and far more undulating than the ground I was now crossing. The track was sloppy. The bush looked eerier. It

seemed a deserted country, silent, with but little bird-life, and none other. Honey-eaters, pardalotes, red-tailed cockatoos, and parrakeets, which inhabit this region, seemed too shy to show much sign of their presence. As to myself, in view of the weather and my failure of the previous day, I walked at top-speed, afraid that otherwise I might again not succeed.

Here was the great and lonely bush, where solitude seemed measureless. Giant black-boys rose ghostlike from the swampy slopes and flats on each side of the track. Elsewhere bracken ferns grew to astonishing height, appearing to rise high overhead on their pedestal of more elevated ground. In the glades there was a hush that almost filled the heart with dread, when suddenly through their sombre depth a shriek of savage fear would be heard, the discordant note of some solitary parrakeet. On and on and on I hastened, through intermittent showers, watching from below my umbrella the uncanny formation of intertwined branches overhead, and listening to the crooning menace of the wind. Mile upon mile I left behind, until their number was well nigh eight. And then another change seemed to come over the appearance of the landscape. A kind of strange twilight filled the farthest depths of the distance, and the proportions of everything seen seemed to grow abnormal. Far away, from the vastness and deeper depth of the plain, rose the karri kings in all the beauty of their slender grace. Another half-mile, and I was at the foot of them. Out of the deep tangle below they rose like lofty titan-lilies. True kings of old, clad in their silver grey cuirasses, they shone in the dim light of the darkened skies. And high above, ever so high, there waved the mazy verdure of their plumed helmets. I had beheld them in all their beauty, and I knew that I must be satisfied with this momentary glimpse. For again the sky, which for a short while had brightened, grew dark, and I should have to walk another sixteen miles that day to return to Bridgetown. So I wasted not a minute, but regretfully turned back for the home journey. And, as again I sped through the wilderness, I wondered why these high halls of nature seemed so utterly deserted, why the life seemed banished from haunts that once were its own. What spell of a strange and resistless power was it that had left no trace of peace or strife, such as surely these forest depths had once witnessed? And the voices that whisper out of the silence told me of the ruthless hordes of mankind that had advanced, of dark-faced heroes that had fallen, of the breath of life fled before the rude powers of destruction that announced a new order of being. Were these kingly lords, these noble pillars of the West, the lofty karri trees, soon also to hear the tolling of their knell? Would ere long the ploughman's son scarcely remember where they had stood in their armoured splendour?

On, and on, and on, through pelting rain I hastened too full of these thoughts now to heed the danger of trees or branches. I got back to the farm just in time for midday dinner. A hearty meal put new strength into me, and another two hours' strenuous walk took me back to Bridgetown, where my landlord was just making arrangements to send out black trackers after me.

Two New Western Australian Eucalypts.

Two new varieties of the genus eucalyptus have recently been discovered in Western Australia and described by Mr. J. H. Maiden, I.S.O., F.R.S., Government Botanist of New South Wales. The new varieties are of more interest botanically than commercially. Neither of them is a tree from which commercial timber may be obtained.

To the first of the new species, Mr. Maiden has given the distinctive name E. Lane-Poole n. sp. in honour of Mr. C. E. Lane-Poolei n. sp., in honour of Mr. C. E. State. It is a medium-sized tree known locally as white gum, and carrying a thick bark covered with a white powder. The sap wood is of pale colour, and thick, and the timber interlocked, drying in the course of years to a deep purplish brown. The newly-discovered tree is confined to this State, and, as far as is known at the present, to a strip of coast line more or less ascending the Darling Range in the South-Western portion of the State on the Perth-Bunbury railway line.

The second of the new species has been named by Mr. Maiden E. Ewartiana n. sp., in honour of Professor Ewart, of the University of Melbourne. It is a many-stemmed tree 10 to 20 feet in height. The timber is tough and pale, the bark is peculiar, falling off in narrow longitudinal pieces, giving it a striped appearance, which, if not unique, is certainly rare in eucalyptus. The wood is hard, the centre deep reddish brown. Both of these trees were brought under notice by Mr. F. M. C. Schock, a ranger of the Forests Department.

Bushwards.

(By W. C. Thomas.)

LET us leave the train here at Glen Forest, and take that good, gravelled road leading out of the station-yard past the brick kilns and the school, into the silent wall of trees lying southward from the railway. There must be a thousand delights treasured up in that bushland. The big trees are flourishing there, throwing their befoliaged branches out over the scrub wattles, fluffy with gold, and glistening with all the gay sheen of spring. The "sarsaparilla," so called, casts its frail blue festoons over the young gums in an embrace that must be embarrassing, but has to be borne uncomplainingly, because it all fits with Nature's general scheme of bush economy.

In the great clearing that holds Glen Forest, like a town germ awakening to full life, the spring sky arches away from a decided ultramarine to the softest of silver greys, and scraps of white cloud idle about as if daring the sun to melt them. An avenue of plane trees by the station begins to strike a note of freshness in the landscape that interpreted means that the sleeping trees have answered the summons of the returning sun and begun to robe themselves in their finery of green.

Talk of vitamines, what grander vitamine for health is there than the wind that sweeps up over the awakening bush, bringing to your nostrils the blended perfumes of a thousand throbbing plants? This is the springtime of the year, when the humblest scrub imagines it has as beautiful a mission in life as the ornate orchid to glorify the bushland and uncork the delicate fragrance lying within its wonderful little laboratory that it may escape and entrance the passer-by, and thus perhaps win a momentary glance of admiration! Peace treaties and philosophic doubts cease to worry you on the threshold of the bush.

So let us direct our steps thither and greet the big red-gums, the jarrahs, the banksias, and the shea-oaks with the ardour of schoolboys, and be not ashamed of our enthusiasm. We shall all the better appreciate the dignity and strength of them all, and sometimes perhaps smile at the futile efforts of a crimson creeper to find lodgment high up the bole of a banksia, only to give up the task after a climb of two feet or so, or arrest our steps to uncover a bush of "hovea," the better to admire its masses of violet-hued flowers in the full, free kisses of the morning's glowing sunlight.

The roads criss-cross to every point of the compass, old cart roads and whim ruts lend a certain amount of confusion and adventure to the ramble, because every now and again we shall have need to stop and draw upon our experience; or, if we have any of that valuable commodity, upon our imagination, as to which way we shall go, and if we do wander speculatively half a mile from the right track it will be but to our amusement, and, after all, variety is the thing which makes the salad more piquant.

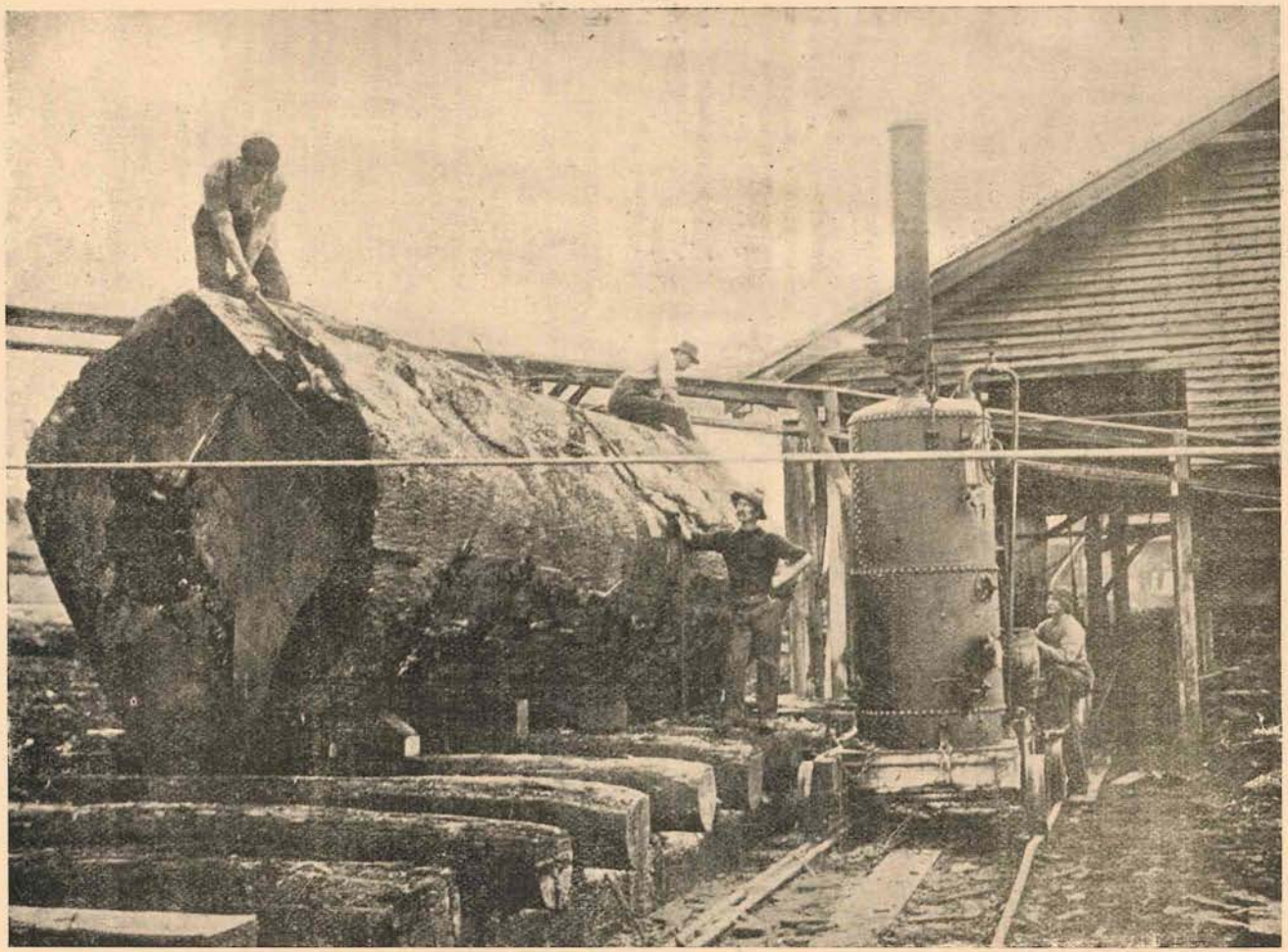
About half a mile out from Glen Forest we shall find the ridge ending in a gentle fall towards the Helena River, then gradually falling more abruptly, with some rather rough going, which you may incline to compare to the rocky road to Dublin. Still, it is much more comfortable to go down such a hill than come up it, and as you descend the rubbly and boulder-strewn road you will have the pleasure of picking orchids nearly all the way, for the whole region abounds with flowers of the whole great family that adorns these hills. We shall come across spots of blackened, sedgy character wherein the "caladenia" orchids are in particularly congenial soil, and as the summer fires would appear to have contributed to their virility and beauty you may ponder on their fate whenever the forestry experts have succeeded in preventing bush fires. They certainly appear to have a penchant for devastated areas, but in our forest economy flowers cannot hope to have much consideration, except those that turn into hardwood trees eventually, and they have, and will continue to have, laws made for their protection.

These hills are thickly timbered, despite the fact that for long years they were cut into for sawmills and hewn out for sleepers, but little that is marketable remains, but the lay mind does not worry about that. It is content to see the big trees about, and to wander in and through the forest mazes and enjoy the varied lights and shades, and the abundance of sweet-smelling, blossoming plants. And so on it continues right down to the river, a distance of another mile, making your walk one long delight, with only a few stretches of very rough track to qualify in some slight degree the fullness of your pleasure.

When at length we shall have reached the pipe-track, which runs away to Mundaring, we shall have unfolded before us an entrancing picture of hills and valleys and river, and we shall halt our steps and find

> " . . . the soul
> At length discloses every tuneful spring
> To that harmonious movement from without
> Responsive."

You will have a period of soliloquy with ravishing nature, and then realise how hungry you are, with such an edge on your appetite that you had not known in the city for many moons.



Cross-cutting a Karri Log.

Moisture Precipitation From Fogs.

Through the Agency of Trees.

By Dr. J. V. Perez, Teneriffe.

EVERYONE knows that the celebrated mountain towering nearly 1000 metres high and situated to the south of Capetown forms a plateau on which the sea breezes are condensed. They blow there from the south-east, remaining during the whole of the summer season, and travellers compare the mist which lodges there to a mantle covering the mountain.

Some years ago, Doctor Marloth made some experiments as simple as they were enlightening by placing two rain gauges in the locality where this mist occurs; one being of the usual pattern and the other containing twenty rods about 30 centimetres high and joined near the end with wire gauze. The result was that the ordinary rain-gauge did not record a drop of rain from the 21st December, 1902, to the 1st January, 1903, but there were recorded nearly 375 millimetres of rain by the gauge containing the rods, the total recorded up to the 15th February by the first apparatus being only 125 millimetres, while the level in the second attained the incredible figure of two metres.

It should be taken into account that the period of this experiment corresponds to summer in this latitude and that it scarcely ever rains in that season, and also, as I have already said, that the sea breezes blow then with more force and that the fog settles for a longer time round the Table Mountain.

These experiments of Dr. Marloth were published in the "Transaction of the South African Philosophical Society," Vols. XIV. and XVI., and M. Braine alludes to them in his pamphlet entitled *"Influencia de los montes sobre el surtido natural de las aguas."*

In the Canary Islands the trade winds from the North-East produce an entirely analogous phenomenon during the dry summer months when there is no rain, the mist forming on our lofty mountains from about 800 metres to nearly 1500 metres. This height is exactly that at which the valuable trees of Monte-Verde, belonging to the Atlantic flora of the Canary Islands, flourish, among others the Til, one of the four laurels of our mountains, distinguished by its berries the shape of which recalls the acorns of the English Oak. The famous Garoe or "Holy Tree" of the Iron Island was undoubtedly a Til which grew on a tall mountain top where fog was condensed from the trade winds, and the quantity of water collected beneath this historic tree was sufficient to form supplies of drinking water for the poor inhabitants otherwise unprovided with a water supply.

No-one who has penetrated the foggy regions in the various parts of the Canaries clothed with our world-famed trees can doubt that the planting of trees serves to moisten the earth. In comparing these lands with others close by and unfortunately stripped of their trees by the woodcutter's axe, one can clearly understand the astonishing results obtained by Dr. Marloth with his two rain gauges, one of which played the part of a tree. Thus it may be seen that there is nothing miraculous in the accounts of trustworthy historians about the "Holy Tree" of the Iron Islands; only this famous Til grew at a height where the trade winds condensed the moisture in clouds of fog and it had the peculiar property of throwing down the bountiful fluid at a season when there was no rain.

The conditions are similar to this at the Cape of Good Hope, where, in the rain gauge contrived to resemble a tree, the rain formed from the fog attained in two months the extraordinary height of two metres, and that shows us clearly and scientifically that what the story tells us of the "Holy Tree" is quite comprehensible. This fact should never be overlooked in the campaign undertaken by the friends of the forests, and it is essential that afforestation be put in hand on all those heights where it is known that mists collect, in order to conserve the water which they contain and which would otherwise be lost. How many such places must there be in the Peninsula Iberique!

Santa Ursula, Teneriffe,
14th November, 1917.

Morrell.

Its Behaviour Under Artificial Drying.

By T.P.C.

ACCORDING to "Julius' Tests on the Timbers of W.A.," one of the hardest and densest of our timbers is Morrell (*Euc. longicornis*). So far, this timber has been of practically no commercial value, its chief use being for firing the furnaces of the big mining plants at Kalgoorlie. The properties of this timber commend it for more useful purposes; notably for wheelwright work such as spokes of wheels, etc. The Forests Department of Western Australia desired to put in hand recently some experiments in this direction, but seasoned Morrell was unobtainable. A consignment of the timber, cut from green logs, was, however, forwarded from Kalgoorlie and recourse had to be made, not without some misgivings as to the ultimate result, to the experimental drying kilns of the Department, to season the timber. These misgivings as to the behaviour of such a close-grained dense timber, when subjected to this artificial drying process, were found to be without foundation, and the results exceeded the most sanguine expectations. Temperatures much lower than those used in drying Jarrah or Karri were used, the maximum temperature being 120deg. F. and the relative humidity never below 40 per cent.; nevertheless the charge, which averaged 30 per cent. of moisture (on dry weight) when first placed in the kiln, was dried down to 8 per cent. in 21 days, and proved to be just as amenable to the drying process as any of the more porous eucalypt timbers experimented with up to date. No defects, such as checking, etc., were occasioned by the kiln drying, the only variation from normal experienced being that the timber, as shown by the pronged section in Fig. 1, was slightly case-hardened. The prongs, turning in as they did, indicated that the outer core of the timber had dried more rapidly than the inside and become set. The inside then started to dry out more slowly, and consequently shrank more. This is shown by the prongs turning inwards. The stresses involved by this state of affairs can be relieved by subjecting the timber to live steam. Steam, therefore, was allowed into the kiln, until the temperature reached 160deg. F. Generally two hours of such treatment is sufficient to neutralise any such stresses involved in the drying of Jarrah or Karri of similar thickness, but with this timber at the end of the first day (after 6 hours' steaming) the stresses, as evidenced by a pronged section (see Fig. 2), were as pronounced as ever. The kiln was, for various reasons, closed down overnight and the steaming resumed next morning, and continued for another 8 hours at the same temperature, after which time a pronged section (see Fig. 4) still showed that the stresses had not been relieved. Unfortunately a case-hardening test was not taken before steaming was commenced on this, the second day of steaming, but the prong, of which Fig. 2 is the outline when cut from the board, had become quite normal when left to stand in a room overnight (see Fig. 3). At the end of the second day steam was again shut off, and next morning a test was taken from the same board as that from which the outline of Fig. 4 had been obtained, when it was found that the stresses within the timber (see Fig. 5) had disappeared. This result is indeed very curious when it is remembered that Fig. 4 and Fig. 5 were obtained respectively from adjacent strips of the same board, and that no further steam was allowed into the kiln after Fig. 4 was obtained. Perhaps some of the readers of "Jarrah" can advance some explanation of this phenomenon.

Trained Men Wanted in the Forests.

THE old-time notion that, because a man had been born and lived near a forest and worked in it for years, he was on that account a skilful forester, and qualified to express authoritative opinion, must be abandoned. As a matter of fact, in the Western World and in Europe, it has been abandoned long ago.

In every country the value of timber to a nation is recognised, and the necessity of being a highly-skilled forester to look after the "State's forests" is also admitted. The same may be said of people engaged in the exploitation of forests.

Perhaps no clearer statement of the needs of trained men in the lumber industry has been presented than that issued by the Oregon Agricultural College of Corvallis, Ore., in announcing its courses in forestry:—

"An industry without leadership is as surely doomed as a rudderless ship. Of all the industries on the Pacific Coast the timber and lumber business is richest in exclusive worth. One-fifth of all the standing timber of the country is in Oregon. The harvesting of this great wealth so as to conserve essential values and serve the public to best advantage is a task for thoughtful men who are specialists in handling forest products. These men must have the aid of modern science and modern engineering methods. Hence they must have training in a technical school of forestry.

"The war crisis revealed to the world how essential to the nation is the timber wealth of the Pacific Coast. It revealed, also, the necessity of a far-seeing and consistent effort to conserve our forests as a permanent resource at the same time that we harvest the timber that is ripe and accessible for market. The activities in shipbuilding and the revived interest in private construction, as well as the extensive programmes for public construction that have been commenced throughout the country, all give assurance of great activity in the lumber business. Hence the need of live and resourceful youths to go out from the School of Forestry as future leaders of approved principles of harvesting, manufacturing, and marketing timber products. Such men are few and far between in practical lumbering operations to-day, since forestry is comparatively new in technical education. They will be needed, however, and demanded with greater emphasis, from year to year. The call is already insistent. The largest and most efficient companies are the ones who are keenest for employing technically trained men. They recognise the permanent worth of scientific leadership.

"The timberman has always contended that the practice of scientific forestry methods would develop through the graduates of logging engineering schools where the young men, after engaging in operations, gradually will blend their theoretical ideals with those of the more practical side of lumbering.

"The men who served in the forestry regiments in France have learned an appreciation for timber conservation and its maximum use which will be exemplified in their future life's work, and in time will be reflected in the forest policies of the country at large."

Oldest Timber-Jack in the World—118 Not Out

The oldest living lumberman, and perhaps the oldest man living in the world, is Uncle Johnnie Shell, of Greasy Creek, Leslie County, Ky., and, according to the best version, Uncle Johnnie Shell will be 118 years old on September 3rd, although there are some who claim to have seen records indicating that he is 130 years old. John Shell has now retired. He was a successful lumberman, and for years operated a mill and ran rafts. As to his personal character, he is in excellent health and has been so for many years, attributing this to plenty of exercise and sleep and moderate use of stimulants. He declares: "It is no trouble for a man to live to be over 100 years old in the mountains if he half obey the laws of nature." He boasts of splendid eysight, being able to read the finest print without glasses. He is a splendid shot—a crack shot, if you please. Not long ago he cut his third set of teeth, and to-day he possesses a mouthful of snowy grinders. Uncle Johnnie Shell is the father of eleven children. He has hundreds of grandchildren and many great-grandchildren and a score or more of great-great-grandchildren scattered over the Greasy Creek Section. In fact, it is declared that his progeny are as numerous as ants. Uncle Johnnie Shell has been married three times, his present and third wife being along in the 20's. Their son is now 4 years old. If the equal of "Old Man" Shell is to be found anywhere else throughout the wide world, the "American Lumberman" will be glad to hear of it.

Australia's Imports of Oregon.

THE following notes and figures are from an article in the "Canada Lumberman," contributed by Mr. R. H. MacMillan, of Vancouver, B.C., a timber expert of high international reputation. It may be asserted with perfect reason that much of the money paid for these huge importations of American lumber might have been saved by our native woods.

"The chief market for Pacific Coast Lumber products," writes Mr. MacMillan, "is Oceanica, the inclusive name of Australia, New Zealand and the South Sea Islands. Over half of the lumber exported each normal year from the Douglas fir country goes to Oceanica. Oceanica is British. In the old sailing vessel days, British Columbia supplied 30 to 40 per cent. of the timber shipped from the Pacific Coast to Australasia and the South Sea Islands. Canadian exports steadily decreased until in 1914, a typical year, 95.7 per cent. of the trade was supplied from the United States.

The accompanying table shows the trade as it stands at present:—

British Columbia's place in Pacific Coast Lumber Shipments to Oceania, 1914 and 1918.

	M Ft. B.M.		M Ft. B.M.	
British Columbia	8,929	4.3%	7,032	8 9%
Washington	149,831	72.8%	422,765	54.5
Oregon	46,966	23.9%	29,095	47.6

Australasian imports are at present only a third of the pre-war normal. Stocks are very low now. A great increase in imports is expected when conditions settle. There are indications that Canada's share will increase hereafter. Exporting houses are paying more attention to improving connections between British Columbia and Australasia. The liner service between British Columbia ports and Australasia is being improved.

Canadian mills, if they meet the prices, may expect hereafter a larger share of the business. The Australian trade has in the past constituted one-half of the Pacific Coast lumber export trade. While it is likely that developments elsewhere will decrease Australia's relative importance, nevertheless it will remain true that British Columbia cannot develop a really large lumber export trade without doing a larger Australian business."

Forest Policy.

We have received, through the Institute of Science and Industry, a copy of the reprint of a paper under this heading contributed to "Science and Industry," the unofficial journal of the Institute, by Mr. C. E. Lane-Poole, Conservator of Forests of Western Australia. In dealing with the subject, the writer takes the broadest views, treating the question as one which affects the Commonwealth as a whole rather than each of the individual States. He illustrates and presses home his point by reference to the experience in other countries, and treats at some length with the new forest policy which has developed in these countries through the experiences gained in the war. Mr. Lane-Poole's conclusions are summed up as follows:—The remedy is the adoption of a forest policy throughout the whole of Australia, such a policy to include—(1) The classification of the land, with a view to the demarkation and survey of the forest estate; (2) the permanent reservation of this estate; (3) the appointment of a certain number of highly-trained working plans officers to draw up the plans necessary for the management of the forests; (4) the establishment of one sound forest school for the training of the professional staff; (5) the training of a subordinate staff in the practice of forestry; (6) the establishment of a Forest Research Institute attached to the Forestry School; (7) the establishment of one or more Forest Products Laboratories to investigate the commercial possibilities of our wealth of forest produce; (8) the initiation of a wide publicity campaign in order to awake a forest conscience in the minds of the people. Mr. Lane-Poole's article is well illustrated by typical examples of forest scenery and forest work in Western Australia, New South Wales, Victoria, and Tasmania.

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