COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH.

DIVISION OF FOREST PRODUCTS.

MONTHLY NEWS LETTER No. 120.

 1st January, 1942.

.....

## WAR-TIME OPERATION OF SEASONING KILNS.

The timber seasoning kilns of Australia are a very important factor in the defence structure of the country. Many of them are on work directly connected with munitions supply, while the majority of the remainder are either indirectly concerned with defence supplies or are occupied with essential civilian requirements. It is not generally appreciated that the total number of kilns throughout the Commonwealth has reached a figure of 750, so that they represent a very important economic factor.

Rapidly changing war-time conditions have brought new demands upon kiln operators and it has been thought advisable to draw attention to some of these and to certain essential precautions which should be taken in the interests of the community. Many operators have found it necessary to dry timber with which they are unfamiliar. Carefully controlled experiments on the drying-out of a very wide range of Australian timbers have been carried out and information is available for the assistance of operators on almost any problem that can arise. If an operator is in doubt at all about the correct drying schedule for the material he has to dry, he should contact the Division of Forest Products for further information. Some kiln owners may be experiencing difficulty in securing the services of kiln operators with adequate knowledge for the demands being made upon them. The Division has in operation a Correspondence Course for kiln operators which should enable these men rapidly to acquaint themselves with modern and efficient methods of kiln operation. The Division has approximately 350 students on its Correspondence Course register.

The present situation calls for additional responsibility on the part of kiln operators regarding maintenance of kiln equipment. It is becoming more and more difficult to secure manpower and materials for maintenance operations and every endeavour therefore should be made to prevent deterioration of kilns rather than to allow depreciation to continue to the stage where extensive repair or replacement becomes necessary.

### Buildings:

Cracks in kiln walls are a fruitful cause of depreciation of kiln structures and in addition are responsible for difficulty in maintaining the correct conditions required. All wall cracks should be brushed or raked out to give a clean dry base; these openings should then be filled with a bituminous or other non-hardening caulking mastic. This treatment should be done preferably when the kiln is cold.

For kilns of concrete construction several proprietary lines which are usually of a bituminous nature are available as protective coatings for the inside faces of kiln walls. For kilns of timber construction any of a number of bituminous paints is satisfactory. Details can be supplied on request from the Division of Forest Products.

Metal linings such as sheet aluminium and copper which are normally recommended for the protection of the interior face of kiln doors are not now procurable. Existing metal linings should therefore be carefully maintained as they are irreplaceable. Where renewal or maintenance is necessary, ¼" resin-bonded plywood is recommended for the sheathing of the door. Details of the method of construction are available from the Division.

Mechanical Equipment:

Care should be taken that all bearings are properly lubricated and where felt rings are installed that these are in good condition. Particular care should be taken with ball-bearing in such items of equipment as lifting trucks, kiln trucks, and fan shaft assemblies, as they are now absolutely unobtainable. Where ball-bearings have to be replaced, heavy duty ring-oiled plummer blocks are recommended. Transmission belts of all kinds are becoming scarcer and shaft alignments should be inspected to see that belts are running truly and are not being damaged in operation. In no circumstances should oil or grease be allowed to contaminate rubber composition belting.

All steel work, including rails both inside and outside the kiln, should be coated with rust-resistant compounds. Dampers should be inspected periodically and greased to provide free operation.

Heating Equipment:

Steam coils should be wire-brushed at intervals to remove rust and scale and then coated with either heavy waste oil such as crank-case or cylinder oil or a good anti-corrosive bituminous paint.

All steam valves, steam traps, and check valves, should be periodically inspected and ground-in before deterioration becomes so great that replacement of the equipment becomes necessary. Particular attention should be given to steam strainers which should be periodically inspected and cleaned. Where control instruments are installed the greatest care should be taken of this equipment as it is impossible to replace it in Australia today.

.....

BREVITY.

Mr. Stanley A. Clarke, Deputy-Chief of the Division of Forest Products, C.S.I.R., has returned to Melbourne from New Zealand. Mr. Clarke has been on leave acting as technical advisor to N.Z. Forest Products Ltd. and has spent much of his time in recent years in New Zealand in connection with the utilisation of young pine plantations.

The result has been the establishment of a highly efficient group of industries costing well over £250,000 and including two sawmills, and a pulp mill with the necessary logging and mill township facilities. These plants are now in operation on 17 year old trees and the weekly output includes 250,000 sq.ft. of ½" insulating board, 90,000 s.ft. of sawn timber and 1,500 to 2,000 pit props. A case mill and a modern pressure preservation plant with two 70 ft. treating cylinders 6 ft. in diameter are at present being erected. A feature of the plants is the complete elimination of waste. At the Auckland plant, comprising a sawmill, pulp mill and case mill, the outside slabs from the sawmill form the raw material for the pulp mill, and all sawdust, shavings and bark are collected and used for firing the boiler to provide steam for drying out the insulating board produced in the pulp mill. In all stages of conversion from the standing tree to the finished product modern plant has been installed, and special attention has been paid to labour-saving devices. Provision is being made for early expansion of the outputs of the plants.

# THE PROPERTIES OF AUSTRALIAN TIMBERS.

## Brown Alder and Rose Alder.

Brown alder and rose alder are the standard trade common names for the timbers derived from two closely related species - Ackama muelleri and Ackama quadrivalvis. The former is commonly known as corkwood in New South Wales and pencil cedar in New South Wales and Queensland; the latter also as pencil cedar in Queensland or as feathertop.

Habit and Distribution: Ackama muelleri is a tree only of medium height, the maximum ranging from 80-100 ft. with a girth breast high of 4-6 ft. The stem is often buttressed. The outer layer of the bark of this species is soft, white and corky, hence the name commonly in use. The inner bark is red. Its range of distribution extends from the Hawkesbury River in New South Wales to Gympie in Queensland and again in the Eungella Range. It is found in the coastal brush forests and in the Dorrigo where it appears to attain its best growth and appearing as a smaller tree in the Macpherson Range and in Queensland.

Ackama quadrivalvis is found only in Queensland where it grows in areas of high rainfall from Innisfail to Cooktown and on the Atherton Tableland. The tree attains a height of 100 ft. with a girth breast-high up to 8 ft., the average log ranging from 5-6 ft.

Properties: The timber from these two species is almost indistinguishable. The wood is light to deep pinkish-brown in colour, often with a purplish tint, weathering to a reddish-brown. The texture is fine and uniform, fairly soft and usually straight grained, though occasionally somewhat interlocked; moderately light in weight, the average air-dry density at 12% moisture content being 42 lb./cu.ft. and ranging from 34-50 lb./cu.ft. In drying to 12% moisture content the backsawn boards may be expected to shrink 10.4% and quartersawn boards 6.5%. This Division has done no direct work on seasoning of this timber but reports from Queensland indicate that the timber is slow drying and that it has been found most satisfactory to air-dry down to 30-35% before kiln-drying and that the timber is prone to warp unless closely stripped; no trouble apparently is found with checking, The timber collapses to some extent, as a reconditioning treatment reduces the shrinkage considerably.

Mechanical: The timber is brittle and has a low static bending value, is only a moderate bending timber, not ranking with silver ash or blackwood. The truewood is not durable and the sapwood is occasionally susceptible to Lyctus attack.

Woodworking Properties: On account of their fine uniform texture these timbers are readily worked with hand and machine tools and selected logs are well regarded for the production of veneers for plywood manufacture.

Uses: Brown and rose alder are used for plywood, also for interior trim, joinery, door-stock etc. On account of its smooth finish and good turning qualities, it finds a use in small wooden articles such as shoe heels, brushware and electrical fittings. The timber cannot be used in exposed positions owing to its low durability.

Availability: Supply not plentiful, available as veneer logs and as sawn timber in boards seldom wider than 12 inches.

.....

## SUBSTITUTE TIMBERS - A WARNING.

Owing to the present restrictions upon trade and shipping certain timbers, formerly imported from overseas, are no longer obtainable in sufficient quantity to meet the demands of Australian industry. In the attempt to overcome these shortages by the utilisation of Australian timbers, sufficient consideration is not always given to the properties of the substitute timbers. A typical example is white cheesewood (Alstonia scholaris). This timber, known in the trade as milkwood, milky pine, swamp pine, is light in weight and colour and has met with considerable approval for pattern making, interior fittings and other purposes where clear wide boards are desirable. Unfortunately, white cheesewood has a very wide sapwood scarcely distinguishable from the truewood. This sapwood is very susceptible to attack by powder post borers (Lyctus spp.).

Reports of damage have been received from merchants, pattern makers and householders in more than one Australian State. To continue the sale of untreated white cheesewood under these conditions is obviously ridiculous and will only result in the sheer waste of a quantity of good timber. Furthermore, the reputation of the timber will be so affected that future markets will be difficult to obtain even if a satisfactory preservative treatment has been applied. It is essential that Lyctus susceptible timber should not be placed on the market without proper treatment, to render it immune to attack, unless it is intended for temporary construction only, as in some case stock, or in some building scantling where the quantity of Lyctus susceptible sapwood is so limited that its entire removal from the edges of the piece would be of no practical importance. In the pioneer stages of the Australian timber industry, the susceptibility of timbers to Lyctus borer attack could only be determined by the damage that occurred after the timber had been sold. There is, however, no excuse at present for the sale of borer-susceptible timber. The State Forestry Departments or the Division of Forest Products can provide information concerning the susceptibility of the sapwood of any particular species.

It is possible to treat the sapwood of timbers such as white cheesewood so as to render it immune to Lyctus attack.

Some time ago the Division of Forest Products issued recommendations for the boric acid treatment of veneer to render it immune to Lyctus and this has been successfully adopted in several of the Australian plywood plants. The results from this veneer treatment have been so encouraging that the process has been extended to solid timber. It is now possible to recommend treatment schedules for the preservation of timber up to two inches in thickness. Treated timber is completely penetrated so it can be cut and dressed at will. It can be glued and stained and polished like untreated timber. Millers and merchants must realise the importance of this treatment.

Only in temporary structures, some case stock or articles which are intended to have a short life should borer-susceptible timbers be used untreated.

.....

## TERMITE (WHITE ANT) ERADICATION IN NEW ZEALAND.

There is a lesson to be learned by Australia in the way in which New Zealand has handled the termite problem. New Zealand has a number of species of native termites, but these are dry wood termites, a type not common in Australia. They do not need contact with the ground. They came to be regarded as just another pest and no particular attention was paid to them.

However, in recent years, it was found that Australian termites (Coptotermes spp.) had established themselves in New Zealand in several centres particularly at Auckland and New Plymouth. Being subterranean termites needing contact with the ground, they were readily distinguishable from the native species. In some areas they were firmly established and the damage there was in places so concentrated that notice had to be taken of it and preventive measures adopted.

New Zealand even more than Australia has had very unhappy experiences of introduction of plants and animals which have found the environment much more suited to their development than their native habitat, and have rapidly assumed the proportions of a menace. Further, houses in New Zealand are almost entirely wooden frame in construction and native timbers, although in many cases giving long life because of their high resistance to decay, were found to be readily susceptible to termite attack. It is not surprising, therefore, that there was a general feeling in the community that the Australian termite menace had to be eradicated before it assumed serious proportions and that this received expression in the form of the passing of a Termite Act. This provided for drastic and effective action to bring the pest under control and it is to be hoped, to completely eradicate it. Any area found to contain Australian termites was declared an infested area, and house to house inspections were made. Inspectors were specially trained in the detection of termites and in the control measures necessary for their eradication. Householders were obliged to give all assistance to inspectors, and if necessary the demolition or partial demolition of badly infested buildings could be ordered. The transport of material from an infested building to a free area was prohibited.

All householders in infested areas were forwarded a pamphlet explaining termite attack, and were advised when inspection would take place. If termites were found, these were sent to the appropriate authority for identification and in the event of Australian termites being present, notices with respect to treatment were served on the householders. For less serious cases the method of treatment consisted of dusting tunnels with poisonous powders, but a small difficulty was experienced in a few instances. The securing of the necessary samples for identification caused the termites to abandon the building at least temporarily and prevented eradication treatment being effectively given.

The surprise of the campaign was the relative extents of attack by Australian and New Zealand termites. In the Auckland City Council area, for example, which includes a number of suburbs in addition to the city area, between 1,300 and 1,400 inspections were made in the first 8 or 9 months active operation of the Termite Act. In these properties only 64 were found to be infested by Australian termites, whereas 410 were infested by native species. Areas in which Australian termites were known to exist were inspected first and it is significant that in the last month of the period referred to, no infestation of Australian termites at all were found.

It is reasonable to suppose that within a year or two, the Australian termite in New Zealand will be completely eradicated, and as steps are being taken to prevent its entry, what might have been a serious menace will have been eliminated. New Zealand's treatment of the termite problem is a lesson to Australia in what can be done by public enlightenment and resolute, planned rational action.

COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH.

DIVISION OF FOREST PRODUCTS.

MONTHLY NEWS LETTER No. 121.

1942##121

1st February, 1942.

.....

## THE USE OF "FIREPROOF" PAINTS.

There is some confusion in regard to the function and value of so-called fireproof paints. In the present circumstances with the possible risk of fires from incendiary bombs there are a few facts which should be understood.

Since it is clearly impossible to prevent all fires, the first principle in any fire-fighting plan is the extinction of fires as rapidly as possible. A small fire can be put out in a short time with simple equipment. A large fire requires a team of fire-fighters and elaborate equipment. Small fires do not spread rapidly but the great difficulty in fighting a large fire is to control its spread.

Fireproof paints are intended to prevent the rapid spread of fire until measures can be taken to combat it. They are of no value in preventing the spread of a large fiercely burning fire. This should be borne in mind. A fireproof coating such as lime wash is therefore essentially a time saver to give fire-fighters time to reach the spot where the fire has commenced before it has become firmly established. Most fireproof coatings are affected by rain and tend to deteriorate over a period of time. There are very few, if any, which retain their original efficiency for more than 12 months even in sheltered positions. Coatings should be inspected therefore from time to time and renewed wherever it appears necessary. It should be emphasised moreover in regard to houses that it is the material inside the house which usually commences to burn. If fireproof coatings are used over woodwork an effort should be made to get rid of or to breakup concentrations of inflammable materials such as loose papers, cloths, oil etc. which can cause a severe fire by themselves.

If these precautions are taken, fireproof coatings will prove of great benefit in checking the growth and spread of fires.

.....

## BEARINGS IN KILN CONSTRUCTION.

In the assembly of fan shafting in kiln construction, ball bearings have, in the past, generally been accepted as essential, particularly in the case of longitudinal shaft kilns where the large majority of bearings used are mounted within the kiln interior, and exposed to the high temperatures and humidities of the kiln atmosphere. However, the defence forces' ever increasing demand for ball bearings, and the fact that all ball bearings used in Australia have to be imported, resulted in the setting up of governmental control measures under the Directorate of Machine Tools and Gauges, to determine and control priorities in so far as bearings are concerned. In the list of priorities subsequently issued the use of ball bearings in the construction of timber seasoning kilns was not included, so that ball bearings may not now be purchased for use as kiln fan shaft mountings.

As a result of this decision, where bearings are required for new kiln construction or for replacement purposes in kilns, some type of bearing other than ball bearings must be sought, and until experience either confirms or confutes the opinion, it seems that a good quality brass bearing of the self aligning type and fitted with sight (or drop) feed oil lubricators, is probably the most satisfactory substitute. The lubricators should, of course, be of sufficient size (say the ½-pint size) to give an ample reservoir of oil.

It is generally well known that metal bearings need to be under fairly constant supervision, and so located that they can be frequently inspected. Where, therefore, the kiln design is such that bearings must necessarily be located in positions difficult of access, or directly exposed to high kiln temperatures or humidities, it is obvious that this requisite cannot be complied with should metal bearings be used in such cases. Under such conditions, only one bearing has to fail and, more likely than not, all other bearings associated with it will likewise fail before the trouble is noticed or, can be rectified. Furthermore, even if the bearing does not actually fail there is some risk of fire should a bearing commence to run hot and not be discovered in time.

Obviously then, a kiln design requiring the mounting of a metal bearing inside the kiln interior is not to be recommended and, at least while ball bearings are unobtainable, this type (such as the longitudinal shaft) should be completely avoided.

With the cross shaft type of kiln, all bearings are mounted externally, are unexposed to kiln conditions, and are in easily accessible positions - all conditions which comply with requirements for the safe running of metal bearings. This Division strongly recommends, therefore, that only the cross shaft type of kiln be erected in further construction. Plans and specifications are obtainable free of charge from the Chief of the Division on application.

.....

## THE PROTECTION OF WOODEN BOAT HULLS AGAINST MARINE BORER ATTACK

Wooden ships in tropical waters are constantly exposed to attack by marine boring organisms, the commonest and most destructive of which are the ship worms. It is essential, therefore, that wooden hulls should be suitably protected against their attack.

Various forms of protection have been used in the past, some with considerable efficiency. Sheathing with copper plate has proved to be one of the most permanent means of protection. At present, this method is not to be recommended for obvious reasons.

It has been found, however, that certain types of paints and preservative substances definitely retard ship worm attack. In Bulletin No. 12 of the Queensland Forest Service "Destruction of Timber by Marine Organisms in the Port of Brisbane" by C.J.J.Watson, F. A. McNeil, R. A. Johnson and Tom Iredale, it is pointed out that copper and anti-fouling paints can be relied upon to give protection in heavily infested waters for periods up to three months. After this period the coating should be renewed. Attention is also drawn to the fact that very good results have been secured by surface applications of creosote to piles in Port Jackson Harbour, and it is suggested that this material if painted on the hulls of wooden boats would effectively protect them for periods up to two months.

In view of the importance of wooden shipping in the present circumstances, it appears that these recommendations should be carefully followed by those responsible for the maintenance of wooden craft. If copper and anti-fouling paints are not readily available, creosote oil could be easily substituted. It may be obtained in large quantities in Australia at a reasonable price to Australian Standard Specification K55 - 1936 - Creosote Oil for Wood Preserving Purposes.

The regular use of these preservative coatings and the regular inspection, if possible, of the hulls of wooden craft should ensure complete freedom from marine borer attack.

.....

# THE PROPERTIES OF AUSTRALIAN TIMBERS.

## LEATHERWOOD.

Leatherwood is the standard trade common name for the timber known botanically as Eucryphia lucida (Labill.) Baill. (syn. Eucryphia billardieri Spach.).

Habit and Distribution:

Leatherwood is a small to medium sized tree with a total height of 50-70 ft. and a girth breast high of 3-4 ft, the average merchantable bole being 25-30 ft. long. It is found in the higher rainfall areas of the western, north-western and southern portions of Tasmania. Its associates include myrtle beech, celerytop pine, southern sassafras and horizontal.

Properties:

Leatherwood is a moderately heavy non-fissile timber with a fine, uniform texture; growth rings are visible but not conspicuous, colour pinkish to light or sometimes dark brown. The average air-dry density at 12% moisture content is 45 lb./cu.ft. The timber has excellent working qualities and is well suited for turnery.

Mechanical: Leatherwood is a moderately tough and hard timber with excellent bending properties; it is also resilient, being found suitable for tool handles such as for hammers and picks. It may be compared for general strength requirements with English ash.

The peeling of logs selected for conversion into rotary-cut veneers has demonstrated that although the logs are small, leatherwood is suitable for the manufacture of rotary veneers for commercial plywood. Such veneers glue well with synthetic resin glues. Leatherwood is an approved species for the manufacture of aircraft plywood, its mechanical properties closely approaching those of birch. However the frequent occurrence of large numbers of small knots makes a considerable percentage of leatherwood veneers unacceptable by the present standards for aircraft plywood.

Uses:

Leatherwood is a timber suitable for cabinetwork and has been used as a carriage timber for interior work. Its good finishing and working properties make it suitable for such small wooden turned articles as bobbins, clothes-pegs, spokes, etc. In sporting goods it is used for hockey sticks and can be used for archer's bows.

Availability:

Leatherwood is not a plentiful species and the supply is restricted to Tasmania, also the logs being small, only narrow boards can be obtained.

.....

COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH.

DIVISION OF FOREST PRODUCTS.

MONTHLY NEWS LETTER No. 122.



March 2nd, 1942.



.....

## WAR-TIME ECONOMY IN TIMBER.

The timber and building industries, like all other industries, are feeling the strain of war-time conditions, and are finding it difficult to meet civil requirements in addition to those essential for defence. It is obvious that the position regarding civil needs must become worse as the production of war equipment increases in intensity and makes increased demands on material and man-power. Owners and occupiers of houses, buildings and other structures in which timber is used should therefore think carefully of the future, because it is easy to imagine conditions arising when replacement of deteriorated material will be urgently necessary, but when neither the timber nor the labour will be available for repairs to be effected.

Timbers in contact with the ground, such as house stumps, fence posts, sills and poles, all tend to decay at a greater or lesser rate according to the durability of the timber and the severity of the local conditions. Decay usually commences at the ground line and can be retarded by digging the earth away from the timber to the depth that decay is present, clearing away the decayed portion of the wood and painting the timber with several coats of hot creosote. The preservative is ineffective if applied over decayed wood. Puddling with creosote when replacing the soil is also an excellent measure for preventing further decay. Where conditions are severe or where the timber is known to be of low durability, the precaution of painting the timber with creosote and puddling creosote into the soil is well worth while even though no decay is evident. In all buildings it is particularly desirable that suitable action be taken now to prevent deterioration or where decay is still in the early stages that palliative steps be taken to prevent its extension.

The importance of preventive measures where non-durable timber is used in the construction of air raid shelters will be obvious.

Decay in building foundations is a fruitful cause of waste and sometimes whole floors have to be replaced for this reason. Such decay can be prevented by proper ventilation under the floors and if there is any suspicion of this trouble being present, action should be taken immediately to increase sub-floor ventilation and improve drainage from under the building. A Trade Circular of the Division of Forest Products, "Prevention of Decay in Building Foundations", is available on application and gives advice on constructional methods for the prevention of decay and palliative measures for stopping further trouble.

Decay may also occur away from the ground line in some timber structures, particularly in places where water can lodge such as at joints or where one piece rests on top of another, as in a bridge. In timber buildings, the prevention of decay in such locations is usually effected by painting the timber. This serves two purposes. It provides a smooth surface which tends to shed the water rapidly and prevents the wood reaching a moisture content sufficiently high for decay fungi to become active. The shortage of paint has created a difficulty in this respect and it is suggested that where decay is found to be present or where it is feared to be likely to occur, timber should be painted with some wood preservative which should be well worked into all joints. Creosote is recommended but where its oily nature would be objectionable, a solution of zinc chloride could be used with beneficial results.

In a similar manner, careful inspection should also be made for evidence of termite (white ant) attack and where this is present, steps to eradicate the pest should be taken. This is usually a difficult problem requiring expert knowledge but information on the detection and treatment of termites is given in Trade Circular No.36, "Termites (White Ants)" of the Division of Forest Products.

Economy measures are possible in other fields of wood utilization besides buildings. Very large quantities of timber are used for cases, crates and other containers for the carriage of materials for civilian requirements. War-time conditions have brought a steady increase in the re-use of such containers, and every step should be taken to increase this re-use to the limit and so reduce the drain on available timber resources. The life of cases can be materially increased by stapling on flat strapping or wire. Both of these materials are today virtually unobtainable in the new state, but strapping and wire which have been used for the tying of boxes and shooks can be very effectively re-used for the strengthening of containers.

There are many other ways in which timber can be saved by exercising foresight and by taking all steps possible to see that demands on new timber are kept to an absolute minimum.

.....

## THE BOAT WITHOUT A NAIL.

The advent of synthetic resin glues and the new technique of "moulding" plywood has opened up new fields in boat building.

Plywood has been used for many years in the production of small boats. Animal glues provided the bonding medium for the earliest types of plywood; later casein glues made more water resistant joints but did not make the structure completely waterproof. Now-a-days both in U.S.A. and England, absolutely waterproof synthetic glues of the phenol-formaldehyde and urea-formaldehyde types are revolutionising the bonding of veneer and are supplanting the various glues which have given yeoman service over the last 20 or 30 years. The use of these new types of adhesives has been accompanied by the development of plywood panels showing a double curvature and an entirely new bonding technique.

The most sensational developments over the past few years have taken place in the field of aeronautics where wings and fuselages are moulded. The technique, however, is now finding application in the construction of small round bilge boats where the compound curves have always caused considerable difficulty.

The method of manufacture is as follows:-

A mould of the desired form is constructed in wood or metal and suitably perforated to facilitate the production of an internal vacuum. Slots are cut in the mould to receive any internal bracings which may be required in the ultimate structure - in the case of a boat the keel/hog/stem assembly and the gunwale.

Mahogany veneers are formed into phenol-bonded sheets in a manner which gives them a fabric-like multi-directional pliability and packs of such sheets are then cut into a pattern obtained from a development of the mould surface, in a method not unlike those used in mass-production tailoring.

The interior bracings having been laid in their appropriate slots, the patterned sheets are placed on the mould, coated with a special phenol-formaldehyde resin and the desired thickness built up.

When this shell structure is complete the whole is covered with a rubber counter-mould and the complete assembly, which has been made on a trolley running on a rail track, is moved into a large, steam-heated autoclave.

The pressure vessel is closed, vacuum is applied from within the mould, while external pressure (about 50 lb. per sq.in.) is exerted on the face of the assembly, the temperature being maintained at about 80° C.

After a period of about 10 minutes, curing is complete and the now completely formed shell is removed.

The boat is finished by fitting on the outside stem, transom and interior thwarts and knees, many of which sections are themselves of phenol-bonded laminated construction.

These 10-ft. dinghies, which weigh about 80 lb. apiece, have a skin thickness of but ¼ in., but no internal ribs or stringers. The absence of internal framework is, of course, a great point as regards cleanliness, freedom from rot-generating crevices and ease of maintenance, while from the appearance point of view the smooth, jointless surface and the beauty of the wood veneers put them far in advance of even expensively constructed conventional craft. They are, of course, tremendously strong, cannot leak and, in spite of their low weight, the absence of nails gives them a high reserve-buoyancy figure and they are thus particularly useful as life-saving craft.

.....

## LAMINATED TABLE PRODUCTION.

An article in a recent copy of the American monthly magazine, "Veneers and Plywood" draws attention to the increasing use of laminated construction in table manufacture in the United States. It says:-

"Laminated construction is used extensively in table manufacture; for example, sturdy square legs are often built up of four pieces of ½ in. five-ply stock fitted round a square centre shaft, with mitred corner joints so that all edge grain is concealed. Sometimes two or more thicknesses of 1 or 1¾ in. stock are glued together to make table legs, many of which are square, with chamfered corners, while others are turned on an automatic or back-knife lathe.

The durability and appearance of a table is largely dependent on the manner in which the top is built, five-ply construction being preferred by many. The corebodies are generally built up of numerous short and narrow strips of well-seasoned chestnut or white pine, glued together with either tongue-and-groove or square-edge joints which are machined on a glue jointer. Some table makers prefer to use medium-width full-length core strips instead of random-length material.

In one factory molder-run grooved bands 2¾ in. wide are fitted around the tongued edges of the core-plate for each rectangular five-ply top, before laying the crossbanding and face veneer. The tongues are cut on a glue jointer or shaper, after the plates have been planed and equalized. The most approved system is to do the tonguing on the double-end tenoner, simultaneously with the equalizing operation. Much wider edge bands are, of course, used when making circular, oval-shaped and other scroll-sawed tops. As soon as they are edge-banded and sanded, the coreplates are conveyed to the press."

It is interesting to note that the Australian table manufacture has developed along rather similar lines and that laminated construction is becoming increasingly popular and acceptable to the general public.

.....

# THE PROPERTIES OF AUSTRALIAN TIMBERS.

## YELLOW BOX.

Yellow box is the standard trade common name for the species known botanically as Eucalyptus melliodora A. Cunn. The common name is suggested by the deep yellow inner bark and the sometimes yellowish tinge of the true wood. The specific name, melliodora, means 'honey-scented', and the tree is said to be the most valuable nectar-yielding tree in Victoria.

Habit and Distribution. Yellow box is a small to fairly large tree, depending on locality of growth, as it has a very wide distribution occurring on most types of soils, except poor sandy soils. The tree commonly has a height of 60 ft. but reaches a maximum height of 100 ft. on better sites, with a fairly short merchantable bole of 30-40 ft. and a diameter breast high of 50-70 inches.

This species is found in all parts of Victoria with an annual rainfall between 15 and 30 inches, the western slopes and tablelands of New South Wales, and more limited in Queensland to the southern uplands of the Stanthorpe district.

Properties. Yellow box is a dense timber, light pinkish or yellowish brown in colour and of uniform texture; the grain is frequently interlocked. The average density of the timber at 12% moisture content is 65 lb/cu.ft. and normally ranges from 53-78 lb/cu.ft. The timber is hard and difficult to work with tools. In drying to 12% moisture content back-sawn boards may be expected to shrink 6% of their green width and quarter-sawn boards 3%. This Division has kiln seasoned a limited amount only of this species and results may not be entirely representative, but from the material to hand it was evident that the species tends to check fairly readily. It is unlikely that back-sawn material can be economically kiln dried without degrade. On the other hand, the kiln-drying of quarter-sawn stock which has been previously air-dried to a moisture content of 30% or less should offer little difficulty. Such checks as develop have the merit of closing tightly towards the end of the drying period. Reconditioning does not appear necessary as collapse occurs to a slight degree only.

Mechanical. Yellow box is primarily a pole and heavy construction timber. In the "Handbook of Structural Timber Design" it is placed in Class 2 for durability and in strength group B with white and yellow stringybark. It is a poor bending timber.

Uses. On account of its durability and strength, yellow box is used to some extent in Queensland and Victoria as a sleeper timber. In Queensland it is also used for telegraph poles and cross arms, for underground slabs, sleepers and round props in mines, and to some small extent as paving blocks. In Victoria, it is primarily used for piles and bridging and in general heavy construction work.

In the smaller field it finds a use in Queensland as plumbers' bobbins and turn pins. In Victoria it is regarded as a moderately good firewood.

Availability. Limited in quantity, mainly available as poles and larger sizes hewn or sawn.

.....

COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH.

DIVISION OF FOREST PRODUCTS.

MONTHLY NEWS LETTER No. 123.

1942##123 APRIL, 1942.



## THE WAR-TIME IMPORTANCE OF AUSTRALIAN GROWN TIMBER.

Up to 1940 approximately one third of Australian timber requirements was supplied by the importation of timber. The majority of this was of coniferous softwoods such as Douglas fir (oregon) and hemlock from the west coast of North America and red deal (red Baltic) and European spruce (white Baltic) from the Baltic area of Europe together with smaller quantities of specialty timbers including teak, mahogany, ash, aspen, red and white lauan, redwood, and soft-textured pines to mention only a few. As imports of timber have been reduced to a mere trickle, Australia has now to depend almost entirely on locally grown timbers, both native and exotic, to meet her timber needs.

Examination of the position indicated that two problems -- elimination of the gap between the demand and the current output from sawmilling plants, and the use of Australian timbers for purposes where imported timbers were generally employed formerly -- would have to be overcome.

Experienced labour and suitable equipment are fundamental to increased production, but enlistments in the fighting services, including many in Forestry Companies now overseas, and the attractions of more amenable conditions and better wages often obtainable in munitions and other work in cities have made a considerable drain on many bush sawmill crews. Fortunately, the manpower situation has been relieved to some extent by the exemption from military service of employees engaged in timber production and the classification of timber production as an essential industry. Difficulties in obtaining necessary equipment, especially tractors for logging operations, have also hindered efforts to increase sawn timber output.

On the consumption side, restrictions in private building construction have cut down civil demands for timber, furniture manufacture is indirectly restricted by labour shortages, and by prohibiting and restricting the manufacture of certain luxury and other articles further savings have been made. Offset against these reductions are increased demands for large quantities of timber for A.R.P. work, to replace steel for constructional and other work, for new military camps, hangars, ordnance stores and other constructions, for equipment, and for box, case and crate manufacture consequent on the arrival of the United States Army personnel and the expansion of Australian Fighting Services. As a result, Australia's productive capacity is being taxed to close the gap between the demand for timber and the supplies available from local output, imports and stocks.

The substitution of Australian for imported timbers appeared at first to be particularly difficult since the opportunity for expansion in output lay chiefly in hardwood (density at 12% m.c. 40 lb. and over per cubic ft.) production whereas the majority of timber imported was softwood (density at 12% m.c. 28-35 lbs. per cubic ft.) and was used for many purposes where lightness, softness and relative ease of working and seasoning were advantageous. Furthermore, Douglas fir was an ideal timber for many purposes, especially constructional, on account of its availability in long lengths of large cross section. At first complaints were registered, innumerable objections were raised and only with considerable reluctance was the use of Australian timbers agreed to for many purposes when it was finally found that the large quantities of imported timbers sought were not available or the prices had risen so high that it became quite uneconomic to insist on their use.

As a consequence of these factors, the demand for increasingly large quantities of timber for cases for foodstuffs, general transport and other purposes is being met, not with hemlock but with various eucalypt timbers (including fire-killed mountain ash), various brush timbers of New South Wales and Queensland, hoop pine and plantation and "hedge-grown" exotic conifers--chiefly pines. This change-over has caused no end of trouble because of seasoning difficulties as hardwoods take longer to air-dry and the necessary stocks of these were not available to permit complete and satisfactory air-drying. Whilst considerable trouble has been experienced from the use of insufficiently dry timber for some of these purposes, kiln capacity is increasing and the position in this regard is improving.

In recent months, numerous large structures with clear spans up to 130' have been erected for purposes as ordnance stores, hangars, workshops and in the construction of these various eucalypt timbers not Douglas fir, have been used. It is noticeable that this use of hardwood timber in such structures is almost unique since, overseas, timber structures made possible by revolutions in design and constructional methods consequeat on the use of timber connectors were developed largely with coniferous timbers. In Australian pre-war construction of buildings of this kind, steel would almost certainly have been used, but now using timber, a very valuable contribution to the war effort is made in that large quantities of steel are released for other important munitions work.

Examination of the service requirements of many purposes for which imported timbers were previously used indicated that they were not exacting and their original use had been due to factors as cheapness, availability or ease of working rather than some intrinsic property of the wood which made it peculiarly suited for that use. For many of those purposes the Australian timbers now used have been chosen for the same reasons and it is most probable that these substitutions will persist even when normal trading again becomes possible.

Many other substitutions which may not appear important as only relatively small quantities are used are nevertheless so because of the intrinsic properties required. Many Australian timber substitutes are not considered as good as the original timber but this unfavourable opinion has often been closely associated with the use of timber which has been unseasoned, badly seasoned or has not been selected as carefully as was the imported timber previously used.

Some of the most important of these substitutions are the use of scented satinwood (coachwood) instead of birch for aircraft plywood, and instead of walnut for rifle furniture (Queensland maple was used for this purpose in Australia in the Great War 1914-18), hoop pine in lieu of Port Orford cedar for battery separators, the replacement by Queensland maple of mahogany in aircraft propellers and in boatbuilding, white birch (crabapple) and radiata pine as aspen substitutes for matches, spotted gum instead of hickory for axe and hammer handles, silver quandong and hoop pine instead of spruce for spoon bladed oars, Queensland maple and scented satinwood (coachwood) instead of Gaboon mahogany and birch for plywood panels for Army bridging stores, sheoak and myrtle beech for boat lasts instead of maple.

---oooOooo---

# THE PROPERTIES OF AUSTRALIAN TIMBERS.

## Red Bloodwood.

Red bloodwood is the standard trade common name for the timber known botanically as Eucalyptus gummifera (Gaertn.) Hochr. syn. Eucalyptus corymbosa Sm. It is widely known as bloodwood, being qualified specifically as red bloodwood to distinguish it from brown and yellow bloodwood. The common name "bloodwood" is derived from the frequent occurrence of trickles of rich red kino from gum pockets immediately under the bark on the trunk.

Habit and Distribution: Red bloodwood is a fairly large tree attaining heights of up to 120 ft. and stem diameters at breast height of 3'6" to 4'. Its range of distribution extends from the Victorian border of New South Wales, through the coastal divisions of that State and Queensland to the Atherton district in North Queensland. It grows commonly on poor sandy soils, attaining maximum size in association with tallowwood and red mahogany.

Properties: Red bloodwood is a coarse textured pink to dark red coloured wood, characterized by the presence of numerous concentric gum veins and of gum pockets. The grain is often interlocked. The average density at 12% moisture content is about 55 lb. per cubic ft. Red bloodwood is extremely durable being resistant to both decay and termite attack. In drying from green to 12% moisture content its shrinkage is relatively small, being about 4% in a tangential direction and 3% radially.

Mechanical: Red bloodwood has been placed with white mahogany and yellow stringybark in Strength Group B in the C.S.I.R. "Handbook of Structural Timber Design", but owing to the frequent occurrence of gum veins the quality is generally very low.

Uses: Red bloodwood is commonly used for house stumps, fencing posts, piles, sills, curbing, mining slabs and sleepers. It is generally used in the round and is rarely sawn on account of the liability of sawn timber to shell off along the concentric gum veins so often present.

Its durability and resistance to attack by termites make it a valuable timber for use in situations where decay and termite hazards are high.

Availability: Red bloodwood is available normally in the round for bed-logs, sills, piles, poles, house-stumps and posts, and sawn or hewn pieces are generally heart-in and of large dimension. Logs are rarely sawn into small section pieces unless they are exceptionally free from gum veins. For structural purposes sawn or hewn timber with numerous gum veins is of standard grade or lower.

---oooOooo---

## AUSTRALIAN TIMBER HELPS NEW FISHING INDUSTRY

A recent survey by the Division of Fisheries, C.S.I.R. demonstrated the presence of large tuna resources in Australian waters and efforts are now being directed to the successful establishment of commercial tuna fishing.

A live bait method, in which small fish, generally of the sardine type, are liberated from wells or tanks in the fishing vessel, is used to attract around the vessel shoals of tuna. Fishing is then conducted by rod and line using barbless hooks covered with feathered lures. It is essential that adequate supplies of live bait be available to ensure commercial success. Furthermore, if the season of occurrence of the bait does not coincide with the tuna season, retention of the live bait is necessary. This seems to be the case in Tasmania where the tuna resources are considerable.

In the Philippines bait is kept alive in fish pens by Japanese who for years have controlled the fisheries of southern Mindanao. Live bait has not previously been penned in Tasmania or elsewhere in Australia. It was therefore decided to carry out experiments with a new method of retaining live bait in wooden pens moored in sheltered inland waters in north-eastern Tasmania.

Last January, the anchovy, which are to be the bait in this case, were netted and then held in captivity in wooden pens. Although the experiment is not complete the losses to date have been inconsiderable and the prospect of success is most promising.

As softwood which is commonly used overseas for fish pens was not available, stringybark (one of the eucalypt hardwoods) was used. This necessitated the use of floats to ensure the tops of the pens would be well out of the water and so prevent the fish from escaping in rough weather. Cages of two sizes were made having internal dimensions 9' x 9' x 6' and 6' x 3' x 3' respectively. The pens were made up in sections to facilitate erection at a point convenient for launching and their recovery from the water at a later date if necessary. The sections were framed up from members up to 4" x 3" in cross-section, were covered with 2" x ¾" strips spaced slightly to permit a good circulation of water through the pens. To protect the fish from birds a bird-wire netting was stretched over the top of each pen.

It is intended that these experiments will be continued next season when it is hoped to hold sufficient bait in captivity to carry on commercial experiments in the capture of tuna.

## SALVAGED TIMBER REPAIRS FIRE DAMAGE).

The Timber Trades Journal reports the use of timber salvaged from damaged buildings to effect repairs to the roof of a church in London which was destroyed by fire in 1941. "The charred remains of the trusses, at a height of 65 ft. from the floor have been replaced. The nave, 45 ft. wide, is now spanned by nine low pitched trusses, also of salved timber, bolted together."

---oooOooo---

COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH.

DIVISION OF FOREST PRODUCTS.

MONTHLY NEWS LETTER No.124.



1st May, 1942.



.....

## PRINTERS' BLOCKS.

Recent enquiries at the Division of Forest Products, C.S.I.R., for substitute materials for backing blocks for zinc and copper plates used by process engravers and stereotypers indicate that they are experiencing difficulty in obtaining supplies of the special plywood which has proved itself the most satisfactory material for this purpose.

Prior to the advent of plywood for printers' blocks, extensive research for materials suitable for this purpose is reported to have been made in countries all over the world. In Britain, oak and mahogany were extensively used, oak being employed chiefly in better class work for which it was highly regarded as relatively little trouble with warping was experienced in well selected material.

The first plywood used frequently had 9 or 11 plies but the face veneers on these were often cut away completely in dressing to the required thickness and warping frequently resulted. Five-ply or sometimes seven-ply boards with thick ($\frac{1}{8}$", 3/16" or $\frac{1}{4}$") face veneers are now used so that dressing is confined to the outer veneers and warping troubles are rarely experienced. Although in Australia this special plywood, usually available in 6' x 2' x $\frac{7}{8}$", 15/16" or 1" sheets, is initially more expensive than boards of solid timber, the complete utilization without wastage and the virtual elimination of warping - especially in larger size blocks - make it more economic in use. Consequently, special plywood, by its merit for this purpose, now dominates the field of materials which have been tried for printers' blocks.

Some composition materials prepared from sawdust mixed with a binder and compressed into blocks have also been used, but while they were quite nailable and warping was negligible, they were abandoned as the cutting tools used were rapidly blunted. Similar complaints concerning blunting of cutting tools were often recorded when eleven-plywood was used. This appears to have been due to the numerous glue lines.

In 1936-37 and again this year, opinions were sought from some Australian process engravers who submitted comments on the different plywoods and solid timbers which they had used at various times.

There was a general agreement in the opinions expressed which are tabulated below:-

**Plywood.**

| | | |
|---|---|---|
| Beech plywood (5-ply) imported | -- | Very satisfactory |
| Hoop pine plywood (5-ply) | -- | Very satisfactory |
| Silver ash faced plywood(5-ply) | -- | Very satisfactory |
| Vanikoro kauri plywood | -- | Not well regarded. |

**Solid Timber.**

| | | |
|---|---|---|
| New Zealand kauri | -- | Fairly well regarded |
| Queensland kauri | -- | Too soft - subject to warping |
| Vanikoro kauri | -- | Too soft - " " " |
| White beech | -- | Inferior to beech plywood |
| Red cedar | -- | Too soft |
| Red lauan (Pacific maple) | -- | Coarse textured - fair. |
| Rose mahogany | -- | Good but sawdust and shavings reported to be irritating. |
| Crow's ash | -- | Somewhat hard, stayed flat, supplies reported difficult to obtain. |

Perhaps some of the discrepancies in the opinions expressed are due to variations in individual requirements and to unsatisfactory selection and treatment of the timber concerned.

If, as reported, special plywoods cannot be obtained and a reversion must be made to boards of solid timber, the following points should be carefully observed to obtain the best results:-

(1) The timber should be properly seasoned to a uniform moisture content of about 12% throughout its thickness and width, and should be free from seasoning stresses. If timber can be stripped out and held on the user's premises for several months before use, so much the better.

(2) It should be fine textured and moderately hard to resist compression, but soft enough to permit the driving of fine nails into it to fix the plates.

(3) It should provide a smooth even surface when planed ready for mounting the plates.

(4) The timber used should have a low shrinkage factor, and have little differential between radial and tangential shrinkage so that it will not warp when subjected to changes of temperature and humidity.

(5) To reduce warping, especially cupping, to a minimum, timber should be quarter-cut and straight-grained, and excess wood should be dressed evenly from both faces.

Several Australian timbers fulfil quite well requirements (2) and (3) above and with special attention to selection of straight-grained quarter-cut boards and dressing evenly from both faces they should provide reasonably satisfactory backing material for blocks up to 12" wide. It is strongly recommended that any plywood which can be obtained should be reserved for blocks wider than 12".

Blocks made from Queensland maple boards selected originally for aircraft material, but rejected after mechanical testing, are now under observation in service tests and the preliminary tests indicate that good results will be obtained.

Other timbers worthy of test are myrtle beech, scented satinwood (coachwood), sassafras and soft textured mountain ash or similar eucalypt timber.

It should be particularly noted that for printers' blocks, as for many other purposes, the proper seasoning of the timber and its careful selection and machining are probably more important factors than the actual choice of species itself.

Process engravers and stereotypers are invited to send to the Chief, Division of Forest Products, 69-77 Yarra Bank Road, South Melbourne, suggestions or comments arising from their experience with other timbers or materials.

---

## "PLASTIC" PLANES FUNDAMENTALLY WOOD VENEERS.

In an article by Mr. I.F. Laucks President, I.F. Laucks, Inc. U.S.A., published in 'the Timberman' and 'Wood Products', attention is drawn to a current tendency to decry glues and the art of gluing and refer to many glued wood products as "plastics". Many people have recently heard or read of "plastic planes" and perhaps wondered what they are. These so-called "plastic planes" are fundamentally made from "tailored" wood veneers, bent to shape and glued up with synthetic-resin adhesives. Many moulding powders for the manufacture of plastics are made from synthetic resins mixed with various materials as wood flour, cotton, asbestos or other filler, but this process of compressing a formless powder into the shape provided by dies can scarcely be compared with that of bonding veneers to special plywood in planes.

Mr. Laucks sets out his opinions very soundly, and as we agree with him the article is reproduced below.

### Glued-up Woods are Not Plastics.

"I believe it is time to call a glue pot a glue pot. As a glue manufacturer I am getting tired of hearing glued up articles being referred to as "plastics" either because of lack of comprehension of the difference between the plastic art and the glue art or because of some misguided notion that glue is not a subject of polite conversation.

For some time back now I have been reading articles in the press, in the magazines, in the trade papers and technical journals about plastic airplanes, but I submit that these are nothing more or less than glued up plywood formed into the proper shapes. A plain piece of plywood might just as well be called a plastic.

Just the other day I saw in one of the nation's prominent newspapers a statement about plywood which ended: "The old art of using glue has been supplanted." This was the final straw.

I wonder how many people realize the great distinction between the plastic art and the gluing art. Not many I think, if we are to judge by the confused emanations from even those who are supposed to be informed technical writers.

That there is a great difference between the gluing and plastic processes is commonplace knowledge to anybody who knows very much about either. I personally have good authority on which to base a statement about this difference. I once had to fight a patent suit in which my opponents claimed that there is no distinction between the plastic art and the glue art. After hearing testimony for two years, the court decided that these are two seperate and distinct arts. This decision should carry some weight. If the Patent Office considers these arts dissimilar, and in practice they are entirely different, I think the general public should recognize the fact.

Perhaps the present prevalent habit of calling everything a plastic that can be remotely included in that category is due as much to the fact that plastics are currently fashionable as from a general disinclination to use the word "glue". Plastics, of course are new. The art of gluing, on the other hand, dates from at least early Egyptian times.

Gluing might be defined as the art of binding two pieces of wood together to make a joint that is stronger than the wood itself. In this definition I do not state what the binding means are. As a matter of fact no binding means has ever been found that was not of the nature of glue as people generally understand the word. For example, no metallic fastenings of any kind will compare with glue in strength.

The ancient glues were made of either bones, hoofs and hides (whence I suppose the name glue first acquired a bad odor) or of casein. Later came starch glues which do not smell bad, still

later came soybean glues which do not smell bad, and later yet came synthetic resins, some of which do and some of which do not smell bad. Now then, just because some glues smell bad, should the entire glue industry be made to feel that it ought to apologize for itself? Should the people who use our product do so on the sly and cover up this fact by declaring they are making plastics?

I maintain that the art of making a joint stronger than the wood is a real art and an honorable one. It is the art of gluing, and neither the man who knows how to do it nor the man who knows how to make a glue to do it with need be ashamed of saying he is in the glue business or that he is using glue. I insist that the old art of using glue has not been supplanted, but instead is expanding its uses into ever wider fields and is becoming of progressively greater importance every day.

---

## UNITIZED LIDS FOR FRUIT CASES.

Samples of unitized lids for citrus cases, cleated by somewhat different methods, were recently brought to the notice of this Division. Favourable comments were made with reference to one method of cleating but the second method was deplored on account of the considerable damage experienced by carters, storemen, salesmen and others whose hands were severely torn by the sharp ends of exposed staples when handling such cases.

In the favored method the staples are driven through the cleats and are clinched over on the underside of the shooks so that when the lid is nailed on the case only the wire loop is exposed.

The second method involves the use of stiff wire staples which are driven through the shooks into the cleats but they are not long enough to pass right through the latter. With this method there is often a tendency for the cleats to split at the staples. In subsequent handling of packed cases the edges of many cleats chip off and expose the sharp ends of the staples which, although scarcely noticeable, may nevertheless cause painful injuries to the hands of unwary storemen or others.

An examination of both types of lid indicates no apparent mechanical reason why cleating machines should not be adapted to drive staples throught the cleats into the shooks so that when unitized lids are put into service the wire loop is exposed and the probability of incurring injuries in handling would be practically obviated.

---

# THE PROPERTIES OF AUSTRALIAN TIMBERS.

## COAST GREY BOX.

Coast grey box is the standard trade common name for the timber known botanically as Eucalyptus bosistoana F.v.M. It is also known in Victoria as Gippsland grey box from its area of distribution. In New South Wales it is known as Bosisto's box, after the early botanist.

Distribution: This species is confined in its distribution to the coastal belt of Eastern Victoria and New South Wales, extending from Bairnsdale through East Gippsland to the south and central coastal divisions of New South Wales as far north as Sydney.

It seems to prefer the richer soils containing lime or loamy soils with a moderately heavy sub-soil.

Habit: Coast grey box is a fairly large tree growing to a maximum height of 170 ft., but usually 90 - 120 ft. high, with a diameter at breast height up to 6 ft., but generally 2-4 ft. The bark of this species is rough and persistent at the base of the trunk up to 30 ft. from the ground, the remainder of the stem and branches having a smooth, pale deciduous bark.

Timber: The truewood of this species is usually light brown in colour with sometimes a pinkish tinge; the sapwood is whitish. The timber is uniform in texture with a somewhat interlocked grain. The average density of this species at 12% moisture content is 69 lb/cu.ft. with a normal range of 62 - 75 lb/cu.ft. In drying from the green condition to 12% moisture content, this timber shrinks about 8% tangentially and about 4% in a radial (quarter-cut) direction. In the C.S.I.R. 'Handbook of Structural Timber Design', coast-grey box is placed in strength group A, with the ironbarks and grey box.

Coast grey box is extremely durable and has been placed in durability class 1 (ranking with such eucalypts as tallowwood, red bloodwood and the ironbarks.)

Uses: Coast grey box is used almost entirely for heavy constructional purposes in the form of hewn or sawn beams or planks, piles, poles and for fencing and railway sleepers.

Availability: Moderate to scarce (annual production 1 - 5 million s.ft. per annum), available in the round or larger hewn or sawn sizes, the grade being mainly select and in the higher price field.

.....

COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH.

DIVISION OF FOREST PRODUCTS.

MONTHLY NEWS LETTER No.125.



.....

## SEASONING OF SMALL POLES - A NOVEL METHOD.

Attention was drawn recently to a report by an officer on the staff of the Commonwealth Forestry Bureau on the practice adopted by a firm in the United States of America in the preparation of small pine logs 7-8 inches diameter and up to 8 feet long for the construction of log cabins.

The green logs were first turned to a diameter of about six inches and were then put on a machine boring carriage where the central core 3 inches in diameter was bored from the log.

The log cabin construction firm claimed that the main idea of boring the logs was to give added insulation, but the officer making the observations, points out several advantages which are more interesting from an Australian point of view. He observes that the relieving of surface checking is probably the main advantage and the better insulating properties are dependent on this rather than the presence of a pocket of still air in the centre of each log. In cabins built with ordinary logs it would be practically impossible to seal all the checks to prevent the entry of cold air which would nullify the insulating value of the wood, but since no checking is present in bored logs these can be made into walls which form perfect barriers against air currents, and it is consequently much warmer inside these cabins.

As a result of his observations on the use of hollow cored logs for cabins he carried out experiments with small southern blue gum logs grown in California and found that when logs were bored to provide a core half the diameter of the logs these could be dried without degrade under quite severe conditions. He considers that possible benefits would accrue from experimental work and ultimately commercial operation on these lines in Australia using eucalypt and other hardwood logs and plantation grown pines. For example, the removal of the core from round posts or even telephone poles would relieve seasoning stresses and, in the case of eucalypts, some of the compression in the centre of the green log. In the case of pines in which spiral grain is commonly present in the core this would be removed. Perhaps the most important advantage to be gained in bored posts and poles set in the ground is the fact that the hollow core might be utilised for giving an interior surface for the absorption of preservatives and enable the use of naturally non-durable timbers for these purposes. Where preservatives which would diffuse through green timber are used it is suggested these might put in the stoppered holes as the bored poles are put into use.

.....

## DON'T USE GREEN TIMBER FOR BINS FOR MOTOR SPARES.

The taking over of garages, motor vehicle showrooms and spare parts depots for Army Stores has resulted in the necessity for the preparation of new bins for the storage of motor spares in newly occupied premises. Our attention has already been drawn to the rapid corrosion of bright steel parts stored in such by one firm in bins made from GREEN timber, and another firm learning of this corrosion has sought suggestions of methods of treatment of the green timber from which their new bins have just been made, but which so far have not been used for storage. The use of properly seasoned timber for bins is the only method whereby corrosion can be prevented. It may be diminished by carefully greasing all metal parts and lining the bins with oiled or preferably bitumen-impregnated paper. Remember, "USE SEASONED TIMBER FOR BINS FOR MOTOR SPARES".

## CONSERVATISM OR TIMBER CONSERVATION.

An enquiry was recently received from a firm of Melbourne manufacturers for recommendations on timbers suitable as substitutes for an imported timber which is no longer obtainable. The architect had specified the imported timber because it had been customary for him to do so in the past. Instances of this type of conservatism which tends to maintain the heavy demand upon our limited stocks of imported timber during a period when these stocks are of vital importance are all too frequent.

Consumers of timber, whether for civil requirements or for the use of our armed forces, must be prepared to make shift intelligently with substitute material. In many cases the high grades we preferred in peace time because of their pleasing appearance can be safely replaced by timber of inferior quality. Temporary buildings do not require the highest quality and the most durable timber for stumps. Similarly, many other purposes neither require nor deserve specially selected quality of the particular timber it has been customary to use in the past because of its ready availability, easy working or good appearance. Supplies of many such materials are limited and are urgently needed for special defence or offensive and essential works.

On the other hand it may be imperative, in the case of timbers on which considerable work involving machining capacity and labour has to be performed, and where replacement would upset production, to use the best quality of the most suitable timber available for that purpose. Where destructive agencies such as termites are liable to destroy in a few months or even weeks important timber members in buildings, installations, plant, etc., it is most desirable that durable timbers be used to avoid the necessity for heavy replacements at inconvenient times, or alternatively, adequate steps should be taken to prevent destruction.

In selecting a timber for any particular purpose consideration should be given to the essential requirements only, in order to avoid the use of material of unnecessarily high quality. Careful attention should also be paid to the design of timber structures in order that the maximum use may be made of the timber with the lowest possible loss through such hazards as fire, and termite attack. It should be borne in mind that for many wartime purposes service life is measured in months, not years. Under these conditions decay, for example, is of no practical importance and accepted standards of building construction can be suitably cheapened and simplified. Similarly in motor body construction there is no point in rejecting timber because of slight traces of decay which might develop into serious defects only in the course of years.

A recent publication of the Division of Forest Products, (Pamphlet No. 112)"Building-Frames Timbers and Sizes" will provide engineers and architects with the necessary data for the economical design of timber structures. The principal Australian structural timbers have been classified into strength groups and tables of sizes for each group have been drawn up for bearers, joists, rafters, purlins, etc. under various loadings and for two main types of construction. The first type approximates to that for first-class dwellings, the second to that for temporary or second-class dwellings with lowered rigidity. The sizes given for the second type of construction may seem in some cases to be somewhat incautious but in actual fact they are, from many points of view, quite conservative in that design loads are very seldom applied in normal usage. Copies of this publication may be obtained free of charge upon application to the Chief, Division of Forest Products, 69-77 Yarra Bank Road, South Melbourne. S.C.4.

Furthermore the Division of Forest Products will be glad to advise on the choice and selection of substitute timbers and to indicate to what degree peace time standards can be modified in order to overcome problems of timber supply. It is essential that all timber consumers should adopt conservation and not conservatism as a guiding principle.

# AIRCRAFT PROPELLERS IN WARTIME.

## Wood Blades Used for Training and Service Aircraft.

Aircraft propellers may be divided into two main classes, namely, fixed pitch and variable pitch. The use of fixed pitch propellers is practically confined to training and slow flying aircraft. The majority of these propellers are made from laminated wood; others are metal.

Variable pitch propellers are used for all service and for many training aircraft. These propellers usually have three blades, but occasionally two or four blades are fitted. The pitch is controlled in various types by hydraulically or electrically operated mechanism. Magnesium alloy, aluminium alloy, hollow steel and wood are the principal materials which have been used for the blades of variable pitch propellers. Magnesium alloy blades were extensively used in German and to a limited extent other aircraft prior to the war, but this material appears to have been abandoned for the present because in service its record did not compare favorably with that of the other materials. Magnesium alloy blades of the types used were too susceptible to nicking by stones and other materials blown about on landing grounds.

Aluminium alloy blades are about 10% heavier than hollow steel or wood blades for the same performance in service aircraft with 10-13 ft. diameter propellers. Aluminium alloy and hollow steel blades are generally made to the same planforms and have similar thickness ratios. Wood blades are required to be somewhat thicker so that in high speed aircraft such as fighters there is a slight loss in performance at maximum speed with wood blades as against metal blades. On the other hand, the fact that wood blades can be made more readily in wide planforms results in increased efficiency at lower speeds. The vibration damping capacity is higher in wood than in metal blades and wood blades are not likely to fail by fatigue.

Two types of wood blades are used in variable pitch propellers. Both these are of laminated construction. In Schwarz type blades individual laminations are prepared with the root portion of 'improved' or 'compregnated' wood - compressed impregnated wood veneers bonded together - scarf jointed to the outer part of some medium or low density wood.

In Jablo (Heine) construction wood veneers are used throughout the entire length of the blade whose density varies from a maximum at the hub end to a minimum at the tip. This variation of density throughout the length is effected by the interleaving of short veneers, greater resin content and the application of greater pressure at the hub end. At the tip, except for the fact that the grain of all laminations runs in the same direction, it resembles ordinary resin bonded plywood as the veneers are merely glued up and are not compressed to any degree.

Some time ago it was reported that of the German planes brought down and examined by Allied or neutral observers only one plane had a wood blade controllable pitch propeller, and these blades were of the Heine construction.

Wood blades of both types of construction are used on British war planes for fighters and bombers, as well as for training aircraft. The service record of wood blades on aircraft operating from 'dromes with good runways has been quite satisfactory as regards damage from stones etc., and some blades with 400 and 500 hours operation have been little affected by service wear. However, when airport conditions are poor, a larger percentage of wood blades require repairs than do metal. Metal blades are able to withstand the impact of striking balloon barrage cables better than wood. Both metal and wood blades which have been damaged in crashes or by bullet holes can often be repaired. Bending is the most common damage sustained by metal blades and these may be straightened if bends are not too severe.

Minor repairs can be made to small bullet holes and stone bruises on wood blades by cleaning out the damaged portion and filling with a type of plastic wood. Wood blades subject to more extensive damage may be repaired by splicing on a new tip if more than half the radius from the hub is undamaged.

.....

The many friends of Mr. Ian Langlands will be sorry to hear that he met with a serious accident on the 20th May. While he was inspecting a roof truss near Melbourne, the trestle on which he was standing was removed, and he fell over 20 feet to the concrete floor. His fall was broken by a workman whose ribs were fractured, but Mr. Langlands sustained a fractured skull. He is, however, making very good progress towards recovery, although it is not expected that he will resume duty until about the end of July.

.....

## WOOD OUSTS METAL IN NEW CULVERT!

An American drainage company whose standing was attained through its development and promotion of corrugated metal pipes and culverts recently announced its entry into the field of using wood for culverts. This partial changeover resulted from the conservation of regular corrugated steel pipe for use on war projects where no suitable substitute could be used.

The new piping, as developed after considerable experimenting, is a sectional octagonal-shaped wood pipe, fabricated from various sizes of lumber according to load requirements, and fastened together with wood dowels, eliminating all metal. Units are shop-assembled into lengths of 12 ft. or more, which are joined together in the field into a single structure. Ordinary wooden box culverts are rigid, but this new segmented design results in a flexible structure that builds up side support with resulting increase in load-bearing capacity. Thickness of the wood segments can be varied with the diameter of the pipe. The segments can be rapidly cut in any job carpenter shop. Scrap lumber may be used if desired, and the ultimate life may be increased by treating the wood.

It is stated that this new design in wood drainage structures meets all wartime emergency requirements with added advantages of lightness in weight, ease of handling, and low installation cost with unskilled labour.

.....

# THE PROPERTIES OF AUSTRALIAN TIMBERS.

## SOUTHERN BLUE GUM.

Southern blue gum is the standard trade common name for the timber from trees known botanically as Eucalyptus globulus Labill. and Eucalyptus bicostata Maid., Blakely & Simmonds. Eucalyptus globulus is known in Tasmania as Tasmanian blue gum or blue gum, in Victoria also as blue gum. Eucalyptus bicostata is considered by some authorities to be a higher altitude variety of E. globulus. In New South Wales it is known also as eurabbie.

Distribution: E. globulus is found mainly in Tasmania, chiefly in the south eastern portion of the State, and was also to be found in the south coastal portions of Victoria, but now is restricted almost entirely to the Otways. E. bicostata is found in the higher tableland country of south and central New South Wales and central Victoria, mainly north of the divide. This species prefers sheltered localities with a deep loamy soil. E. globulus (mainly of Tasmanian origin) has been planted extensively in many countries abroad and seems to thrive in quite differing sites and climates. It has been used in plantations mainly in South Africa, the more temperate parts of South America, New Zealand and California. As an ornamental or shelter tree it has been planted even more widely.

Habit: E. globulus is a medium or large tree with a fairly heavy crown. The tree grows to a height of from 60 - 150 ft. and a diameter breast high of 3-5 ft. The bark is smooth of a bluish or greenish grey colour and deciduous except for the portion at the base of the trunk. E. bicostata is a tree of similar form but not so tall and with a more persistent rough bark at the base of the stem.

Timber: The truewood of southern blue gum is light-yellow brown in colour, with an open texture, commonly interlocked grain and growth rings are fairly distinct owing to denser latewood bands. The sapwood is somewhat pale in colour and rarely exceeds 1½ inches in width. The average density of southern blue gum at 12% moisture content is 56 lb. per cu.ft. with a normal range of 48-63 lb./cu.ft. In drying to 12% moisture content shrinkage on surfaces tangential to the growth rings is large being about 11% of the green dimension whilst the shrinkage on quarter-cut faces is about 5%. The timber is somewhat difficult to season as it has a tendency to check and it commonly suffers from collapse. Most seasoning degrade occurs on the tangential faces and for this reason quarter cutting of boards is desirable. Initial air drying at least to 30% moisture content is recommended before kiln drying. Collapse may be considerably reduced by reconditioning.

In the C.S.I.R. Handbook of Structural Timber Design southern blue gum is placed in strength group B with such timbers as yellow stringybark and white mahogany. Selected southern blue gum is a very good timber for steam bending.

Southern blue gum is not generally regarded as a very durable timber and for this reason has been listed in the third of the four durability groups in the classification of Australian structural timbers. The sapwood is frequently liable to Lyctus attack.

Some difficulties are experienced in the working of this timber when seasoned on account of its fairly dense nature and the tendency for the grain to be interlocked. Nevertheless with care and attention to cutting tools good results are obtainable in machining.

Uses: Southern blue gum is used in the building of heavy and light structures. It is highly regarded for wheelwright work and waggon building on account of its strength and good bending properties, being used for spokes, felloes, shafts, swingletrees

and framing. It is used to some extent for cross arms, boatbuilding and for pick, axe, and hammer handles. Other uses include piles, poles, fencing, sleepers, paving blocks and fuel.

Availability: Although occurring over a relatively wide range the annual cut is small, probably less than 1,000,000 sup.ft. and supplies are now difficult to obtain.

When available the quality is generally fairly high and the price is moderate.

.....

COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH.

DIVISION OF FOREST PRODUCTS.

MONTHLY NEWS LETTER No. 126.



July-August, 1942.

.....

## SUCCESSFUL CONTROL OF THE LYCTUS POWDER POST BORER.

It is pleasing to note in these days of big demands and short supplies that the lyctus beetle, commonly known as "the borer" is no longer able to attack timber with impunity. Some years ago the Division of Forest Products developed a process for the treatment of veneer to render it immune to lyctus attack. The following extract taken from a letter recently received from a progressive firm of plywood manufacturers is gratifying evidence of the success of the treatment in helping to conserve our valuable timber resources. The extract reads:-

> "As a matter of interest we would advise that we are making increasing use of the Boric Acid treatment, which is bringing into use for commercial purposes, numerous timbers which we previously were prevented from using on account of their susceptibility to borer attack. To date we have not received any complaint that treated starchy veneer has subsequently been attacked".

This short extract should cheer those unfortunates who have purchased, as substitute for well tried timbers, new species of Australian timbers which proved to be expensive failures due to lyctus attack. It is now inexcusable to manufacture plywood from untreated lyctus susceptible veneer. A cheap and simple protective treatment process has been made available. Before long it should also be inexcusable to market solid timber liable to lyctus attack.

Much progress has been made in the development of a protective treatment for solid timber. It should be possible shortly to give full instructions for the production at a reasonable cost of borer-proof white birch (crabapple), white cheesewood (milky pine) yellow carabeen, etc.; in fact to provide a protective treatment for all those timbers which at present are under a cloud due to their susceptibility to borer damage.

Timber producers and consumers can now fairly regard timber losses due to lyctus attack (with the exception of attack in hard-wood scantling where damage is relatively insignificant and can usually be ignored) as unnecessary waste rather than as the inevitable misfortune which one must expect if certain timbers are not avoided. These losses due to lyctus attack can be avoided by treatment of the susceptible timber. There should be no need to emphasise the desirability of exploring any developments which will lead to a more efficient utilisation of our forest resources, help to render us more independent of external supplies, and eliminate sources of trouble which hamper our efforts.

Details of the treatment of timber to render it immune to lyctus attack can be obtained by application to The Chief, Division of Forest Products, 69-77 Yarra Bank Road, South Melbourne. S.C.4.

.....

We regret that because of the break-down of our duplicating machine, it was impossible to arrange for the issue of our July News Letter, and this is consequently a joint July-August issue.

.....

## CREOSOTE OIL AND ITS USE AS A WOOD PRESERVATIVE.

The term creosote or creosote oil refers to an oil distilled from coal tar which is a by-product from the manufacture of town gas. It is a dark reddish brown to black oil with a distinctive odour similar to that usually associated with disinfectants. It has a sharp burning taste and is poisonous both to humans and stock. It is inflammable, but not highly so. If it is splashed on the skin it does no harm if it is immediately washed off, but if left will set up irritation. Sometimes a crust forms on the surface of Australian creosotes; this readily dissolves on warming and stirring.

Creosote oil has world wide recognition as a wood preservative. Australian creosotes are of a different type from those in use in other countries, however. In 1936 an Australian Standard specification (No. K55) for Creosote Oil for wood preserving purposes was drawn up with the objects of standardising practice in the tar distilling industry and safeguarding the interests of the user. This specification prohibits the admixture of petroleum oils, limits the water content and the volatility of the oil, and rules that the oil shall be completely fluid at 100°F.

Creosote oil acts as a wood preservative because it is intensely poisonous to the fungi responsible for the decay (rotting) of wood and also to various wood boring insects. It is worth noting here that petroleum oils are not poisonous to wood destroying fungi and hence they are almost useless as wood preservatives. Mixtures of petroleum oil and creosote are sometimes used as wood preservatives but this practice can be recommended only on the grounds of cheapness.

K55 creosote may be applied in various ways. It may be brushed on to the wood, preferably while hot, several liberal coats being applied each one after the previous coat has soaked into the wood and left a dry surface. Alternatively it may be sprayed, or if possible, the object may be dipped in creosote and allowed to soak.

The best results, however, are to be obtained by impregnation. Several impregnation processes have been proposed but the one of most interest to the small user is the simple and inexpensive open tank method. In this process the post, pile, pole, house stump or other object to be treated is placed in creosote oil and heated for two to four hours or longer at about 200°F. The charge is then allowed to cool, preferably overnight, and removed only when the temperature of the oil has fallen to about 100°F. In some cases the charge may be removed after the preliminary heating and placed without delay in a bath of cold oil. This speeds up the treating process but may not be convenient for the small user.

Another common method of using creosote in the preservation of poles, house stumps, etc. is by bush treatment of the area in the vicinity of the ground line together with "puddling" of creosote into the surface layers of soil surrounding the pole. New poles or stumps and timber already in service may be treated in this way. Prior to back filling, the soil for a depth of 6-8 inches and for 2-3 inches surrounding the pole should be mixed or "puddled" with about half a gallon of creosote and then tamped firmly around the pole. This assures a toxic layer immediately around the "wind and water" line where decay is most likely to occur.

Creosote is also used as a wood preservative in conjunction with the oxy-acetylene charring process. In this case it is sprayed on to the charred layer which becomes saturated and acts as a reservoir of toxic materials. This process is of little interest to the small user however.

In conclusion, it must be stressed that the most satisfactory method of combating decay is by using wherever possible, firstly proper methods of construction and secondly, durable timbers or properly treated material in "danger" areas. For round timbers where a layer of sapwood can be treated the hot and cold bath process is to be recommended. In other cases, several brush coatings together with "puddling" of creosote around the ground line area afford the best protection.

## PLYWOOD DRUMS FOR POWDERS AND LIQUIDS.

Shortages in supplies of tinned steel sheet commonly used for many types of containers, and increased demands for these have resulted in the further usage of plywood drums for the transport and storage of dry powders and other produce. In a recent issue of the "Indian Forester" it is recorded that liquid-tight containers of this type are now being used in India to hold grease, oil and paints.

These containers, made of plywood bent to cylindrical form for sides with solid wood ends, are fitted with iron bands. They have been developed by the Forest Research Institute, Dehra Dun, and have capacities from 1 to 36 lb. of powder and up to 5 gallons of liquid. According to the material they have to contain they are provided with different types of wood or metal stoppers and are treated both inside and outside with various coatings such as cashew shell liquid varnish, prolamin, shellac, etc., to make them leakproof. Attempts are also being made to fabricate kerosene and petrol containers out of plywood, but rendering these completely leak-proof under severe conditions of handling has not been easy. The latter containers would probably have to be fire-proofed.

In Australia also there is increased interest in plywood drums and some patents to cover novel methods of construction have recently been applied for.

One of these, a cylindrical drum in which no nails or screws are used, every joint being glued only, involves the use of plywood sides covered at the longitudinal butt joint by a strip of veneer and is fitted with heavy plywood ends. A circular metal lid is provided in one end, and to prevent pilfering several metal studs are fixed round the lid to enable it to be soldered to the studs.

Another type of cylindrical drum with joints both nailed and glued has been designed for the transport of petrol. The sides are made from two sheets of plywood whilst the bottom is of thick plywood. To prevent leakage it is proposed to seal the drum with a petrol resistant coating.

Plywood containers are characteristically of good appearance when new and that appearance is largely maintained during their service life because the plywood is resilient whereas steel drums are easily dented, and while the latter may remain serviceable they soon become unsightly. A further advantage of plywood drums is their lightness - well-designed drums providing equal serviceability with about half the weight of steel.

Sometimes plywood outer containers are used to enclose fully sealed light steel drums to protect these from excessive denting and puncturing. This results in a saving of steel and provides an attractive container.

The present and potential uses for plywood drums include packaging of various types of dry powders, foodstuffs such as dried fruits, barley, rice, peas, oatmeal and cereal products, and, if fully sealed, for fats, oils and other liquids.

## WHAT TIMBER DO YOU REALLY NEED?

The increase in tempo in Australia's war industries has greatly increased the demand for timber. This demand has to be met in spite of shortages of man power, equipment and transport, and in face of greatly decreased supplies from overseas. On the production side, it can safely be said that a splendid effort has been made, but consumers can help also.

There is still too much insistence on one timber and one timber only for a particular purpose, or for a quality superior to that really needed.

In many such cases in the past, substitutes have had to be used from force of circumstances, and usually it has been found that the substitute was equally effective and, in some cases, superior in behaviour to the timber demanded.

Often special characteristics are essential in timber for some purpose and in these cases it is better to indicate on the drawing or in the specification the characteristics required, rather than to specify a timber with the properties. For example, if cypress pine were specified, it might be for its termite resistance or because of its general physical properties. In the former case, an ironbark would be a substitute, but this would certainly not be satisfactory if the general physical properties of cypress pine were desired.

The following points should be noted when specifying or ordering timber:-

Don't order timber produced in another State, or in a distant part of your State, when a timber available near at hand is suitable.
Don't specify an unnecessarily high grade of timber.
Where possible, specify the characteristics required rather than a particular timber.

---

## DIVISION OF FOREST PRODUCTS STAFF NOTES.

Mr. G. W. Wright, B.E., who joined the staff of the Division of Forest Products in 1936 as a Timber Seasoning Officer, has now been appointed as Officer in Charge of the TimberSeasoning Section. He succeeds Mr. C.S. Elliot, whose time during the past two or three years has been given increasingly to other duties.

Mr. Wright was formerly with the Forests Department of Western Australia, and since joining the staff of the Division, he has had wide contact with members of the timber industry in Victoria and Tasmania. He brings to his new position the appreciation of practical problems with which officers of the Division have always sought to temper their advice to the industry.

Three officers from the Malayan Forest Service are at present working at the Division of Forest Products, C.S.I.R.

Mr. A.V. Thomas was Officer in Charge, Timber Research Laboratory, a branch of the Forest Research Institute, at Sentul, near Kuala Lumpur.
Mr. F.S. Walker, Forest Officer, assisted on various occasions at the Timber Research Laboratory.
Mr. C.F. Symington was Forest Botanist at the Forest Research Institute.

The many friends of Mr. Ian Langlands, Officer in Charge, Timber Mechanics Section, Division of Forest Products, will be pleased to hear that he has recovered from his accident and has resumed duty. Fortunately, the injury has left no after effects, and Mr. Langlands is looking fit and well.

THE PROPERTIES OF AUSTRALIAN TIMBERS.

## WHITE BEECH.

White beech is the standard trade common name for the timber from trees known botanically as Gmelina leichhardtii F.v.M., Gmelina fasciculiflora F.v.M., and Gmelina macrophylla Benth. It is often known in Queensland as grey teak. Although belonging to the same botanical family as the true teak of Burma and India the timbers have little superficial resemblance.

Distribution: Gmelina leichhardtii is found along the coastal lowlands of New South Wales from the Shoalhaven River north into Queensland, through the Blackall Range and the Maleny district to the Eungella Range west of Mackay. This species occurs sparsely as single trees among such brush and jungle mixtures as the Flindersia species, yellow carabeen, brush mahogany, red cedar, etc. and also in mixture with kauri. Gmelina fasciculiflora and Gmelina macrophylla are found in the tropical rain forests north from the Rockingham Bay-Innisfail district, through Cape York to the islands of Torres Strait.

Habit: White beech is a species attaining heights up to 100 or even 120 ft. and often a massive trunk sometimes up to 6 or 7 ft. in diameter breast high, but more commonly 2-4 ft. The base of the trunk is moderately buttressed and the stem often irregular in shape or fluted. The tree has a semi-deciduous habit.

Timber: The timber is very pale brown or grey brown in colour with little distinction between sapwood and truewood. The wood is medium in texture and has a somewhat interlocked grain. The average density of this species at 12% moisture content is 34 lb./cu.ft. with a normal range of 26 to 42 lb./cu.ft. In drying from the green condition to 12% moisture content the shrinkage of this species is small being 3.5% in a tangential direction (back-cut) and 1.5% in a radial direction (quarter-cut). This timber is not prone to warping or other degrade during drying but is one of the slowest drying of timbers and the drying of stock more than one inch in thickness presents considerable difficulty. The truewood is very durable and resistant to termites. It has excellent wood working properties being mild cutting and finishing to a smooth surface, which wears well.

Uses: On account of its easy working, white beech is an excellent timber for templates and pattern making and for turnery and wood carving. It has been used to some extent for churns because it is not prone to shrinkage or swelling under alternate dry and wet conditions. It is this property which led to its use previously for hull planking and floats of seaplanes. White beech is used in ship and boatbuilding for decking, gratings, pulley blocks and many other parts exposed to the weather. Because of its smooth wearing properties and decay resistance, it is often used for external and internal floorings. Other uses for this species include drawer slides in cabinet work, and in joinery and furniture making, and for chives for beer casks.

Availability: White beech is normally available in the eastern Australian States in the form of boards seldom wider than 12 inches and squares up to 4 inch side measurement. The annual cut is probably less than one million super feet of logs and large supplies are not available at any one time.

.....

COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH.

DIVISION OF FOREST PRODUCTS.

MONTHLY NEWS LETTER No. 127.

September-October, 1942.



.....

## WOOD, METAL OR CONCRETE RAILWAY SLEEPERS?

The promulgation of a British Emergency Standard for concrete railway sleepers and the installation of an experimental section of main line indicate a potential challenge to wood as the premier railway sleeper material.

Owing to the increasing necessity for conserving wood and steel in Britain, considerable work has been carried out to determine to what extent concrete railway sleepers can be used to replace the wood or steel sleepers normally used. Experiments on the use of concrete sleepers were carried out as long as twenty-five years ago but with little practical application. Now, with the closing of many sources of supply and to save shipping space, the use of concrete sleepers has become of real importance to British railway companies who previously obtained their timber sleepers from the Baltic and Canada, purchasing over four million annually.

Recently, the British Ministry of War Transport and other Government Departments have been recommending the use of concrete railway sleepers wherever practicable, and British railway companies are supporting this effort. The British Standards Institution was asked to prepare in the series of War Emergency Standards, a British Standard Specification for concrete sleepers, and this is now issued for use.

At first experiments with concrete sleepers were largely confined to sidings, marshalling yards and places where high speeds are not run. However, the London Midland and Scottish Railway has decided to make tests on a heavily used section of main line, and two hundred yards of track have been laid on concrete sleepers conforming to the new standard. Time will provide information on their serviceability.

Whilst in normal times they were scarcely considered practicable for various reasons such as excessive weight and brittleness it seems that concrete sleepers are now entering a wide field of use with little fear of competition in Britain. Undoubtedly improvements will be made and when normal times return wood sleepers may face severe competition especially in places where traffic moves slowly.

Which will be most favored? Will factors such as initial cost, serviceability, and maintenance decide the fate of wood, metal or concrete as a material for railway sleepers in post-war days, or will publicity and advertisement win the day for any one of the three types of sleeper? The value of publicity, which, in many instances, has resulted in the replacement of wood by substitutes which are not always as good as wood, has not been recognized or availed of by timber producers. Australia is an exporter of considerable quantities of wooden sleepers. Will she continue to be such in face of publicity favoring metal or concrete sleepers? Do we know sufficient about the conditions of sleeper usage to obtain the best service from wooden sleepers?

In the published British Standard for concrete railway sleepers some notes on the use of concrete sleepers are provided. Is similar information concerning the use of wooden sleepers available? Are we, in Australia, certain that sleepers cut on the back, as commonly specified, and laid heart face down are more serviceable than sleepers

cut on the quarter or laid sapwood face down? Would pads between the rail and the sleeper increase the life of a wooden sleeper? Is some new preservative or preservative treatment available for preventing decay of wooden sleepers. The answers to these and similar questions together with publicity for wood may decide whether the wooden sleeper remains supreme in railway line construction or is replaced by steel or concrete or other substitutes.

.....

WANTED - A SUBSTITUTE FOR RUBBER FOR MOTOR TYRES.

During the past several months many references have been made to the need for rubber substitutes and particular attention has been paid to tyres for motor vehicles. Apart from reclaimed rubber synthetic rubber and other materials which have many of the properties of natural rubber, and in fact are superior to it for some special purposes, attention has also been directed to the use of substitute materials which actually have little in common with rubber.

Solid wood, laminated wood, plywood and paper have all been proposed and their use has been recorded on a number of occasions.

The following summarized extracts from overseas periodicals indicate the lines along which substitutes are being developed.

"The Timberman", May, 1942. "More Wooden Tires"

Four section wooden tires, faced with brake lining to form the wearing surface are reported to be giving good service on the delivery trucks of a New Jersey concern. Speeds up to 30 miles an hour are possible with this equipment, according to the users, although the jolting is very noticeable on cobblestone pavements.

Experience with wooden tires in other sections of the country has been partially successful, although few experimenters have found them practical for the rear wheels. One user reports a terrific toll on bearings in experimental operation with wooden tires.

Laminated wooden tires, built of plywood in a single, integral piece, requiring no bolts or fastenings, have also been tried. This construction offers some possibility, although in their present development such tires are hard on bearings and transmissions. It has been suggested that two concentric sections of plywood construction, joined together with a series of counter-sunk peripheral springs, might be tried.

"Wood Products" April, 1942. "Wood Tires Good For 15-20 Thousand Miles Put in Use"

A new type wooden tire using 40 wooden blocks bolted to the wheel rim went into service to solve the tire problem of a milk delivery company.

The tires will become standard equipment of the company when delivery equipment is changed over from motor trucks to horse drawn wagons.

The blocks, V-shaped to fit the wheel rims, are soaked in hot linseed oil and paraffin at 140 degrees for 16 hours. Officials estimated the life of the wooden tires at 15,000 to 20,000 miles- good enough to last the vehicle for two years' normal delivery use.

"Timber Trades Journal" 4th July, 1942. "Plywood Tires"

An article in this journal says:-

"Plywood tyres, it is stated, have already proved their worth.

An official of an American Pacific Coast lumber concern announces that when it was impossible to replace a solid rubber tyre for one of the company's lumber vehicles three months ago, three rings of 1¾" plywood were fastened together and put on a rear wheel. The wear has been slight and even, and traction on wet boards, it is claimed, is better than with rubber tyres and on dry boards about equal with the rubber variety. He said that drivers cannot tell the difference in driving the vehicle with the odd tyre on one wheel.

This achievement once again shows that there appears to be no limit on the versatility of plywood. Possibly, however, one would need a good deal of faith to ride a motor-cycle with wooden tyres over a wood block road in wet weather, remembering how even rubber tyres fail to grip a wood surface on a rainy day! Still one never knows.

"The Timberman", April, 1942. "Plywood Tyres"

The manufacture of plywood automobile tyres is reported. A complete set seven inches thick, made from 56 plies has been made and is guaranteed not to fall to pieces. The report states they are believed to be good for 15,000 miles.

"Paper Trades Journal" June 25th, 1942. "Paper Tyres"

Paper tyres to alleviate the rubber shortage in this country may ease the problem of rationing if the war continues and the scarcity of the raw material becomes more acute. It should be stressed, however, that at the present time, such tyres are purely experimental.

They have proved fairly successful in driving tests and are undergoing further testing and experimentation at the present time. The tyres which were designed are manufactured from paper which is made from old khaki uniforms and compressed under hydraulic pressure.

The Company concerned has designed and experimented with these paper tyres and is continuing with its development. The tyres resemble rubber in appearance but present a flat surface to the pavement like a wagon wheel, instead of the full rounded surface of a pneumatic tyre.

Naturally they are not as flexible and do not give the cushioning of a rubber tyre, but in an emergency such as this, they could be used for short trips and in all probability, will prove practical for ordinary, everyday use of an auto.

The tyres are made from circles of paper, the inside diameter of which is 18" and the outside diameter 28". They are now 5 inches thick but it is hoped to get them down to 2½" later. A rubber center would increase the cushioning effect somewhat, but an attempt will be made to perfect them without using any rubber at all. About ¾" of the paper protrudes over the steel rim and holds it together and as this is worn down, the steel rim is cut away to permit further wear; the tyres have about the same traction as a rubber tyre but are noisier.

.....

## SUBSTITUTE FOR CARNAUBA WAX IN CARBON PAPER

The Forest Research Institute, Dehra Dun, India recently reported a method of preparing a substitute for carnauba wax in the manufacture of carbon paper.

Carnauba wax, is obtained from the leaves of "wax palm" Copernicia cerifera Mart., a palm indigenous to tropical South America. As marketed it is in lumps of irregular size, and is hard and brittle. Its important properties are its hardness, capacity for high gloss and polish and its relatively high melting point. Among the chief uses of carnauba wax are the manufacture of polishing waxes for wood, leather, linoleum etc., the preparation of boot polish, varnishes, gramophone records, cable coverings, tailors' chalk, and carbon paper. It is also used for hardening softer waxes.

The substitute wax made from shellac, beeswax and sal dammar is prepared as follows:-

1. Melt together 85 parts of shellac and 10 of beeswax.
2. Heat to 210-230° C. then add slowly 5 parts of finely ground sal dammar.
3. Continue stirring until complete mixing is effected.
4. When the bubbles from the hot mixture have disappeared strain the melt through muslin into tin frames and allow to cool.

This material colored by certain oil soluble aniline dyes gives a uniform hard shining coating when spread on paper and has met with the approval of the carbon paper maker.

.....

## VICTORY V-BELT DRIVE SHEAVES FROM WOOD.

An article in "Textile World" notes the use of wood sheaves as alternatives to metal V-belt drive sheaves. It states that the efficiency of these wooden sheaves is equal to that of metal sheaves except where fly-wheel effect is essential. A laminated construction is used, the timber chosen in U.S.A. being selected kiln-dried maple (Acer sp.) The note adds that wood bushings and an arrangement for firmly fixing the pulley to the shaft are provided.

The use of wood instead of metal for V-belt drives makes possible the release for vital war purposes, not only of the metal but also the metal working equipment formerly used for manufacture of metal sheaves.

Several Australian woods should provide satisfactory wooden V-belt drive sheaves. Fine grained even textured timbers such as coachwood, myrtle beech and leatherwood which have properties somewhat similar to the maple used in U.S.A. are suggested for use in initial manufacture. Other woods are also worthy of trial.

Officers of the Division of Forest Products, C.S.I.R., 69-77 Yarra Bank Road, South Melbourne, would be glad to discuss with prospective manufacturers the use of available timbers and methods of construction proposed for the manufacture of wood V-belt drive sheaves.

.....

## BREVITIES.

The many friends of Mr. I. H. Boas, Chief of Division of Forest Products, will be interested to hear that his son Lieutenant H.J. Boas returned this month from the Middle East. Lieutenant Boas suffered a severe arm wound during the battle for Egypt.

.....

The timber industry of Australia and that of New South Wales in particular has suffered a severe loss in the tragic death on 29th Sept. of Mr. M. B. Welch, Senior Research Officer of the Wood Technology Division of the N.S.W. Forestry Commission.

During the last war Mr. Welch, who was a graduate in science, served in England as a chemist at an explosives factory. He was for many years attached to the Sydney Technological Museum, and here, carried out valuable research on the physical and mechanical properties of New South Wales timbers. He read many papers on original work to the Royal Society of N.S.W. of which he was an active member.

Upon the formation of the Wood Technology Division of the N.S.W. Forestry Commission, Mr. Welch became Officer in Charge, and in a comparatively short time built up an active and efficient organisation. His energy and enthusiasm have contributed much to the advancement of standardisation of timber specifications, and he was a keen member of the Standards Association committees dealing with these matters.

Mr. Welch was always ready with help and advice to all those engaged in any way with timber, and his death will be felt severely by a wide range of the community.

.....

THE PROPERTIES OF AUSTRALIAN TIMBERS.

## YELLOW WALNUT.

Yellow walnut is the standard trade common name for the timber known botanically as Beilschmiedia bancroftii, C.T. White. This timber is also known as canary ash in Queensland; the adjective in both cases referring to the colour of the wide sapwood.

Distribution: Yellow walnut is found only in North Queensland, the distribution being confined to the Atherton-Evelyn tableland. It is found as a co-dominant member of the tropical jungle type in association with such species as Queensland walnut, North Queensland kauri, silky oak and Queensland maple. It prefers a deep rich loamy soil.

Habit: Yellow walnut is a medium to large sized tree growing to 90-100 ft. or even taller, with breast high diameters up to 5 ft. These trees generally have heavy crowns. The trunk is slightly buttressed for 6 to 12 feet from the ground with a merchantable bole of 30-40 ft. The bark is thick and nodular and grey in colour.

Timber: This species has a wide sapwood with a distinctive bright yellow colour; the truewood is a light-brown to brown with greenish streaks, and is generally confined to a small core even in large trees. The texture of the timber is moderately uniform and coarse with the grain frequently interlocked. The average density of the timber at 12% moisture content is 37 lb./cu.ft. with a normal range of 32 to 42 lb./cu.ft. Yellow walnut can be air-dried or kiln-dried with relatively little difficulty although timber of this species appears to have a tendency to warp during seasoning. Yellow walnut is not a durable timber and the wide sapwood is susceptible to Lyctus borer attack. In veneer form it is readily treated with boric acid which renders it immune to these borers. It dresses to a smooth finish but has an abrasive effect on all cutting tools. It is non-fissile and holds nails well.

Uses: Yellow walnut is mainly a veneer and plywood timber, its use for other purposes being limited by the blunting effect it has on saws, planer knives and other cutting tools, and the possibility of attack by Lyctus borers. However, it is used to some extent for internal lining and flooring where durability is not essential. In North Queensland yellow walnut veneer is extensively used for wire bound butter boxes.

Availability: Yellow walnut is available chiefly as plywood. Veneers of this species are commonly treated with boric acid to protect it against Lyctus attack. Plywood is available in standard size sheets. Sawn and dressed timber is seldom available except upon special order.

.....

COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH.

DIVISION OF FOREST PRODUCTS.

MONTHLY NEWS LETTER No. 128.





November-December, 1942.

.....

# SUBSTITUTES FOR IMPORTED CANES.

## AUSTRALIAN GROWN MATERIALS WORTHY OF TRIAL.

In normal times large quantities of cane are used in Australia for cane furniture, perambulators, panniers, shipping baskets and many other purposes where lightness combined with strength and resiliency are desirable.

Before the Japanese attacked Malaya, supplies of cane were imported at reasonable prices from Asia and the East Indies and little thought was given to locally produced materials which might be used for the same purposes. With the main supplies cut off, control was instituted in May 1942 to ensure that canes and rattans were used here only for service equipment and essential purposes.

Although substitute materials have been sought, little real attention has been given to two sources of supply - native Australian cane and willow osiers - which might be of considerable assistance if properly organised. To draw attention to these Australian grown materials the following notes on imported cane, lawyer cane and willow osiers have been prepared.

The imported canes were obtained chiefly from climbing palms of the genus Calamus, a range of diameters being obtained according to the species and the position in the stem. For sewer rods, handles for sweeps' brooms and other purposes requiring stiffish flexibility, large diameter canes were used, and cane furniture - apart from the framework commonly composed of stiff cane or even wood - is made from smaller and more flexible species. Considerable quantities of cane about ½ in. diameter split in halves are used for basket ware. If canes are to be split by machinery and the smooth outside is not particularly valued, thick canes are preferred.

Australian canes, derived from plants known as lawyer canes or vines or "wait-a-while" are fairly prolific in certain tropical rain-forest areas in Queensland. They belong to the same genus Calamus as that from which most imported canes were derived. They are obtainable in diameters ranging from ¼" - 1" diameter, but the size most prolific is about ⅜" thick.

Enquiries made early this year in North Queensland revealed that a cane chair manufacturer in Cairns has used during the past several years a considerable percentage of lawyer cane along with imported cane and is quite satisfied with the material he selected himself, after obtaining it from the jungle nearby. He stated the cost to be about equal to that of imported cane. In the light of this information, it seems that adverse opinions of the quality of Queensland cane have probably been based on the examination of a low grade cane.

Selection of course, is necessary to obtain satisfactory material from any plant product. Many people are apt to overlook the fact that most imported plant products, especially those partly manufactured as was much of the cane, are generally known only in the better qualities as selection has already taken place in harvesting and marketing and preliminary manufacture overseas, the low grade material being rejected or used locally for relatively unimportant purposes. Cane imported from overseas was usually well graded before export.

After harvesting, canes are said to be treated before drying. Little definite information on treatment is available but it seems that they are usually soaked in water for several days, pulled through sand to remove prickles, and then stretched around trees or posts to dry in the sun.

Manpower, and, to a lesser degree, transport difficulties are the real problems preventing the exploitation of Queensland lawyer cane for essential purposes.

Osiers, straight flexible branchlets from certain species of willow (Salix) have been used from time immemorial in wickerware. These willows which are native to the Northern Hemisphere are now growing well in certain localities in southern Australia and New Zealand. One year old osiers called rods are generally used but two year old stock is employed for stickwork where heavier rods are required.

During the Great War 1914-18 supplies of medical and surgical panniers were made in Australia chiefly from willow grown in Tasmania.

The osiers are cut from the trees in winter, are stored in water until they are just beginning to sprout when the bark loosens and is easily stripped off. They are subsequently dried and just prior to use are again soaked to make them more pliable and plastic before weaving.

Some trouble may be experienced with borer attack in both canes and willows but this can be prevented by a relatively simple and cheap treatment, particulars of which may be obtained from the Division of Forest Products, Council for Scientific and Industrial Research, 69 Yarra Bank Road, South Melbourne.

.....

## PREVENTION OF LYCTUS ATTACK IN SAPWOOD OF SPOTTED GUM.

An interesting experiment which has been carried out by the New South Wales Forestry Commission has shown that it is possible to produce spotted gum (Eucalyptus maculata) mill logs in which the sapwood is immune to Lyctus borer attack. In trees of this fine timber, the sapwood, which is often rather wide compared with most other eucalypts, generally carries a large amount of starch. The presence of this starch renders the wood liable to attack by Lyctus, the powder post borer.

Observing the satisfactory results of some experiments carried out in France several years ago the Forestry Commission of New South Wales selected a number of trees representing five species known to be severely attacked by Lyctus, and ringbarked them at the top of the bole, just below the head. This operation was designed to prevent the carbohydrates manufactured in the leaves from being transported down to the trunk, so that the living tissue in the trunk would be forced to consume the reserves of starch in the sapwood before the tree died. In four of the species under test the results have not been entirely satisfactory but in the spotted gum trees selected for the experimental work the operation was a complete success.

Although ringbarking at the top of the bole of a tree presents difficulties these results are very encouraging. The possibility of the commercial applications of the method deserves very careful consideration for the prevention of Lyctus attack in spotted gum and would remove what is at present an irritating handicap to its complete commercial utilisation.

## KILN SEASONING OF CASE STOCK.

Largely because of Army needs, the demand for seasoned case material in Australia to-day is very considerable - the most recent estimate obtained put the annual Australian requirements at some 190,000,000 super feet of timber. Reduction of imports of coniferous softwoods from overseas has resulted in Australian manufacturers having to use increasingly large quantities of indigenous hardwoods which generally have much greater water contents when felled and will not air dry as rapidly as softwoods. Consequently increasing use has been made of kilns for drying case timber in Australia. For the purpose of removing any misconceptions, concerning drying times in kilns or the cost of kiln drying, the following notes were prepared.

In a modern internal fan forced circulation kiln, the usual time required to dry hardwood case stock, of the nature of mountain ash, from the green condition to a moisture content of about 15%, averages about 24 hours for ¼-inch material, about 36 hours for ⅜-inch stock and about 3 days (24 hours per day) for ⅝-inch stock. Jarrah case stock would probably take about 40% longer than the times indicated above. The kiln drying time for softwood case stock, of the nature of plantation grown Pinus radiata, from the green condition to a moisture content of about 15% usually averages about 15 hours for ¼-inch stock, and about 24 hours for ⅜-inch stock. Neither the hardwood nor the softwood case material requires much attention during drying as fairly severe conditions may be used from the outset of drying. For example, an initial temperature of 180°F. with a wet bulb depression of 30°F. may be used for either hardwood or softwood in the thicknesses referred to previously. It should be pointed out that, where hardwood which collapses during drying is kiln dried, a reconditioning treatment of from 2 to 4 hours is advisable at the conclusion of kiln drying.

Kilns may be constructed in timber, brick or reinforced concrete, and all are satisfactory materials, although the brick and concrete have somewhat longer lives. The cost of constructing in reinforced concrete a modern kiln capable of holding about 5,000 super feet in 1-inch, or about 4,200 super feet in ⅝-inch stock, (assuming ½-inch stacking strips) is approximately £600 per kiln. A reconditioning chamber of similar capacity would cost about £180. These costs do not, of course, include the cost of items such as trucks for handling, a moisture meter for moisture content determination, any constructional work required in laying out a stacking or handling yard, nor, where it is intended to use steam for heating, the initial cost of a boiler.

The heating medium used for kiln drying may be steam, town gas, electricity or flue gases from a sawdust or waste wood incinerator. Where steam is available from an existing boiler, or where it is intended to operate several kilns, which would warrant the installation of a steam raising boiler, steam is undoubtedly the most economical method of heating a kiln. Where steam is not available and it is intended to operate only one kiln, town gas is the most economical method of heating and the initial outlay is not so great as where a boiler has to be purchased. For a small unit of this nature drying hardwood case stock, the steam for reconditioning purposes can be supplied at atmospheric pressure from a small gas heated boiler. Usually electric current is not available for the full 24 hours of each day at a rate which would permit this type of heating to compete with steam or gas heating. It has been estimated that to meet the latter case electric current would have to be supplied at about 0.45d. per unit.

The cost of kiln drying hardwood case stock is not excessive. On the basis of kiln drying ⅜-inch hardwood, of the mountain ash type, from the green condition to a moisture content of about 15%, the total drying cost (including the cost of handling, power for fans, the cost of the heating medium and any overhead)

should not exceed about 3/3d. per 100 super feet where steam is used for heating; nor 4/- per 100 super feet where gas is used. Assuming that the average sized wooden case uses about 5 super feet of timber the cost of kiln drying thus ranges from about 2d. per case to about 2½d per case. Further information on the kiln drying of case stock and plans covering the construction of kilns of suitable type may be obtained on application to the Chief, Division of Forest Products, C.S.I.R., 69-77 Yarra Bank Road, South Melbourne, S.C.4.

.....

AUSTRALIAN IRONBARK MAKES HISTORY ON NORTH WEST PASSAGE.

Australians will be interested and delighted to learn of the praise given to ironbark timber from which the outer protecting sheath, on the hull of the 80-ton auxiliary schooner 'St. Roch' was made. This little ship has made history by completing for the first time in the reverse, or west to east, direction the fabled "North West Passage" around the north of Canada from the Atlantic to the Pacific Ocean.

This voyage was reported in the "Canadian Newsletter" just received. Extracts from the article are reproduced below:

"Sydney: Nova Scotia: Completing history's first west-to-east water voyage across the top of America, eight men arrived here recently in a little Royal Canadian Mounted Police ship, 2¼ years after the vessel had set sail from Vancouver.

"The rediscoverers of the fabled Northwest Passage sailed quietly into this harbour aboard the 80-ton auxiliary schooner 'St. Roch' whose white painted hull had bucked floes for most of the 28 months they spent thrusting their way through the ice-choked waters atop the continent.

"Theirs was the second traversing of the Northwest Passage. Their only predecessors were the six men under Roald Amundsen, the Norwegian explorer, who first negotiated the twisting passage early this century, from east to west. In the small Norwegian sealing sloop "Gjoa", Amundsen and his men set out in 1903 and emerged into the Pacific Ocean more than three years later.

"The 'St. Roch' itself, considering the battering it had undergone in the long months in the Arctic, was in remarkably good shape. Her solid, round hull bore few bruises. The 'St. Roch' had been built specifically to ride over the floes that close in on ships in the North. As she negotiated the tortuous, dangerous passage where no eastbound vessel had pioneered, she was lifted bodily out of the water more than once. The vessel, which was built in North Vancouver, was put together with an eye to meeting the conditions of the North. Her timbers are two-thirds heavier than those normally to be found in a ship of her construction. Her outside hull construction is unique. She is sheathed in copper, and over that layer is another sheath of Australian iron-bark--the only wood known to resist the grinding effects of ice.

"The vessel is equipped with two-way radio and apparently was in touch with doings in the outside world on the long trip.

"When she sailed, the 'St. Roch' carried a goodly load of provisions that were replenished from time to time as she touched at R.C.M.P. posts in the northlands. Her crew foraged too, and seals and walrus were shot and fish taken aboard for food. On the trip the crew sighted the wreck of the 'Victory', abandoned by Sir John Ross in Boothia Gulf 1832.

"Larsen then went on to say that he and his crew of seven had been "lucky", that's all". Luckiest experience he said was when the schooner became locked firm in the ice at Paisley Bay, not far from the magnetic North Pole. "We couldn't move an inch" he said "and we stayed right there for eleven months and one day. But the ship held up under the strain and if that isn't luck, I don't know what is."

Ironbark is obtained from several species of Eucalyptus which grow in the eastern states of the Australian mainland. The chief of these are grey ironbark (Eucalyptus paniculata), narrow leaved red ironbark (E. crebra), broad-leaved red ironbark (E. siderophloia) and red ironbark (E. sideroxylon). There is little to choose between all these species in strength and durability but, as they are commonly available in larger sizes and of somewhat better form and quality, the first three are generally regarded as superior to the last. Although it is not specifically stated it is probable that the Australian ironbark referred to in the article is grey ironbark.

.....

No. 128.

# THE PROPERTIES OF AUSTRALIAN TIMBERS.

## BOLLY SILKWOOD.

Bolly silkwood is the standard trade common name allotted to the timber from trees known botanically as Cryptocarya oblata F.M. Bail. It is commonly known as Tarzali or Tarzali silkwood in Queensland, and veneers are sometimes sold in southern Australian markets as "mahogany".

Distribution: Bolly silkwood is a moisture and shelter loving tree growing in North Queensland in the coastal jungles between Cardwell and Cooktown and on the Atherton Tableland where the rainfall is seldom less than 50 inches per annum. It occurs as occasional trees in mixture with such species as Queensland maple, silver quandong, yellow walnut, Queensland walnut, sassafras etc.

Habit: Bolly silkwood is a medium to large sized tree attaining a height of 100 ft. and a breast high diameter of 3-4 ft.; the merchantable bole is usually 30-40 ft. in length. The crown is generally compact and heavy, the bole cylindrical and without prominent buttresses.

Timber: The truewood of this species varies from brownish to quite a pink colour; the sapwood, commonly 2 inches wide but sometimes as wide as 4 inches, is paler often weathering to a greyish colour if logs are not converted immediately after felling. This timber is straight grained and fissile, fairly coarse and uniform in texture with a bright silky lustre and frequently a slightly greasy feel. The average density at 12% moisture content is 34 lbs. per cu. ft. with a normal range of 31 to 38 lbs. per cu. ft. In drying from the green condition to 12% moisture content, the timber may be expected to shrink on the average 7% in a tangential direction (backcut) and 3% in the radial (quartercut) direction. No trouble is experienced in air drying boards if correct stacking principles are observed. It is not a durable timber and should not be used in exposed conditions where subject to decay hazards or termites. It is easy to work with hand or machine tools and dresses to a smooth surface.

Bolly silkwood is somewhat similar to Queensland maple in appearance, though it is not so susceptible to ribbon grain and consequently seems softer and is more easily worked.

Uses: Bolly silkwood finds its main use as solid timber in linings, doors, panelling, furniture and cabinet work, partition and roof framing and to a small extent for interior flooring.

Owing to its ease of working and clean smooth finish it is used for brush stocks, turnery and electric light switch blocks. Bolly silkwood has been successfully peeled and is used for the manufacture of plywood bonded with casein and film type synthetic resin adhesives.

Availability: Only limited quantities of logs are available for conversion to sawn timber or veneers. Sawn timber is not available to any extent outside North Queensland.

.....