NEWSLETTER

Forest Products

1935##036

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EXPERIMENTAL WORK ON THE TIMBER FROM YOUNG EUCALYPTS

Reference has previously been made to the investigations by the Division of Forest Products into the physical and mechanical properties of young mountain ash. Some time back, logs from a number of representative trees 15, 20 and 25 years old were supplied to the Division by the Victorian Forests Commission. Mechanical tests on this material are proceeding quickly and sufficient evidence is available to indicate that the timber from these young trees is likely to prove a very valuable product. Contrary to common belief the seasoning of the material investigated did not present serious difficulties and although collapse was quite common and in cases severe, it was readily removed by a reconditioning treatment.

An attractive feature was the excellent way in which the material behaved during manufacture, and the pleasing appearance of the planed surface.

It is of interest to note that in these various experiments the sapwood was left on during conversion and included with the truewood in the various tests. This was done because it was found that the sapwood of these particular logs did not contain starch and, hence, according to the latest work, is immune from the attack of the powder post borers. Naturally, if sapwood can be used without danger of borer infestation, there is a considerable increase in the recovery of sawn timber from the log. This question of the occurrence of starch in the sapwood of young mountain ash is the subject of a special co-operative investigation between the Division of Forest Products and the Victorian Forests Commission.

In the conversion of the logs of young mountain ash one rather disturbing feature was the amount of gum veins and gum pockets. There are likely to be an important economic factor in utilisation and are also the subject of a special investigation.

As soon as the present tests are completed, the results will be published, and it is probable that large scale seasoning and utilisation experiments will then be undertaken.

The investigation of the physical and mechanical properties of young eucalypts is of interest to all the other States as well as to Victoria, since in the various States there are forests of young eucalypts in which thinning is desirable.

PERMANENT LABORATORIES FOR THE DIVISION OF FOREST PRODUCTS

The Division of Forest Products of the Council for Scientific and Industrial Research was formed six years ago. The small initial staff was housed at the head office of the Council in Albert Street, East Melbourne, pending the erection of suitable offices and laboratories. Unfortunately, just when plans for building and equipment had been prepared, the depression intervened and all capital expenditure by Government Departments ceased.

During the past five years, therefore, the steadily growing Division of Forest Products has been forced to find laboratory and office accommodation in the stables, coachhouses and lofts at the rear of the Council's Head

Office. With a rapidly expanding field of work, and increases in staff to cope with it, these quarters have proved sadly inadequate, and from time-to-time it has been necessary to build temporary sheds to accommodate equipment, etc. The officers of the Division have been severely handicapped in working under such conditions and the progress of the Division has been hindered. It is very welcome news, therefore, that the Federal Ministry has decided to provide $25,000 for the erection of permanent laboratories for the Division of Forest Products and that negotiations for an excellent, centrally situated position near Melbourne are nearing completion.

The work of the Division is favourably known throughout the continent and the resultant demands for information and for more experimental work have been responsible for the steady increase in the staff. The change from the existing cramped and inadequate quarters to properly laid out and equipped laboratories must act as a spur to the enthusiasm of these investigators.

ZINC CHLORIDE AS A WOOD PRESERVATIVE

Zinc chloride is ackowledged as the standard water soluble wood preservative for general purposes. Being so soluble in water, it is, however, readily leached from the treated wood when used under conditions where water comes in contact with the treated timber. It is of interest to note, therefore, in a recent number of the Industrial and Engineering Chemistry, News Edition, that recent research work in America has developed a mixed salt consisting largely of zinc chloride. This mixed salt is stated to have all the desirable properties of zinc chloride and, at the same time, to be much more permanent in the wood. The development of such material is of great interest to Australia, as much could be done with a good cheap preservative, e.g. the treatment of farming timbers, such as posts, rails, etc., and the treatment of stumps, etc. in the building of wooden houses. Further information on this material has been requested and will be carefully investigated as soon as available.

POLE PRESERVATION TESTS

During December, the experimental pole test site at Belgrave, Victoria, was inspected. In this experiment the efficacy of numerous treatments for the increase in the life of telephone and electric transmission poles is under investigation. Most of the poles have now been installed for two years, and it was considered desirable to retreat those that had been originally brush treated. Several of the poles brush treated originally with crude oil and arsenic and puddled with the same mixture during installation, were found to contain a considerable amount of decay. All untreated controls were badly affected by decay, but the reminder treated by various processes were found to be free from decay.

CREOSOTED TIMBER USED IN REBUILDING PIER

Approximately 800,000 board feet of creosoted timber was required in the substructure of the recently rebuilt pier of the Cunard Steamship Company in New York Harbour.

Early in May this year the superstructure of the old pier was destroyed by fire. In the rebuilding, the pile foundation of the original pier were utilised in founding the new structure. Of the 2,500 piles supporting the original structure, about 800 required replacement. These were replaced by new southern yellow pine piles, varying in length from 75-84 feet. All the piles were untreated, but creosoted timber was specified for all the sub-structure work above cut-off elevations, and included all the timber for the column footing caps, grillage planking, transverse caps, posts, fish plates, double row stringers, caps, chocks, diagonal bracing, vertical backing pieces, side wall and lower side fillers.

It will be of interest to know that preliminary investigations on the effect of creosoting in preventing the attack of marine borers are in progress in Australia. Piles of several species have been treated by the Division of Forest Products and installed by the Queensland Forest Service in their marine testing stations in the Brisbane River and in Moreton Bay.

EMPIRE FORESTRY CONFERENCE

At the third British Empire Forestry Conference held in Australia and New Zealand during 1928, it was decided to hold the fourth conference in South Africa in 1933. Owing to the Depression, however, it was decided to postpone the conference, and it will now be held in October, 1935.

The coming meeting will be of considerable interest to Australia for, in addition to the usual forestry programme, special consideration is to be given to forest products matters. Extensive research work in forest products is being carried out in England, Canada, India, South Africa, New Zealand and Australia, and the co-ordination of the work of the laboratories will result in prevention of overlapping and the more effective development of this important sphere of investigation.

Mr I.H. Boas, Chief, Division of Forest Products, will represent the Commonwealth of Australia as far as forest products matters are concerned. While abroad, Mr Boas will also visit USA, Canada and Europe, and in addition to investigating the latest developments, will establish and renew contact with forest products investigators in other countries.

BREVITIES

The Senior Wood Anatomist of the Division of Forest Products, Mr H.E. Dadswell, M.Sc., has been granted seven months special leave of absence during 1935. It is expected that he will sail from Melbourne on 30th March, and will visit laboratories dealing with the investigation of timber and timber products in the United States, Canada and England. While abroad, Mr Dadswell will attend the meetings of the International Association of Wood Anatomists in Amsterdam, Holland. These meetings form part of the International Botanical Congress held in the first week of September, 1935.

The International Association of Wood Anatomists, although of recent origin, has been very successful in bringing together the various research workers throughout the world, interested in the fields of wood structure and wood anatomy. As a first step in the right direction, they have developed a glossary of some 150 terms, which from now on, will serve as standards for all workers in this field. Several Committees of the Association are at present working on the standardisation of methods for recording the measurements of the various cell structures, and on the standardisation of methods used in the determination of specific gravity and density of wood.

CSIRO
AUSTRALIA

1935##037

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NAMES OF TIMBER TREES.

Great confusion marks every aspect of the naming of the timber trees of commerce and the position has been receiving the attention of the various interested bodies for some time past. This confusion is very pronounced in Australia, especially among the various timber trees of the genus Eucalyptus, and it is of great importance both to the forester 'nd to the timber man that such confusion be eliminated as far as possible.

The problem has three different aspects, namely:-

(i) Botanists are continually studying the botanical characteristics of the trees of any one species or of the species of any one genus, and as a result of their examinations, often propose the division of a well-known species into a number of species on the basis of morphological differences. A well known example of this is the case of Eucalyptus globulus (blue gum in Victoria and Tasmania). It was originally considered that this species occurred both in Tasmania and on the mainland in Victoria and the highlands of south-eastern New South Wales. Now, however, the mainland variety is considered as a separate species under the name Eucalyptus bicostata.

(ii) From time to time, the study of ancient manuscripts reveals that well known species of timber trees were studied and named earlier than published records indicate, Hence, under the International Botanical Rules the published name is wrong because it lacks priority. That is to say, the first recorded specific name must stand and the well known name which has been in existence for a long period of time is displaced.

The International Botanical. Congress has for some time past recognised the disadvantage of changing well known generic names and has adopted a list of generic names which are officially recognised by all botanists. There is, however, at the present time, no such rule for specific names which are subject to the rule of priority. A curious position thus arises and this is best illustrated by an example. The well known bloodwood of New South Wales and Queensland - Eucalyptus corymbosa - was first described and named as Metrosideros gummifera. A few years later it was again described and placed in the genus Eucalytus with the specific name of corymbosa. Now, however, the discovery of the earlier description with the specific name gummifera forces botanists to call this species Eucalyptus gumrrnifera. In this way, there are changes in botanical names which are very well known both to the foresters and the timber trade with resulting confusion. This.is especially unfortunate since the timber industry, dissatisfied with the plethora of common or vernacular names, has been using botanical names more. and more. If the above example were the only one, it would not matter, but we find there are numerous other examples and the following well known names have been altered as indicated below:-

E. rostrata (red gum) to E. camaldullensis.
E. eugenioides (white stringybark to E. scabra.
E. crebra (narrow leaved ironbark) to E. ra cemosa.
E. tereticornis (forest red gum) to E. umbellata.
E. acmenioides (white mahogany) to E. triantha.
Syncarpia laurifolia (turpentine) to Syncarpia procera.

(iii.) The third confusion is in the use of one common or vernacular name for several different species or, on the other hand, the use of several entirely different common names for the same species. An example of the former is the case of blue gum, which is the common name for E. leucoxylon in South Australia, E. globulus in Tasmanian E. saligna in New South Wales and E. tereticornis in Queensland. On the other hand, E. regnans is mountain ash in Victoria and swamp gum in Tasmania.

All these conflicting questions badly need straightening out.

The matter of common names is perhaps the simplest to tackle and the Standards Association of Australia has a committee which is attempting to prepare a list of standard names of well known trees. It is hoped that by the exercise of the spirit of compromise a final list will be adopted and slowly brought into use.

The matter of botanical nomenclature is more difficult. The Australian National Research Council has had a Committee on Botanical Nomenclature at work for two years, and some progress towards a solution has been made. It is proposed to appoint a special committee of the Australian National Research Council which will review all proposals to split existing species of commercial timber trees, and which will investigate the available evidence when changes in nomenclature are proposed. There are many difficulties in doing this, but it is not impossible of attainment, and if the Committee is supported and if it consists of the right men, a great deal of good can be accomplished.

Finally, it is proposed to ask the International Botanical Congress to conserve specific names which have been in use for a period of years and so prevent the irritating changes mentioned.

One can imagine how difficult it is to get all these things done, but at least the problem is clearly recognised, and is being seriously discussed. Thus, one may hope for a solution in the not too distant future.

THE BRITISH EM IRE FORESTRY CONFERENCE.

The programme of the Fourth Empire Forestry Conference is now to hand, and contains the following items relating to forest products:-

Timber Utilisation*

(a) Consumption, Supply and Marketing: World, Empire and South Africa.
(b) Forest Products Research: Methods and Objectives, Collaboration between Laboratories, Standardisation of Terms, Grading Rules.
(c) Standard Collection and Trade Names of Empire Timbers.
(d) Utilisation of small timber (thinnings, etc.).

It will be seen that the Empire's foresters realise the importance of the study of problems connected with the utilisation of timber, and are prepared to make their consideration a major part of the programme. This is a very hopeful sign. Hitherto the problems of sylviculture have been so pressing that very little time indeed has been spared for utilisation; but a recognition of the fact that the latter is really the ultimate end of the former is now well established and hence the very promising development in the Conference programme. It is hoped that much good will result from the exchange of views from workers in various parts of the Empire.

THE DIMENSIONS OF HARDWOOD TMBERS IN TIMBER DESIGN.

During the last few days of January, a very important conference was held in Sydney, at which Messrs. Clarke and Langlands of the Division of Forest Products were present to discuss with representatives of different sections of the timber industry and of Government timber using departments the question of the sizes of hardwood to be used in timber design.

Hitherto, it has been the common practice of engineers and architects to use hardwoods in much the same dimensions as softwoods. This practice arose in the past from lack of knowledge of the strength properties of our local hardwoods, but slowly this gap in our knowledge is being filled, There is still a great deal to be done, but at last enough has been accomplished to specify considerable reductions in sizes in some common dimensions. This should lead to a substantial reduction in the cost of buildings. It is time the great relative strength of our timbers was more fully recognised by designers, and it is hoped that the Conference referred to will lead to results of considerable value in establishing safe first approximations to minimum dimensions in Australian hardwoods.

KILN DESIGN.

The modern cross flow internal fan kiln is a very efficient type which is giving satisfaction wherever it is used. However, it is not wise to regard it as the last possible word in kiln design.

Some time ago, a very important member of the timber trade in Australia, who had been flirting with the idea of installing kilns for some years, but had never finalised his plans, was asked why he hesitated so long. His reply was that he was not satisfied that present designs of kilns would remain unaltered. He was assured that they very definitely would be altered if the officers of the Division of Forest Products could find any way of effectively and advantageously doing so. On asking him if he waited to buy a motor car until the last word had been said on car design, he agreed that, so long as present designs were good, there is no need to wait for perfection.

Work on kiln design is proceeding in the Division of Forest Products and a special kiln has been built to study various features experimentally with the hope of effecting improvements by establishing sound principles of design instead of the present methods of trial and error. It is felt that the present type of kiln is very good and is not likely to be seriously modified in principle, but that does not prevent the patient search for small improvements to make them still better.

It is hoped that there are not many timber people waiting for the kiln millenium and that their desires for the perfect will not deter them from installing the best at present available,

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BREVITIES

Sir David Rivett.

In the recent list of honours, appears the name of Sir David Rivett, Chief Executive Officer of the Council for Scientific and Industrial Research, on whom the signal honour of K.C.M.G, has been conferred by His Majesty the King. The Division of Forest Products joins in the general feeling of satisfaction, not only that Sir David's preeminent services to Science in Australia have been so suitably rewarded, but especially that the Commonwealth Government has so signally shown its appreciation of the value of Science to the community. There are great hopes for sound advance in a country where appreciation of science is shown in so practical a way. The Division of Forest Products offers its heartiest congratulations to the Chief Executive Officer.

Visitors to the Division.

Mr. A.H. Christian of Millars Timber & Trading Co. Ltd., of Western Australia, is spending a month at the laboratories of the Division studying mainly methods of seasoning, but also investigating other phases of forest products research.

Early in February , Mr. R.A. Johnson, an engineer of the Sydney Harbour Trust, will visit the laboratories of the Division and spend some time investigating various problems connected with timber preservation.

This continued recognition of the Division of Forest Products as the centre of forest products research in Australia is very gratifying and it is hoped that such visitors will continue to come along. They will always be heartily welcomed.

Timber Collection.

Recently a set of timber, hand samples was received from Professor Jaccard of Zurich, Switzerland. These samples have been placed with others in 'the Museum of the Division. By the collection of various timbers in Australia and the exchange of samples with various countries, the Division has now in its collection representative samples of some 455 genera and 1200 different species.

Pole Tests in New South Wales.

Mr. J.E. Cummins o the Division of Forest Products will visit New South Wales during this month to arrange for the installation of a number of treated and untreated poles in selected test sites, The poles

selected are of some of the less durable New South Wales timbers, namely, E. saligna (Sydney blue gum), E. pilularis (blackbutt) and E. maculata (spotted gum). Seven different methods of preservative treatment will be represented in the treated poles. Two test sites have been selected and at each site 155 pole stubs will be installed. One site is infested with termites and it is expected that the poles under test in this area be subjected to severe conditions. Thus, the immediate value of any preservative treatment should be soon known. The other site is representative of the general conditions obtained in the coastal belt of New South Wales,

In these tests the co-operation of the following bodies has been obtained:-- The Postmaster General's Department, the New South Wales Forestry Commission, the New South Wales Public Works Department, the N.S.W. Railways, the Sydney City Council and the Newcastle City Council. Assistance in the supply of materials and in the treatment of poles is being provided by the Australian Gas Light Co. and Messrs. Allen Liversidge (Aust.) Ltd.

1935##038

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A NEW METHOD OF VENEER DRYING

Generally speaking, it is necessary to dry veneer moisture content lower than is attainable by air-drying and usual practice is to dry it either in special veneer drying machines or in tunnel driers, the latter being simply progressive kilns.

In veneer drying machines the sheets of veneer are fed into one end of the drier through which they are passing continually; the type of conveying system and the method of applying the necessary heat varies in different types. of machines. The common well-known makes of these machines give very satisfactory results, but their high capital cost is a serious drawback from the point of view of many concerns.

Tunnel driers, on the other hand, are comparatively cheap to install and when properly designed can be made to give satisfactory results, Not infrequently, however trouble is experienced in obtaining even drying throughout each stack of veneer and usually they are not economical from the point of view of steam consumption. The usual method of stacking adopted is to stack the veneer in special crates in which the individual sheets are separated by fixed "fingers". The loaded-crates are then moved progressively through the kiln.

Following the development of the internal fan compartment type kiln in which rapid and positive circulation and reasonably even drying conditions are generally obtainable, the Division of Forest Products took up the question of drying veneer in compartment kilns. one plant erected a pair of cross-shaft internal fan kilns for this purpose and good results were obtained, the drying being both rapid and uniform, At first, there was some opposition to the use of compartment type kilns on the grounds of inconvenience, the claim being that a progressive principle was essential to be in keeping with the other operations of a veneer plant. This argument was met by designing a number of comparatively small kilns instead of one large kiln. Thus, while operating each individual unit as a compartment kiln, the battery as a whole could be so operated that it maintained a more or less continuous output of dried stock and, in effect, gave a progressive system of drying. The advantages to be gained by such kilns as compared with tunnel driers are: (a) greater economy in steam consumption and (b) more rapid and even drying.

The method of stacking the veneer compartment kilns has, to date, been similar to that used for tunnel driers - individual sheets being separated by fixed "fingers" which form part of a crate. There are two objections to this- method. In the first place, the maintenance of the crates is a fairly large item and, secondly, handling of single sheets of veneer, especially of thin veneer, has to be carried out with considerable care in order to avoid degrade due to tearing.

Inquiries in the United States where the drying of veneer in internal fan compartment kilns has also been developed to some extent, showed that it is not the practice there to use special crates in which to stack the veneer, Instead, the veneer is stacked in multiple thicknesses, making up rows about half an inch thick. These rows are separated by spacing strips as in the case of ordinary timber. It is claimed for this method that the handling is quicker, that it is not attended by danger of tearings, and that the sheets are kept free from buckling, which is a problem of some importance when sheets are dried in single thicknesses. The sheets making up each row are said to dry evenly and the charge capacity of a given kiln stacked in this way would, of course, be greater than when stacked with sheets in single thicknesses. The drying time per charge, on the other hand, would be increased.

In order to investigate the net effect on the output of a kiln as well as the other claims made for the system of stacking in multiple thicknesses, the Division of Forest Products has planned a series of preliminary laboratory tests with hoop pine veneers of ¼ ", ⅛", $^{1}/_{16}$" and $^{1}/_{32}$" thicknesses. Through the co-operation of the Queensland Plywood Board, the material for these tests is being provided free

of charge. The results of the investigations and consequent recommendations will be available in the near future.

TIMBER GRADING STUDIES.

The Division of Forest products commenced, towards the end of 1934, a programme of field studies for the grading of Australian timbers. To date, mill runs of sawn products have been tallied at typical sawmills in the main forest districts of Victoria in order to determine the extent of characteristic defects and to show the proportion of select and merchantable grades in normal outputs. Some 40,000 different pieces of timber have been graded and the data collected are being assembled separately for each mill to show the sizes produced, their grades and common defects, and to indicate the recoveries obtained from different logs in the main forests, Timbers of the ash group of eucalypts namely, mountain ash (E. regnans) Alpine ash (E. gigantea), messmate (E. obliqua), shining gum (E. nitens) and silvertop (E. sieberiana) have been studied and. sixteen different mills visited.

When, as a result of this work, figures are available regarding supplies and quality, it is hoped to study the requirements of the principal wood using industries. The object will then be to consider whether the supplies available can be more fully utilised in meeting the needs of the consuming industries and to suggest grades in the qualities specified which correspond with those available in the forest.

After the completion of the study-of the main sawmilling timbers of Victoria, the grading of hewn and structural timbers, sleepers, pales, and poles will be investigated.

TIMBER LOOK-OUT TOWERS.

Perhaps the most outstanding development in timber construction during the present century has been the introduction of timber connectors. The strength of any timber structure is determined by the strength of the joints. With ordinary bolted joints, it is possible to develop only a small percentage of the strength of the timber with the result that unduly large sizes have to be used. During and immediately after the war, however, special. connectors for joints were developed in Germany and Sweden, and these enabled. the efficiency of the joints to be increased 2 to 3 times. By using these-connectors, therefore, timber can be utilised in much smaller sizes than are necessary with the ordinary methods of construction. The saving in cost due to the reduction in sizes and also due to the ease of assembly is very considerable and timber can now, compete with steel in many types of structure.

The saving made by the use of timber instead of steel is so great that in Europe, and particularly in Germany, timber structures are very widely used for such purposes as wireless towers, large roof' trusses, bridges, trussed arches, grandstands, etc., even though timber is comparatively expensive the better grades having to be imported and steel very cheap. It must not be thought that these structures are merely temporary - they are intended to be permanent and with modern preservative methods should have a life equal to or even exceeding that of a well-maintained steel structure.

During the last few years, modern timber connectors have been introduced into the United States and have made rapid progress, practically revolutionising timber design and giving a new lease of life to timber as a structural material. There are many kinds of connectors. but two main type appear to be more or less superior to the others. These are: (a) the Alligator type, which consists of a toothed steel ring which is embedded by pressure into the timbers to be jointed, and (b) the split ring type, which consists of a steel ring somewhat similar in principle to a piston ring. Both types may be obtained in various diameters. and widths. A. groove is out in the wood b y a special tool and the rings are inserted in the grooves, the whole joint being held together by a bolt.

Alligator connectors are obtainable in Australia and have been used with success, one of the most important applications being at a large bulk-handling system at Geelong, Victoria, Recently a request was received by the Division of Forest Products from the Western Australian Forests Department to

design a timber tower 100 ft. high to be erected in the jarrah forests as a fire lookout tower. The design submitted called for the use of split ring timber connectors and the cost was estimated to be approximately 25% less than an equivalent steel structure. Arrangements are in hand for its erection in time for the next fire season.

The tower, which is provided with a 9 ft. square platform at the top and a wide staircase up the centre, has a base 20 ft. square. It has been designed to withstand a wind velocity of 100 miles perhour and is self-supporting (no guys being used). As this is the first structure of its type designed for Australian conditions, the factor of safety allowed was rather higher than usual. It is probable that experience will show that the cost can be even further reduced.

The useful life of the tower in which green jarrah will be used is expected to be at least equal to that of a .steel tower, and maintenance costs after the first twelve months will probably be no higher than with steel. During the first year, the bolts willhave to be tightened 2 or three times to take up the shrinkage of the timber. The design has aroused considerable interest and requests for further information and drawings have been received from the South Australian Woods and Forests Department, and from the New South Wales Forestry Commission,

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TIMBER BENDING.

The Division of Forest Products is about to initiate: systematic research into the bending properties of various Australian timbers. Although bending is not such an important branch of wood working as it was in the palmy days of carriage building, it is still used to a large extent as a means of producing curved products Inquiries received from the trade showed that there was need for research into the bending properties of Australian timbers and, as a result, the Division has obtained a special machine to carry out this work.

This machine, which consists essentially of a horizontal rotating table, to which the form is clamped, together with a lever for holding the piece to be bent, was specially designed by the British Forest Products Research Laboratory. The drawings of the: machine were kindly supplied by the English Laboratory, but the machine itself had been constructed locally.

The first timber to be tested will be red tulip oak (Tarrietia argyrodendron var. neralata), and` these tests are being carried out at the request of the Queensland Forestry Sub-Department.

LABORATORY TESTS ON QUUENSLAND TULIP OAK.

Eleven logs of red tulip oak (Tarrietia argyrodendron var. peralata) have arrived at the laboratories of the Division of Forest Products from North Queensland. At the request of the Queensland Forestry Sub-department this timber will be subjected to extensive tests. Its strength properties, seasoning properties, and capacity for bending will be determined. At the same time, also, measurements will be made of the actual limits of sapwood, and experiments will be carried out to find suitable methods for determining such limits in seasoned timber.

The Queensland Forestry Sub-department have for some time past been interesting themselves in the utilisation of this timber since:. there are large quantities available in the north. Before any such timber can be utilised to best advantage, it is preferable that all available information regarding its physical and mechanical properties should be recorded, and it is for this reason that the Queensland authorities have requested the Division of Forest Products to carry out the tests on this timber.

RECENT PUBLICATIONS OF THE DIVISION OF FOREST PRODUCTS.

1. Trade Circular No. 24 - The "Working" of Wood.

This circular deals with that property of wood commonly known as "working", a factor which is not sufficiently taken into account by manufacturers. "Working" refers to the alternate shrinking and

swelling which is to be expected with any timber product, and although it cannot be eliminated, many of the troubles experienced can be avoided or at least minimised to a marked degree. Trade Circular No. 24. discusses the main cause of "working" and also gives various methods which can be employed to reduce "working".

2. Trade Circular No. 27 -'The Preservation of Timber:"
One of the disadvantages of timber in the experience of many is its liability to attack by decay or various forms of insect life. This liability to attack varies with different species. Some are highly resistant, while others are somewhat resistant to decay, but not to insect attack. It is not generally realised, however, that it is possible to confer some resistance or durability on less resistant species by the use of suitable methods of wood preservation. The development of preservative processes has proceeded rapidly overseas, but the various methods have so far been little used in Australia. Increased life of timber in service not only lowers cost of maintenance, but reduces the drain on forest resources. It, is, therefore, important that suitable preservative methods should be employed wherever possible. This circular sets out briefly the methods which can be used to combat the attacks of fungi and of insects.

BREVITIES.

Chemical Seasoning.
The United States Forest Products Laboratory has for some time past been carrying out experiments on the chemical seasoning of timber. Successful results have been obtained in the drying of southern swamp oaks which ordinarily show warping honeycombing and excessive checking during drying. The timber was steeped in brine, and then subjected to a high-temperature and low humidity schedule in the kiln. In this manner, one inch boards were treated and dried in two weeks to a moisture content as low as 5%, with no checking and with less shrinkage than when seasoned by ordinary methods. Experiments are being extended to other species, and large sizes, and to treatments with various salts to secure fireproofing and decay resistance, along with quick and effective drying.

Does old timber work less -than new?
In the report of the Forest Products Research Board of the English Department of Scientific and Industrial Research, for the year 1933, mention was made of an investigations carried out to test the truth of the common belief that timber works less
the older it gets. The following statement was made: -
"Panels of oak from the fourteenth century and of a softwood (Pines sp.) dating from 1770 were tested against panels of new timber very carefully selected with regard to similarity in grain. The changes in dimension which took place over a moisture content variation of from 10-17% were observed, and it was found that a new specimen of the softwood appeared to shrink and swell slightly less than an old one, while with oak the position was reversed. The differences observed, however, were so slight that they could well be accounted for by structural characteristics, which could not be exactly identical in the old and new timbers. The conclusion is, therefore, that there is no material difference between old and new timbers from the point of view of shrinkage and expansion

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DOUBLE-STACK KILNS

It has been, and still is, the policy of the Division of Forest Products to advocate comparatively small kiln units for general use in Australia. The size of kiln, which has now been adopted as more or less of a standard, is one taking a charge of between 5,000 and 6,000 super feet of one-inch stock. Kilns of this size are most suitable to the output requirements of the average Australian plant in which the weekly output of any one size and species is usually not very large. Many plants with kilns installed prior to the general adoption of this practice have found to their cost that larger kiln units have involved them in the undesirable practice of drying mixed charges, i.e. charges of either mixed sizes or mixed species. A second advantage of the small units is that the charges can be handled easily and economically without the installation of powered handling gear.

In occasional instances, however, plants are concerned with the drying of comparatively large outputs of one size and species of timber and in such cases it is possible to reduce overhead costs somewhat by building larger kiln units. In order to achieve this purpose without increasing the handling problem, the Division has now prepared plans of a double-stack cross shaft internal fan kiln. In this kiln, the charge capacity of the kiln is double that of the kiln ordinarily recommended, but the charge is handled in stacks of the same dimension as in an ordinary sized kiln.

In the double-stack kiln which is used commonly in still larger sizes in the United States of America, there are two sets of rails instead of one, the two lines of stacks being separated by a space slightly larger than that required for actual clearance in handling. The air from the fans passes across one stack of timber and becomes remixed to some extent in the space between the stacks before it passes across the second stack. The circulation is reversible. The kiln in all features except size is similar to that of a single stack cross shaft internal fan kiln.

Double-stack kilns of this type have been on trial in Australia for approximately two years and have given very satisfactory service. Whether they are preferable to single stack kilns for any particular plant depends on such factors as variety and quantity of output. The Division of Forest Products will be glad to give advice in this regard to any millers or others who are interested.

SHRINKAGE FIGURES FOR AUSTRALIAN TIMBERS

A knowledge of the shrinkage which occurs during the drying of any timber is of considerable importance in the efficient utilisation of the timber. Not only does it affect the size to which the green timber must be cut to produce the required size when dry, but it serves as an indication of the "working" which will occur in the timber during service.

During the past twelve months the Division of Forest Products has been carrying out an extensive investigation to determine the shrinkage which occurs during the drying of different Australian timbers. Tests have been made with backsawn samples, quartersawn samples, and also to determine the longitudinal shrinkage. The latter shrinkage is well known to be very small in all but a few exceptional cases, but a knowledge of its actual value is desirable.

Tests have been made with samples 1" square x 4" long in the direction in which the measurements are made - this size being the International Standard - any on 6" x 1" boards which are used for seasoning investigations. Very thin samples are also used for the determination of normal shrinkage that is apart from "collapse", which is so common in many Australian timbers.

In this work over 120 species have been investigated. These were represented by 1,700 different samples and the work has entailed over 30,000 measurements and weighings.

The Division of Forest Products will be glad to answer any queries regarding the shrinkage of Australian timbers and to give where possible actual shrinkage figures.

POLE EXPERIMENTS IN NEW SOUTH WALES

As portion of a comprehensive test on poles, the installation of 130 poles has just been completed in New South Wales in two localities, (i) near Wyong, and (ii) near Clarence Town. Sixty-five poles were set at each test site. The timbers chosen for these experiments were blackbutt (*E. pilularis*), Sydney blue gum (*E. saligna*), spotted gum (*E. maculata*) and ironbark. The first three are representative of the less durable pole timbers, large supplies of which are at present available. The successful utilisation of these species is essential for the pole user and also for the more complete exploitation of the forest. Supplies of the more durable pole species are decreasing and future pole timbers will have to be taken from the less durable species.

In the experimental tests in New South Wales, the poles installed represent: (i) untreated controls, (ii) brush treated and earth puddled with creosote, (iii) poles with a special bandage which contains preservative salts known as Tanalith U. A number of poles of each of the less durable species has been cut and is stacked for seasoning. These will be treated early next year, using a number of other methods of treatment and different preservatives, the chief of these being impregnation with creosote oil and with a mixture of zinc chloride and arsenic. In some cases, the full length of the pole will be impregnated under pressure, and in others the butt only will be treated by the open tank method.

The experiments are being carried out in co-operation with the Postmaster General's Department, the New South Wales Forestry Commission, the New South Wales Public Works Department, the New South Wales Railways, the Sydney City Council and the Newcastle City Council. Officers of these departments who visited the test sites while treatments were in progress evinced great interest in the work and considered that the test sites and procedures adopted were excellent. Results are expected to be of great future value. Full records of costs of treatment are being kept and this, together with relevant data, will be analysed and a report prepared.

It is of interest to recall that a somewhat similar pole test using messmate (*E. obliqua*) was instituted in Victoria in 1932. The results of this test have already proved of great value to pole engineers in Victoria and representatives of all the large pole using authorities in Victoria make a special point of being present at the periodical inspections to discuss the results of the tests, especially in relation to their own problems.

PRESERVATIVE TREATMENT OF *PINUS RADIATA* SLEEPERS

Three hundred and twenty railway sleepers and fifty-four tramway sleepers, all of *Pinus radiata*, have been successfully treated with preservative solutions in the laboratories of the Division of Forest Products. Treatments of different batches were made with: (i) creosote, (ii) creosote plus petroleum oil, (iii) zinc chloride plus arsenic, and (iv) Tanalith U. In all cases excellent penetration and absorption of the preservative was obtained. The sleepers are now being forwarded to South Australia for installation in the track of the South Australian railways and the Adelaide Tramways Trust.

The railway sleepers will be set in two localities, one near Adelaide in the Mt Lofty Ranges, and the other near Mt Gambier. A particular study will be made of the life of the treated sleepers from the dual aspects of durability to decay and to termites and also

from the aspect of mechanical wear. To study the latter effect the sleepers will be placed in both straight and curved portions of the track with and without sleeper plates. Jarrah sleepers will be included for comparison purposes.

Plans have now been completed for the treatment and installation of a further 640 railway sleepers to be set on both broad and narrow gauge tracks in two further localities. When this experiment is completed, the *Pinus radiata* sleepers will have been tested under very varying conditions of climate, ballast and railway loading.

The South Australian Railways are co-operating in these tests for which the sleepers have been supplied by the South Australian Woods and Forests Department.

The tramway sleepers will be installed in co-operation with the Adelaide Tramways Trust and the behaviour of the treated *Pinus radiata* specimens will be compared with that of red gum.

PERSONAL

Mr I.H. Boas, Chief of the Division of Forest Products, left Melbourne on March 30th on the liner "Monterey" for the United States of America. While abroad, Mr Boas will visit the United States Forest Products Laboratory Madison, Wisconsin, the Canadian Forest Products Laboratories at Ottawa and Montreal, and the Princes Risborough Forest Products Research Laboratory, England. Mr Boas will also represent the Council for Scientific and Industrial Research at the British Empire Forestry Conference which will be held in South Africa early in September.

Mr H.E. Dadswell, Senior Wood Anatomist of the Division of Forest Products, also left for the United States on the liner "Monterey". Mr Dadswell is on special work leave and while abroad, will investigate the latest methods employed in the study of the fundamental structure of the wood fibre. While abroad, Mr Dadswell will represent the Council for Scientific and Industrial Research at the Sixth International Botanical Congress, held in Amsterdam during the first week of September. At this congress, the International Association of Wood Anatomists will also meet. Mr Dadswell has recently been elected to the Council of this Association and will represent the Division of Forest Products at its meetings.

BREVITIES

Recently a sample of Australian timber was received from Canada for identification. It had been used as a pile timber under the extremely vague name of Australian gum wood. The Canadian Forest Products Laboratory (Vancouver Branch) report that Canadian purchasers of Australian timbers for marine piling get eucalypt, Australian gum wood and turpentine. The particular sample forwarded was grey ironbark (*E. paniculata*). This practice of selling Australian timbers under extremely vague names does not add to their prestige abroad, since, in many cases, timbers unsuitable for a particular purpose are sold indiscriminately.

Reports have come to hand on the suitability of timber tennis courts. Such courts have been installed by the Earl of Leven and Melville in Scotland. Play on them is very fast and enjoyable, and maintenance costs are low. Such utilisation is expected to be of assistance to the timber industry.

In the latest annual report on the work of the Imperial Forestry Institute, Oxford, England, attention has been directed to the unsatisfactory state of botanical nomenclature, especially as it affects the names of many of the better known species of trees. In an endeavour to effect some sort of finality in regard to the British elms and to avoid the frequent changes of name which have occurred in the past and are still taking place, the matter has been referred to the four chief forestry societies of Great Britain with the proposal that a list of permanent specific names be adopted.

This proposal has been accepted by three of the societies and the Institute has been asked to represent the matter in the proper quarter with a view to its being brought up at the International Botanical Congress to be held in Amsterdam in September, 1935.

PUBLICATIONS OF THE DIVISION OF FOREST PRODUCTS

Technical Paper No. 14:- "The Chemistry of Australian Timbers, Part 4 - A Study of the Lignin Determination."

Lignin, one of the major chemical constituents of wood, is very difficult to isolate in a pure condition. The impurity of the product has impeded investigations, both into its chemical composition and into the development of possible uses for it. Hence, in recent years, many investigators have concentrated on the problem of obtaining a lignin from wood in the same chemical state as it exists in the wood. The work of the Division of Forest Products has shown that Australian eucalypts are very difficult to treat by the various methods used for the isolation of lignin, the product being contaminated with various extraneous materials. To remove these, it is necessary to treat the wood with dilute alkali which treatment, however, may have some effect on the lignin. The publication under discussion refers to these possibilities and deals with various methods which have been employed elsewhere to remove extraneous materials. While such an investigation is of necessity fundamental, and of little apparent value commercially, it is most essential that the question be satisfactorily answered in order that it may be possible to obtain more important information on the chemistry of our timbers.

Technical Paper No. 15:- "The Identification of Wood by Chemical Means, Part 2 - Alkalinity of Ash and some Simple Chemical Tests for the Identification of the Coloured Woods of the genus *Eucalyptus*."

The identification of many commercial eucalypt timbers is not always a simple matter, and it is often of very great importance that any identification be as accurate as possible. To assist the wood anatomist in this way, various chemical methods for the identification of timbers difficult to identify by ordinary methods have been explored with the result that there are at least four definite tests of value. The most important and most useful of these is the "alkalinity of ash" test, by means of which many timbers are definitely separated. This test should be used where possible to supplement the "burning splinter test". Three other simple chemical tests which give, with very few exceptions, consistent and easily recognised differences among the woods examined, are described.

CSIRO
AUSTRALIA

1935##040

NEWS LETTER NO. 40 May 1st, 1935.

END MATCHING OF SAWN AND DRESSED TIMBER.

End matched timber has been a feature in American practice for many years and has also made considerable progress in England. It offers so many advantages that it is strange that it has not been widely adopted in Australia. Until recently it was practically confined to hardwoods, but in the United States, end. matched softwood is now well established and is likely to become very popular.

End matching simply consists of cutting tongues and grooves. the ends of boards as well as on the sides. There are modern machines which do this rapidly and cheaply.

It offers a solution of one of the greatest difficulties in timber manufacture, via., the use of short lengths. It cuts out standard lengths and, indeed, end matched boards are truly endless,

In docking out defects, very frequently much timber is wasted and burnt. In end matching, the defect is docked, and the ends tongued and grooved so that the loss is very small.

In a United States Government publication on the marketing of short lengths, it is shown that whereas in general only 12%. of the timber in small house construction is in lengths less than 8', with end matching, 20% may be of such short pieces. This represents an obvious saving of waste to the miller and also cheaper construction.

End matched flooring, linings and weatherboards give much tighter joints and the saving in labour in laying is considerable. Analysis of costs shows that 20 motions per strip are saved by-the carpenter who uses end-matched timber. At each cut end the carpenter: (1) takes pencil from pocket, (2) picks up square, (3) places square on piece, (4) draws a line, (5) replaces pencil in pocket, (6) puts down the square, (7) places board for sawing, (8) picks up saw, (9) saws the board, and (10) puts saw down. It is estimated that approximately 4/6d. per 100 super feet is saved in labour in laying. With end matched timber there is no need to have the joints over studs or floor joists. The pieces are joined in the lengths available. This alone constitutes a considerable saving in material and labour.

To the sawmiller, end matching offers the opportunity of raising the grade of his article by docking defects with very little loss of material, and often of making a marketable article of otherwise unsaleable material, Also, sawmilling waste would be reduced if definite lengths do not need to be produced. To the timber merchant there is the saving in not having to carry stocks of standard lengths,

End matching is not new to Australia, and is a standard practice of at least one firm producing large quantities of flooring. Some attempts to use end matching have, however, ended in failure, the reason ascribed being that tongues and grooves in the cross section warped, and fitting of the boards end to end was seriously time consuming,

The difficulty in these cases was undoubtedly due to unsatisfactory seasoning, and it can not be too strongly emphasised that end matching is only feasible when combined with good seasoning practice.

However, the standard of seasoning has been greatly elevated in Australia of late years, and in some of the States a very high degree of efficiency is maintained. The time for a. closer examination of end matching has, therefore, now arrived,' for there is here a possibility of greater and more effective utilisation of the forest.

PAINTING CHARACTERISTICS OF HARDWOODS .

Dr. F.L. Browne of the United States Forest Products Laboratory has been working on problems in painting for a number years. Softwood is, of course, the main construction timber in the United States and naturally earlier work has been mainly connected with painting softwoods (non-pored timbers).

In a recent publication of the U.S. Forest Products Laboratory, Madison, Dr. Browne describes work he has been carrying out on the painting of hardwoods (pored timbers). Using pure white lead paint and a lead and zinc paint he has established some. principles of importance. Common house paints do not make satisfactory coatings on hardwoods with large pores because the paint applied by the brush does not succeed in filling the pores properly. As a result, the pores often remain visible as slight depressions in the coatings. To plug the holes sufficiently to allow paint to be applied smoothly, stiff pigment paste must be worked into them mechanically.

Other conclusions are:-

(1) On hardwoods as on softwoods, the general rule is that paints last longer the lower the density of the wood.

(2) Paints tend to last longer on hardwoods with small pores than they do on softwoods of the same density. On the other hand, once disintegration has set in, it may spread over larger areas and in a more unsightly manner.

(3) The width of the annual rings and the angle at which the painted surface intersects them have little effect on the retention of hardwoods with small pores. In this respect they differ from softwoods.

There is room for research into the behaviour of paint on our Australian hardwoods, for paint is one of the most widely used methods of preservation. The Division of Forest Products plans to begin paint studies after the return of an officer who has been specialising in this work in other countries.

TESTS WITH PINUS RADIATA FOR POLES.

The growing of Pinus radiata in plantations is becoming more extensive, especially of recent years. Some of the earliest plantations in Australia were planted by the South Australian Woods and. Forests Department and these forests are now being converted into sawn timber. The utilisation of all trees on a clear felling basis is not complete as the cost of conversion of smaller trees is sometimes higher than the return from the sawn timber. A study of the utilisation as pole timber of some at least of these trees, warrants serious consideration.

Co-operative arrangements have been made with the Postmaster General's Department, and the South Australian Woods and Forests Department, for a test of P. radiata poles treated by various methods. 100 poles were cut about six months ago and stacked for seasoning, Early in May, the Senior Preservation Officer of the Division of Forest Products, Mr. J.E. Cummins, will visit South Australia and in conjunction with Engineers of the Postmaster General's Department, will supervise the treatment and erection of the poles. The treated poles will be installed in actual pole lines and their behaviour carefully noted.

TEST WITH P. RADIATA FOR SLEEPERS.

In co-operation with the South Australian Government Railways, the South Australian Woods and. Forest,,a Department, and the Adelaide Tramways Trust, the Division. of Forest Products has recently completed the treatment of 200 each of narrow gauge and broad gauge railway sleepers and 52 tramway sleepers. The railway sleepers were treated with four different wood preservatives, namely, creosote oil, a mixture of creosote and fuel oil, zinc chloride plus white arsenic and Tanalith U, a proprietary wood preservative, and the tramway sleepers with a mixture of creosote and oil. All treatments were made in the Division's experimental pressure treating plant in East Melbourne, and full details have been kept of the treating schedules, the amount of preservative absorbed by the sleepers and the depth of penetration of the preservative, together with details of the defects such as knots, etc., occurring in the timber.

Mr. J.E, Cummins, Senior. Preservation officer, while in Adelaide early in May, will discuss with the Chief Engineer of the Railways and the Chief Engineer and. General Manager of the Tramways Trust, details for the installation of the test sleepers. The behaviour of the treated pipe sleepers will be directly compared with jarrah, in the case of the Railways, and red gum, in the case of the Tramways,,

STARCH IN RELATION TO ATTACK OF TIMBER BY THE POWDER POST BORER.

It has been found that specimens of sapwood of Australian timbers which are usually susceptible to attack by the powder post borer have remained immune, although exposed to the activities of the insects, It frequently happens in the case of some hardwoods that sapwood is left on the sawn timber and frequently extensive damage to this timber has been reported in houses, etc . The sapwood, however, may not always be attacked and in an article to be published in the May issue of the Journal of the Council for Scientific and Industrial Research, it is conclusively shown that unless the sapwood contains a sufficient quantity of starch it will be immune from attack. This raises an important issue in the better utilisation of our timbers. It is possible to detect easily the presence of starch and thus determine the possibility of infestation. Also investigations are now being undertaken to render sapwood immune from attack by removing the starch from the' log or living tree or else treating the susceptible sapwood with suitable chemicals

BREVITIES.

Grid-wood Fabricated Construction.

French wood-workers have recently perfected a novel method of panel construction. Wooden strips are notched and interlocked to form a. grid of the desired dimensions. On this grid is glued plywood or metal or marble veneer or whatever surface is wanted. The system was originated for doors and other uses and is now largely used by the French mercantile marine.
The advantages claimed for this system of construction are the elimination of warping, reduction in weight while achieving a massive appearance, ventilation throughout the panel, additional sound proofing, and low cost.

Newsprint from Pines in Germany

One of the main difficulties which are met with in the utilisation of resinous pine woods for papermaking is the trouble caused by the resin during sheet formation. A process which reduces the resin content during grinding for the preparation of ground-wood has recently been developed in Germany. Groundwood is the main constituent of newsprint, and hence a process such as that mentioned above, which makes resinous pine wood technically usable is a development of first rate importance. At the present time, however, there is not sufficient information to indicate that the process can be used economically on a commercial scale.

NEWSLETTER

Forest Products

1935##041

MONTHLY NEWS LETTER NO. 41 FIRST PUBLISHED IN 1 JUNE 1935

THE MANUFACTURE OF BRIQUETTES FROM WOOD WASTE

The disposal of wood waste, preferably at a profit, has always been a major problem in the timber producing and using industries. A proportion of the wood waste available is now used, but there remains a great quantity for which utilisation as fuel seems to be the only outlet. Furthermore, shavings and sawdust may be burned satisfactorily only in a special furnace and, on account of their bulk and nature, are not normally suitable for domestic use. Briquetting the shavings and sawdust overcomes these difficulties, and wherever wood briquettes can be manufactured to sell in competition with other fuel their introduction is economically warranted.

Wood briquettes have definite advantages in that they are clean and convenient to handle, burn well leaving little ash, and may be split easily into kindling. As they are generally manufactured from wood having a moisture content of only about 10%, wood briquettes have a calorific value of about 8,500 B.T.U.s per lb., more or less irrespective of species, which is considerably higher than that of the partially dry wood usually sold in Australian cities.

Wood briquettes have been successfully manufactured in Europe for many years. Also, for some 30 years, they have been manufactured on the West Coast of the United States, but it is only recently that close attention has been given to the matter. With the introduction of a new highly compressed wood briquette, interest has been definitely aroused, and wood briquettes now seem likely to become a feature of modern life, particularly in large cities where fuel is expensive.

In general, wood briquettes are made by compressing previously dried sawdust, shavings, or groundwood in a heavy press to the desired degree of hardness. The most recently introduced briquettes are manufactured in a special machine invented in America, which, in that country, is leased to approved manufacturers, a considerable number of machines being already in operation. The machines will be sold outright to prospective manufacturers in foreign countries. The briquettes turned out by this machine are produced without the incorporation of any binder and are cylindrical in shape, being 4" in diameter, 12" long and weighing about 8 lbs. They stack easily and are clean to handle. Being highly compressed, they burn for a long time and are suitable for burning in furnaces, stoves or fireplaces. For burning in open fireplaces, chemicals may be incorporated to colour the flame. They do not come apart with ordinary handling, but may be easily split with an axe.

The essential features of the manufacturing process are as follows:- The wood waste is dried by allowing it to pass through a series of steam coils and perforated plates. It is then ground to fine particles in a hammer mill, after which it is subjected to pressures of about 20,000 lbs per square inch in the specifically designed machine. The pressing process raises the temperature of the material to about 450°F. After cooling, the briquettes are ejected from the machine ready for use.

It is not possible to estimate accurately the cost of manufacturing wood briquettes in Australia from the meagre data available, but there is

reason to believe that they could be manufactured and sold at less than £2 per ton. The requisites for success in manufacturing and selling wood briquettes are:-

1. A large continuous supply of raw material at a low price.
2. Full capacity production.
3. A high priced market such as that of Sydney or Melbourne,

The Division of Forest Products will be glad to give further details to anyone interested in the manufacture of briquettes.

THE IDENTIFICATION OF TIMBER

For some years, the Division of Forest Products has been making a close study of the structure of the commercial timbers of Australia with a view to working out methods that will enable the true identity of any piece of wood to be established. That this work is of great value to the timber industry is demonstrated by the increasing number of specimens of wood that are sent in for identification.

Recently, some very interesting specimens have been dealt with. For instance, one piece of timber was received for identification, which was heavily coloured by a stain used in the process of manufacture. The staining obscured many of the features of the wood, but microscopical examination made identification possible.

Another sample sent in was of considerable scientific, even if not of commercial, interest. It consisted of a piece of wood which had, during a long period of time, become silicified, i.e. had turned into stone. Perhaps the most interesting feature of the specimen was the fact that even though the wood had gradually turned into stone, the original structure was still plainly visible under the microscope, and it was a comparatively easy matter to identify the original wood as Queensland Hoop Pine. It is interesting to note that the specimen was picked up in Gippsland, Victoria, which is far outside the present limits of growth of Hoop Pine. Before building up fanciful theories as to the distribution of Hoop Pine in ages gone by, however, one must consider the rather prosaic possibility of the specimen having been carried to Gippsland in somebody's pocket, or even perhaps in a blackfellow's dilly bag.

Two other samples received consisted of partially silicified and carbonised wood, i.e. the original wood had turned into coal and stone. The black colour and brittle, hard nature of the material made it difficult to work on. Although it was not possible positively to identify the species, microscopical examination revealed sufficient details of the structure to enable the samples to be identified as belonging to certain groups of woods.

TREATABILITY OF QUEENSLAND TIMBER

During January, 1934, the Queensland Forest Service forwarded to the Division of Forest Products 9 samples of round house stumps, averaging 8" in diameter by 4 feet in length, and also a corresponding number of sawn truewood specimens 4" x 4" x 4', to make a preliminary investigation of the treatability of the timbers with creosote oil.

The samples comprised three species, grey satinash, hoop pine and red tulip oak. The specimens were allowed to season until a satisfactory moisture content for treating was reached. Two treatments were used for the house stumps: (1) Hot and cold bath treatment, which consists of immersing the specimens in the hot oil for a certain period and allowing them to remain immersed until the oil has cooled, and (2) pressure treatment, in which the preservative is forced into the wood under high pressure.

Excellent results were obtained with both treatments. In the case of the red tulip oak, the penetration was complete and the adsorption was good, while complete sapwood penetration and high absorptions were obtained with the grey satinash and hoop pine.

As truewood is difficult to impregnate, the sawn specimens were pressure treated only. The tulip oak and hoop pine specimens were completely penetrated and the absorptions obtained were satisfactory. In the case of the grey satinash, however, there was little penetration and absorption.

It would, therefore, appear that there should be no difficulty in treating round seasoned house

stumps, of the species mentioned above, with creosote oil, by the simple and inexpensive hot and cold bath method. These stumps so treated would be very durable, even under the most severe conditions of decay or termite attack.

KILN DRYING IN AUSTRALIA

The development of kiln drying in Australia during the last few years has been particularly rapid, and as yet there is no sign of slackening off in the number of kilns being erected. A battery of new kilns was recently started up in one of the country mills in Western Australia and proposals for a city plant are well in hand, and a further country plant is projected. In Tasmania, several additions to existing plants and erections of new plants have occurred during the last few months, while in New South Wales new kilns have been brought into operation and modifications made to an existing plant. New kilns at a Queensland plant are also projected.

At first sight, it might appear that there is a risk of too many kilns being erected, but that this is not so, is shown by a consideration of the Victorian position. Victoria is far better supplied with kilns than any other state, but the erection of further plants in that state is still proceeding steadily. Two new plants were started up during May and further additions to an existing plant were also made during the month. The old prejudice against kiln dried timber has entirely disappeared and the reliability of properly kiln dried products is now generally recognised throughout the timber industry.

THE GRADING OF AUSTRALIAN TIMBERS

The Division of Forest Products is carrying out investigations in the grading of Australian timbers. A large number of mills are being visited and details of the percentages of different qualities of timber and the prevalence of the defects are recorded. Until recently, the work has been confined to Victoria, where thirty-six mills have been included in the investigation. This has already shown that some of our ideas regarding the sizes and relative importance of defects are not altogether accurate. It has also shown that it is not difficult to write grades which will enable the rapid segregation of timbers into different qualities.

The field grading team is at present in South Australia, and it is anticipated that approximately two months will be spent in this state studying the grading of *Pinus radiata* and indigenous timbers being cut there. In addition, investigations will be made on the utilisation of timber and on the effect that use requirements have on the permissible defects. After South Australia, Tasmania, New South Wales and Queensland will be visited in turn. An extensive investigation into the grading of Western Australian timbers has already been carried out in co-operation with the Western Australian Forests Department and results of this investigation are recorded in Pamphlet No. 41 (DFP Technical Paper No. 8) - The Grading of Western Australian Timbers.

One item of interest noted during the collection of data was the large variation in the sizes of sawmills. Probably the largest mill in Australia is the State Saw Mill, cutting karri at Pemberton, Western Australia. This deals with large logs up to 7 ft or greater diameter, and the output is about 50-60,000 super feet per day in the square. In contrast to this there is to be found in the Eastern States a mill operated by one man only. This is probably the smallest mill in Australia producing sawn timber and its output only averages about 160 super feet per day.

KILN DRYING OF VENEER

The Division of Forest Products has now completed laboratory investigations into the drying of veneer in multiple thicknesses, as outlined in a recent number of the Monthly News Letter. The results are very promising and a report is now being prepared. Recommendations regarding this method of drying will be published in the near future.

PERSONAL

The staff of the Division of Forest Products will be strengthened in the near future by two officers who have been training in America and Europe, as Senior Research students under

the Commonwealth Science and Industry Endowment fund.

One of these officers, Mr S.F. Rust, has been investigating general problems connected with the preservation of timber and, in addition, has made a special study of the latest developments in glues and gluing and problems associated with the painting of timber. The other, Mr W.R. Ferguson, has been studying the seasoning and utilisation of timber generally and has been particularly interested in the uses of timber in general building construction. Both officers arrived in Western Australia on the 28th May and will spend a fortnight studying timber problems in the State. The former will inspect treated fence posts installed in a number of districts in Western Australia about 5 years ago. He will also inspect some sections of treated sleepers in conjunction with Railways Department officers. The latter will enquire into standard building practices and problems associated therein with the use of timber. Both officers will co-operate with the Western Australian Forests Department in these investigations.

Mr W.E. Cohen, B.Sc. (Hons.), A.I.C., A.A.C.I., senior chemist in the Division of Forest Products, who has been awarded one of the five Commonwealth Fund Service Fellowships offered to Government officers in the British Empire, will shortly proceed to the University of Wisconsin, Madison, in the campus of which is situated the United States Forest Products Laboratory. At the latter and other institutions, Mr Cohen will study the latest developments in wood and cellulose chemistry, giving particular attention to the pulping of hardwoods and resinous pines. He will leave in December and expects to be abroad for two years, after which he will return to this position in the Division of Forest Products.

CSIRO
AUSTRALIA

1935##042

NEWS LETTER NO. 42 July 1st, 1935

FOREST PRODUCTS RESEARCH IN U.S.A.

The Chief of the Division of Forest Products, Mr. I.H. Boas, has recently visited the United. States Forest Products Laboratory at Madison, and his impressions provide much food for thought on the future utilisation of timber. The ideas that timber is a vanishing commodity and that further study of it is unnecessary, apparently have few supporters in U.S.A., the greatest timber consuming country of the world, for, recently, the United States Forest Products staff has been accommodated in. a new laboratory which cost £250,000 to build. Now building extensions to house further projects are being made, and proposals for the spending of an additional £1,000,000 on equipment are under consideration.

The Madison laboratory has been carrying out timber tests of all descriptions for many years with the result that it has built up an enormous fund of knowledge about timbers in general, and American timbers in particular. It is not surprising to find, therefore, that it is turning its attention more and more to advanced problems in forest products.

Recently, there has been completed a timber house of totally new design involving a large amount of prefabrication, but enabling the more economical and effective use of timber. Features of the house are the unit construction of the walls, with plywood sheathing, and a special ceiling and floor construction in which plywood is glued to the top and bottom of the joists. By this means, the plywood takes a large portion of the stresses in the units when they are under load, and the resultant structure is light but strong and stiff.

Further points of interest in the new sections of the laboratories are the built up timber arches designed to give a ceiling uninterrupted by the usual roof trusses. Two types of built up arch ribs have been used, one being of structural timber joined with timber connectors, and the other of glued laminated construction. The sheathing of the roof is of plywood, glued to the purlins, so that instead of being a useless dead load, it contributes to the strength and stiffness of the structure as a whole.

These new departures in timber construction, together with the increasing use of timber connectors in built up columns, and large arched timber bridge construction and the use of composite wood and concrete bridges, seem to herald a new era in timber utilisation. Timber markets have suffered of recent years from the inroads of substitutes, and this has largely been due to the fact that the timber industry has been content to rely on the commonly known features of timber, such as availability, ease of working, and adaptability. Timber has many other valuable properties, and in the future these will be exploited to the utmost in new types of construction.

TIMBER SUBSTITUTES.

Substitutes for timber have become prominent in the last few years and it is obvious that in the future, the timber industry will have to make every endeavour to retain its markets. It might be expected that timber with its long history of useful service would be in a. particularly favourable position to meet inroads on its spheres of utilisation. Unfortunately, this is not the case, for it is a trait of our modern civilisation that we are always dazzled by the advantages of something new, and aware of the disadvantages of previously used materials, but do not reckon on the shortcomings which almost inevitably become apparent in the new material with experience in service.

It is not surprising to find, therefore, that the 'timber industry throughout the world is taking steps to protect its markets and to develop new ones. In England, a Timber Development Association has been formed and, according to a report in the Timber Trades Journal of a lecture by the Association's manager, Mr. E.H.B. Boulton, the lecturer stated that he knew of a case where 340 panes of glass had been cracked during a heat wave because of twisting of metal window frames.

This is a good example of an instance where the deficiencies of the substitute have net been fully appreciated. It will be remembered also, in this connection, that two fatalities have occurred in Melbourne of recent years as a result of the shortcomings of metal sash.

The first occurred in August, 1932, at the Caulfield Racecourse, where a spectator was killed by a steel window weighing 56 lbs., which fell from a grandstand. In recording a finding of accidental death, the coroner stated prophetically: "I think the fracture of the window fastenings was due to want of use and a recurrence of this accident will follow if they are not attended to".

About a year later, the same coroner presided at the inquest on the death of a window cleaner who, overbalancing as a result of a weakened metal window frame, fell from the fourth floor of the Bank of Australasia, Melbourne. The metal window was only two and one half years old, and in recording his finding, the coroner stated:- It is perhaps too much to say that such frames are inherently defective, but in my opinion, it is not satisfactory that so soon after its installation this metal window should have given way.

COLLAPSE IN TIMBER.

Most people who have handled the light Eucalypts of Australia such as mountain ash, are familiar with the phenomenon known as collapse. It is well recognised now that this excessive and abnormal shrinkage is due to the pulling in or flattening of the cells in early stages of drying and is quite distinct from and additional to the normal shrinkage. A reconditioning treatment for the removal of collapse is almost a standard feature of the timber industry and in this process the distorted cells which have set and hardened during drying are softened by the application of steam so that they are enabled to revert to normal shape. Hence, reconditioned timber is in its normal state and so long as it is not soaked with water, it Will not revert to the collapsed state.

In the past, it has been considered that only a comparatively few species are subject to collapse, but actually collapse is very much wider in its incidence than this. Investigations into the shrinkage of timber and the means which prevent collapse occurring have shown that quite a large number of timbers which are ordinarily thought to be free from collapse actually owe some of their shrinkage to this phenomenon, Although, in most cases, this shrinkage is not sufficient to warrant the use of the reconditioning process, yet from the scientific standpoint it is important to be able to recognise just how much the shrinkage of timber is true shrinkage and how much is due to collapsing influence.

Another feature of timber which is at present being investigated is the fibre saturation point. Water exists in timber in two ways, as free water filling or partly filling the cell cavities and as combined water adsorbed in the cell wall. When a piece of timber is being dried all the free water has to be taken from the cell cavity before the drying of the cell wall can be commenced. It is through the drying of the free water that collapse occurs and through the drying of the combined water that true shrinkage takes place, Hence, a knowledge of the moisture percentage which corresponds to the fibre saturation point is of considerable importance in studying seasoning problems. The fibre saturation point of timber is usually taken to be between 25-30% moisture content, but sometimes it is above or below this. The fibre saturation point, the extent to which collapse has contributed to shrinkage, and the total shrinkage of timber are of importance in determining the amount of movement which will take place in seasoned timber with changing weather conditions. If all these factors were known, it would be possible to sort out the timbers which would change least from season to season, and for certain exacting purposes it is important to be able to do this.

THE MOISTURE CONTENT OF CYPRESS PINE (MURRAY PINE)

The wood of Cypress, or Murray Pine (Callitris spp.) contains considerable quantities of extraneous material, particularly in the form of volatile oils, which are slowly driven off at temperatures of 212ºF. The presence of these volatile oils seriously affects the accuracy of the usual method of determining the moisture content, i.e. by oven drying the wood at about 212ºF. and measuring the loss in weight.

This treatment drives off the volatile oils as well as-the moisture, with the result that the apparent moisture content calculated is higher than the true moisture content. The error may amount to several percent, and is particularly serious with air-dry material.

As a knowledge of the moisture content is of great importance in the proper utilisation of wood, some simple and rapid method of determining the true moisture content of Cypress Pine is needed if this species is to take its proper place in industry. (The true moisture content can be determined by extraction with xylol but the process is essentially a laboratory one). The Division of Forest Products is at present experimenting with other methods of determining the moisture content, the most promising of which appears to be the "Blinker" - an electrical instrument for measuring moisture content, which is already widely used in the timber industry.

Before the "Blinker" can be used with confidence to determine the true moisture content of Cypress Pine, a considerable amount of experimental work is necessary to determine the correction to be applied to the instrument readings. This work is now in hand, and the results obtained will be published as soon as available.

Another possibility may be to allow a thin section of the pine and a similar section of another species which has similar hygroscopic properties but no volatile oils, to come to equilibrium together and then determine the moisture content of the volatile oil free wood by oven drying. If the original weight of the section of pine and its weight and moisture content at equilibrium are known, it is a simple matter to calculate its original moisture content. Such a method as this has, however, serious limitations in that it depends on there being readily available another timber with similar hygroscopic properties.

THE TREATMENT OF FENCE POSTS.

About five years ago, some 1800 fence posts were treated in Western Australia by different preservative processes, and were installed in three test sites widely differing in climatic conditions. The methods of treatment and the economies likely to result from
using treated posts are set out in C.S,I.R, Pamphlet No.24: "The Preservative Treatment of Fence Posts".

Included in the lines of test posts ARE a number of untreated controls and these early showed signs of deterioration. An inspection of the posts is at present being carried out by an officer of the Division of Forest Products in co-operation with officers of the. Western Australian Forests Department, and the test has now been in operation for a sufficient length of time for this inspection to give definite information on the efficacy of the treatments.

NEW KILN INSTALLATIONS

Two new kiln drying plants were started up in Victoria during June. These are additional to the several plants recorded as commencing operation in. the last issue of of Forest Products Monthly News Letter.

One of the; plants consists of four longitudinal shaft internal fan kilns with fans overhead and is established in a Melbourne yard. The other is at a bush mill and consists of two cross shaft internal fan kilns. These latter have been designed with a high air velocity for the rapid drying of case stock, and, in addition, there is another innovation in that the curved. roof of the kilns is of reinforced concrete.

Reinforced concrete has been found to be one of the most satisfactory materials of construction for kilns, because, if coated at regular intervals with a suitable paint, it resists the disintegrating influence of the hot, moist, and often acidic kiln atmosphere. Kilns with walls of reinforced concrete are, of course, quite common, but in the past the curved ceilings of such kilns, when of the cross shaft internal fan type, were usually constructed of timber.

The construction of the complete shell of the kiln in reinforced concrete will reduce air leakage and the rate of deterioration of the structure, so that operation will be facilitated and maintenance costs reduced.

BREVITIES.

Publications:
In the May, 1935, issue of the Journal of the C.S.I.R. appear two articles pertaining to Forest Products:-

"A commercial Export Trial of an Improved Dump Apple Case" by R.F. Turnbull and W.M. Carne,

and "The Starch Content of Some Australian Hardwoods in Relation to their Susceptibility to Attack by the Powder Post Borer, Lyctus brunneus, by J.E. Cummins and H,B. Wilson.

Reprints of these articles will be obtainable shortly.

Forthcoming Publications:
During the coming month, it is anticipated that three publications of the Division of Forest Products, which are now in the press, will be available for issue, These are:- (1) A revised edition of Trade Circular No.6, "Lyctus, or the Powder Post Borer", in which has been included the results of the latest investigation on the control of this borer.(2) C,S.I.R. Pamphlet No.55, "The Selection, Preservation, Distribution and Identification of Australian Pole Timbers" $ by J.E. Cummins and H.E. Dadswell, which is a comprehensive compilation of all information dealing with the pole timbers of Australia and their preservative treatment both. before and after installation. (3) C.S.I.R. Pamphlet No.57: "Tests of the Efficacy of the Oxy-acetylene Scouring and Charring Process for Sterilising Partly Decayed Poles", by J.E. Cummins, describes some laboratory experiments on the effect on partly decayed poles of the oxyacetylene charring treatment.

NEWSLETTER
Forest Products
1935##043
MONTHLY NEWS LETTER NO. 43 FIRST PUBLISHED IN 1 AUGUST 1935

KILN-DRYING VERSUS AIR-DRYING

When air drying can produce a satisfactory product, kiln-drying are on an equal footing in providing timber for many purposes. In some cases, kiln-drying is essential in order to provide timber at a sufficiently low moisture content, but when the required moisture content can be obtained by air-drying, the question as to which method of drying should be adopted must be decided, not on quality of product, but on points of expediency.

In considering the question of air-drying, we find that while no initial expenditure on plant is concerned, some capital has to be spent in laying out a large air-drying space and building and maintaining foundations. Further, considerable capital has to be tied up in timber held in the drying stacks over a period varying with the class of stock and the climatic conditions. Apart from the question of capital, there are definite disadvantages in air-drying. In the first place, there is a limit to the degree of drying that can be obtained and stock thoroughly air-dried in one district may be insufficiently dry for use in another, or, for particular purposes, in the district where dried. In the second place, uniformly dry timber cannot be obtained right throughout the year. In the third place, stock must be stacked out considerably in advance of requirements. Short notice orders for special stock cannot be met. Yet, again, degrade, which can be prevented by kiln-drying, is practically unavoidable, or can be avoided only by going to considerable expense, with certain timbers in certain districts, under air-drying conditions.

In kiln-drying, a certain amount of capital has to be tied up in plant, although the expenditure necessary in this regard is not as great as is commonly thought. Offsetting this, large stocks of timber in air-drying stacks have not to be provided for. In kiln drying, operating, supervising and maintenance expenses have to be met, but these also are less than is commonly thought. Looking further, there are no disadvantages, but several decided advantages. Any required moisture content can be attained at any time of year. Stock can be turned over quickly and special orders met at short notice. Certain degrade, practically unavoidable in air-drying in some localities (e.g. blue-stain), can be readily avoided.

A detailed analysis of the pros and cons of each method of drying for individual cases shows that in some cases kiln-drying is preferable to air-drying; in fewer cases, air-drying is preferable; in many cases, a combination of air-drying and kiln-drying is the best proposition of any. Where collapse is a serious factor, in almost every case a combination of air and kiln drying with reconditioning provides the most satisfactory solution.

Advice in this regard is given free of charge by the Division.

DETERMINING THE MOISTURE CONTENT OF POLE TIMBERS

For some processes of preservation, it is desirable to know the moisture content of the outside layers of a pole, and recently the problem was presented of finding a simple method for determining this.

The use of an electrical moisture meter appeared to offer many practical advantages for making such tests provided it could be successfully applied for such a purpose and to

investigate this possibility, a number of tests has recently been carried out by the Division of Forest Products. The taste consisted essentially of making moisture meter readings with electrodes driven to various depths in the pole and then in cutting a section from the pole at the position tested and determining the actual moisture variation from the surface inwards by means of oven drying tests. The effect of checking of the pole on the meter reading was also investigated. The tests indicate that an electrical moisture meter reading was also investigated. The tests indicate that an electrical moisture meter can be used quite successfully for such purposes provided care be taken as to the depth to which the electrodes be driven and that the electrodes are not driven on opposite sides of large checks. The more frequent small checks do not have any appreciable effect on the meter reading.

It has been found that the moisture content indicated by the blinker is within about 1% of the moisture content of the timber at the depth to which the electrodes have penetrated, provided, of course, that adjustment has been made for the ordinary blinker correction figure for the species of the pole timber.

TANNIN EXTRACT FROM AUSTRALIAN TIMBERS AND BARKS

Several years ago, the Council for Scientific and Industrial Research, in co-operation with the Western Australian Forests Department, erected a semi-commercial plant in the University grounds, Crawley, Western Australia, for the purpose of investigating the suitability of Western Australian woods and barks as sources of tannin extract. These materials were too low in tannin content to warrant transportation and use in the raw state. The experiments demonstrated that suitable extracts could be obtained and the results were sufficiently encouraging to attract the attention of commercial interests. With the object of continuing the investigations and of testing the market value of the extracts, the plant was later purchased by Messrs Plaimar Ltd., Perth, who, in co-operation with the Braddock Essential Oil Company Ltd., have gradually investigated all aspects of the proposed industry, including other raw materials not previously studied. As the investigations proceeded, a modern commercial extract plant was built up around the experimental unit as a nucleus.

This plant, which is now being operated in Perth by Industrial Extracts Ltd., cost $25,000 to erect and, working 24 hours a day, is producing 1,250 tons of high grade solid extract per year. It is anticipated that all this extract will be sold in Australia and, in order to cope with expert trade, another factory will shortly be erected in the forest country. When this is functioning, the capacity of the two plants will be in the vicinity of 4,000 to 4,500 tons of extract per year.

THE MOISTURE CONTENT OF GREEN TIMBER

The moisture content of green timber is usually considered to vary from about 40 per cent. to 200 per cent. These figures are based on the oven dry weight of wood and mean that the water in the wood may weigh up to twice the weight of the wood substance itself. Recently a timber was found with a green moisture content of between 400 and 500%, that is, with over four times the weight of water as of wood substance, or, in other words, over 80% of the weight of green wood is water.

This timber is known botanically as *Laportea photeniphylla*, and grows in Southern Queensland. It is sometimes known as fibrewood, a name which adequately describes the wood. It has little commercial use, but, when seasoned, should be suitable for insulation purposes, on account of its low density.

TESTS ON THE MECHANICAL PROPERTIES OF *PINUS RADIATA*

The Division of Forest Products has just completed a comprehensive series of tests on the mechanical and physical properties of plantation grown *P. radiata* from Mt Burr and Kuitpo in South Australia. The age of the 19 trees tested varied from 20 years to 35 years. A further 5 trees have just been received from Bundaleer for testing purposes. These trees are about 50 years old, and much slower grown than that previously tested, and it will be interesting to compare the properties of the

wood when grown under such dissimilar conditions.

TIMBER SEASONING LECTURES

Commencing on Monday, September 30th, and lasting for one week, a course of lectures and practical demonstrations in timber seasoning will be conducted by the Division of Forest Products at its laboratory, East Melbourne.

The course, which will include visits to commercial seasoning plants, will be free of charge. It will be open to anyone interested in timber seasoning, but the accommodation available makes it necessary to limit the number attending, and those making early application will receive first preference.

In the past, similar courses have been conducted in Brisbane, Sydney, Launceston, Smithton and Melbourne, and in each instance they have met with appreciative response. In Melbourne, last year, it was necessary to form two classes in order to accommodate all the applicants. It will not be possible to hold more than one class in Melbourne, this year, and as it is probably that no class will be held new year, those who wish to attend in September are advised to lodge their applications as early as possible. Applications, which should be sent to the Division, cannot be accepted after August 31st.

PERSONAL

Miss T.M. Reynolds, Ph.D., M.Sc., a graduate of the University of Sydney, and, until recently, the holder of an 1851 Exhibition of the Dyson Perrin's Laboratory, Oxford, is expected to reach Melbourne by the "Strathaird" on August 19th. Miss Reynolds has been appointed to a special position in the Wood Chemistry Section of the Division of Forest Products, and will be engaged upon fundamental studies of the constituents of Australian wood pulp fibres in relation to their paper-making qualities. This investigation has been made possible by a contribution of £400 per annum by Australian Paper Manufacturers Ltd.

PUBLICATIONS OF THE DIVISION OF FOREST PRODUCTS

Technical Paper No. 17 - "The Selection, Preservation, Distribution, and Identification of Australian Pole Timbers"

In this pamphlet, the results of a recent survey of the present practice of users of poles in Australia are given. Full details are also given concerning the number, size classes, average cost, number of renewals and annual extensions of poles throughout Australia. In addition, the various factors, such as termites and decay, affecting the life of poles, and those features likely to occur in a pole and which may affect its service life, are discussed, and a description of the most important methods of pole preservation and their probable relative economy are given.

In order to assist users in the correct identification of poles, a general description of the timbers used for poles and of their distribution, and keys for their identification are included, together with 16 plates showing the appearance of the cross-section of various pole species when viewed through a hand lens.

Technical Paper No. 18 - "Tests of the Efficacy of the Oxy-acetylene Scouring and Charring Process for Sterilising Partly Decayed Poles"

This publication gives the results of laboratory tests on the oxy-acetylene scouring and charring process for the treatment of partly decayed standing poles, the efficacy of the process being judged by an examination of sections of the treated poles for the presence of wood-inhabiting fungi. In the first series of tests, the process as initially developed in Australia by the promoters was used, but the results of tests indicated that a high degree of sterilization was not obtained. A number of factors appeared to be responsible for this, and in subsequent treatments, modifications in the technique of the process were made. In particular, it was found that the application of creosote oil was intimately associated with the degree of sterilization, and that its use was essential to the best results being obtained from the process.

In the pamphlet, a suggested procedure for treatment is outlined, and careful treatment in

the manner recommended can be expected, in suitable species, to give a relatively high degree of sterilization. To what extent this will increase the life of a pole is beyond the scope of these laboratory investigations, and will have to be obtained from service tests.

1935##044

NEWS LETER NO.44 September 1st, 1935.

THE USE OF ARSENICAL PRESERVATIVES IN HOUSES

The advice of the of Forest Products is often sought regarding particularly the use of arsenical preservatives for the treatment of termite (white ant) or borer infestation in houses. The use of arsenic is in general not advocated, unless it is certain that the method of construction of the house in question is such that no trouble is likely to eventuate.

It has been proved that if arsenical compounds are used and the portion of the structure to which they have been applied is damp, certain moulds can grow on the arsenic and convert it into a highly poisonous gas. This gas, if it enters a closed room, may cause serious illness or death to the inhabitants. In England, deaths have occurred due to the presence of arsenic in-the pigments of the wall paper and in the walls. In one particular case of two mysterious deaths, it was conclusively shown that moulds had developed on a damp wall and converted arsenic which was in the wall plaster and the paper to a very poisonous gaseous form. Evidence was given at the inquest that considerable quantities of arsenic were present in the lungs as well as in other organs of the body.

A very large number of different moulds appear to have the power of converting solid arsenic compounds to a gaseous form. These moulds cannot successfully develop unless damp conditions exist, Suitable conditions are found in damp walls, and the` under floors in badly ventilated houses. Unfortunately, bad underfloor ventilation is often accompanied by termite or borer attack, The use of arsenic compounds under such conditions is a definite hazard, and if its use is essential, the dampness should be eliminated immediately. If arsenic is used, a careful examination should be first made to ensure that conditions suitable for mould growth are not present and cannot develop.

Other preservatives, particularly in the case of borer attack, areas good as or more effective than arsenic, and in consequence, the general use of arsenical preservatives in houses is not advocated.

COAL TAR CREOSOTE - THE WOOD PRESERVATIVE.

The value of any material for use as a wood preservative is directly proportional to the degree in which it satisfies certain requirements which constitute the essentials of the ideal preservative.

First and foremost is the question of toxicity to fungi, termites, and other wood destroying organisms. Secondly, the preservative must retain its toxicity under actual service conditions. Thirdly it must not be a dangerous poison to men and animals, it must neither be highly inflammable nor injurious to wood and metal, and be safe to use and handle. Other considerations are its colour, odour, effect on paint, cost, availability and uniformity.

There is general world wide agreement, backed by service records that coal tar creosote is the substance which approaches closest to the ideal preservative, the essentials of which are outlined above. It answers to the more important of these requirements, but for certain purposes, its colour, odour and effect on paint may make its use undesirable.
The question of uniformity of the preservative has been investigated by a special Technical Committee. of the Standards Association of Australia, and a draft specification has been issued for use. Any coal tar creosote conforming to the specification should give satisfactory results as a wood preservative.

The manufacture and sale of any wood preservative lends itself to improper practice, such as adulteration with inferior and cheaper substances. Creosote has frequently been adulterated in this manner by the addition of tar, petroleum oil, and in some cases, used sump oil. These substances of themselves have little, if any, preservative value, and their addition adversely affects the handling and painting of the treated material.

At the present time, by the use of aluminium primers, it has been, found possible to successfully paint over creosote treated material, and thus one of the objections to the use of creosote has largely disappeared. Adulteration, however, often renders this more difficult and thus the practice is undesirable from this standpoint.

Prior to the issue of the, draft specification by the Standards Association, and even at the present time, creosote comprising mainly the lower boiling fractions of coal tar distillation is being marketed as a wood preservative. These highly volatile compounds quickly evaporate from the treated material which is thus left poorly protected or, in many cases, without protection at all.

The user of creosote should, therefore, safeguard, himself by the purchase of the preservative from reputable firms which give a guarantee that their product conforms to the draft specification mentioned above. Even if. this involves some additional cost, he will most certainly find it cheaper in the long run.

POLE TESTS IN VICTORIA.

In 1932, the Division of Forest Products established two pole testing sites in Victoria, namely, at Belgrave and Benalla. At these sites, poles or pole stubs of messmate (E. obliqua) were treated by various methods and installed in test.

The pole tests have created considerable interest among pole engineers, and at a recent inspection at Belgrave there were present fifteen visitors, and at Benalla, twelve. These visitors were representatives of the Postmaster General's Department, the State Electricity Commission, the Melbourne Electric Supply, the Melbourne City Council, and various industrial concerns and consulting engineering firms.

The untreated control poles have all been more or less affected by decay or termites and the value of treating is obvious. The relative values of the different methods of treatment used cannot be assessed until the test has been proceeding for a much longer period, but the periodical inspections are bringing out a number of interesting features. Pole testing sites have also been established in other States, and the Division welcomes the presence of anyone interested in pole preservation at the inspections. The dates of inspections can be obtained by application to the Division.

BREVITIES.

In a recent number of "The Malayan Forester", a publication of the Division of Forest Products on brittle heart is reviewed. It is interesting to note that research in Malaya confirms the observations made in Australia as to the occurrence and properties of heart, which is also a very prevalent defect in Malayan timbers. Attention is drawn to the fact that compression failures (cross shakes or thunder shakes) often occur in timbers subject to brittle heart, although the presence of, compression failures does not necessarily mean that the piece contains brittle heart. The weakening effect of compression failures is brought out in the review, where it is stated "that in Mauritius there is a very apt name for timber containing severe 'compression failures, viz., three-men boards, the third man being required not because of the extra weight of the board or plank, but to support it in the middle!"

Another article in this publication of interest to Australian motor-body manufacturers, particularly those who are contemplating extension of their activities to the tropics, is the.
rapid development of decay in car bodies under tropical conditions when the tuber used in their construction is not properly seasoned and gated with suitable preservatives.

As stated in a previous News Letter, the Division of Forest Products is carrying out a comprehensive series of tests on Queensland Cypress Pine (Callitris glauca). This investigation is still in its early stages, but already some interesting facts have been brought out. It has been found, for instance, that the radial and tangential shrinkages of this species are approximately equal. In most other species, the tangential shrinkage is considerably higher than the radial shrinkage and this difference is the

primary cause of cupping during seasoning. The fact that in Cypress Pine the shrinkage is small and is about the same in the two directions accounts for the fact that flooring of this. Species, although usually dressed when green, does not give trouble from cupping or warping after being laid.

Reference has been made from time to time to the starting up of new timber seasoning kilns, and although the general increase in interest in kiln drying is obvious, perhaps the extent to which this method of drying is now being used is not generally realised,

A recent examination of the position in Australia has shown that during the year 1934-35, the total, number of plants at which kilns, drying rooms or veneer driers were operated increased by 25% over the figures for the previous twelve months, while the number of individual units in all plants increased by over 40%0 Installation of new plants is still steadily proceeding, so that it is obvious that the standard of seasoning throughout Australia is showing very great improvement.

Mill grading studies have now been carried out in Victoria and South Australia in connection with the Commonwealth wide investigation on the grading of Australian timbers by the Division of Forest Products. Towards the end of September, the grading officers will visit Tasmania and will spend. about two months at some dozen or so mills in the North-west, North-east and Southern districts.

NEWSLETTER

Forest Products

1935##045

MONTHLY NEWS LETTER NO. 45 FIRST PUBLISHED IN 1 OCTOBER 1935

A LARGE TIMBER TESTING MACHINE FOR THE DIVISION OF FOREST PRODUCTS

The Division of Forest Products has placed an order for a large Southwark-Emery testing machine for carrying out tests on the strength of timber and timber structures. This machine, which will probably be the largest precision testing machine in the Southern hemisphere, will form part of the equipment of the new Forest Products Laboratory to be erected in Yarra Bank Road, South Melbourne. The machine will be capable of applying loads up to 600,000 lbs., and will take columns up to 24 feet in length, and beams, or built up structures such as bridge girders, of practically unlimited length.

The tendency overseas is towards new methods of timber construction, but in order that these methods may be used safely and economically under Australian conditions, it is necessary to test not only individual parts of structures, such as joints, but also to carry out full scale tests on completed structures.

The machine, which will be the first of its type in Australia, will be hydraulically driven, the load being indicated on sensitive dial gauges which enable increments of load as low as 20 lbs. to be accurately measured. The maximum error for loads from 4,000 lbs. upward will be well below 1%. Below 4,000 lbs., the maximum error will not exceed 40 lbs.

Some idea of the size of the machine may be gathered from the fact that it will weigh about 25 tons and will extend about 30 ft above the ground, besides requiring a pit about 12 ft deep to take the loading mechanism. The purchase of the machine was made possible by the gift of £5,000 by Mr W. Russell Grimwade, Chairman of the Victorian State Committee, Council for Scientific and Industrial Research, for the purchase of new equipment for the Division.

THE STRENGTH OF NOTCHED BEAMS

Recent investigations in America have shown that the common practice of notching the ends of joists or beams where they rest on plates or bearers has a very serious effect on the strength of the joist or beam. For instance, where the depth of the joist or beam is large compared with its span (i.e., where shear strength is important) cutting out a notch half the depth of the beam reduces its strength to one quarter. It was also shown that by rounding off the bottom of the beam to avoid the sharp angle at the notch, the strength of the notched beam was considerably increased.

Experiments carried out by the Division of Forest Products have confirmed the results obtained in America, and, in addition, it has been found that merely cutting away the bottom of the beam at the notch by means of a slanting saw cut is practically as effective as a curved cut in improving the strength, beams so shaped being over twice as strong as those with ordinary shaped notch. Complete details of these investigations will be published shortly.

SCANTLING TESTS

The faults which occur in Australian constructional timbers are somewhat different from those which are encountered in other timbers. For example, gum veins and gum

pockets are very common, and because of their prominence there is a tendency to consider that the effect of these faults on strength is much greater than it really is. From general principles, it would appear that gum veins and gum pockets are not very important defects constructionally, and that knots and decay are likely to be the most important strength reducing factors. A series of preliminary tests of hardwood scantlings is at present being carried out by the Division of Forest Products to provide further information on this viewpoint.

TEST SLEEPERS IN SOUTH AUSTRALIA

240 treated *Pinus radiata* sleepers have just been consigned to South Australia, where they will be placed in service by the South Australian Railways. The sleepers, which have been treated under pressure in the experimental plant of the Division of Forest Products, using creosote, creosote plus crude oil and a solution of zinc chloride and arsenious oxide, will be installed together with untreated pine controls and new sawn jarrah. The test is planned to study also the effect of mechanical wear under varying conditions of track service, provision being made for sleepers to be placed in curves and on straights and on the level and on grade. In order to reduce mechanical wear and spike killing, a special sleeper plate has been designed and made by the South Australian Railways. This allows independent fastening of the plate to the sleeper and should reduce movement of the rail and plate on the sleeper.

The test sections are on the Peterborough - Broken Hill and Peterborough - Port Pirie lines and inspections will be made at intervals of about two years to determine the behaviour of the sleepers. The work is being carried out in a co-operative project between the S.A. Railways, and the S.A. Woods and Forests Department, and the Division of Forest Products.

SEASONING CLASSES

From time to time the Division of Forest Products has carried out classes in seasoning. These last a week, and include lectures, practical work, and visits to commercial kiln and air seasoning installations. In past years, successful classes have been held in Melbourne, at Smithton and Launceston in Tasmania, and in Sydney and Brisbane. At the present time, a class which started on 30th September is being held in Melbourne, and this is being attended by about thirty students of seasoning. Owing to shortage of accommodation, the class had to be limited, but special provision is being made for this phase of the Division's activities in its new laboratories so that in future years no restriction will be necessary.

BREVITIES

As mentioned in a previous News Letter, the Division of Forest Products has designed a 100' fire lookout tower, which is to be erected at Kirup, W.A., by Western Australian Forests Department. The design of this tower incorporates recent developments in timber design overseas, particularly in the use of modern timber connectors, which have enabled the size of the members to be considerably reduced as compared with conventional designs.

Mr Ian Langlands, Timber Mechanics Officer of the D.F.P., will supervise the erection of the tower, which will be started about the middle of October, and will be completed in time for the coming fire season. Arrangements have been made for the tower to be inspected by members of the Institute of Engineers, Australia, during the annual conference of the Institution which will be held in Western Australia in March.

The Division of Forest Products has been seriously hampered by its severely limited accommodation in temporary laboratories. The position became succeedingly more acute with additions to personnel and equipment and the sum of £25,000 was, therefore, granted by the

Commonwealth Government for the erection of permanent laboratories for the Division. This will permit the erection of adequate and appropriate office accommodation for the administrative section of the Division, substantial and properly equipped laboratories for the sections dealing with delicate equipment and utilitarian buildings for those sections associated with the handling of timber in large quantities of large sizes, and whose activities are more of an engineering nature.

The Victorian State Government granted at a nominal rental the lease of an excellent site in Yarra Bank Road, South Melbourne, adjacent to the Spencer Street Bridge. The Division will thus be installed in the midst of the timber industry, adjacent to the main timber wharves, yet within half a mile or so of the heart of the city of Melbourne, the main interstate railway station, Spencer Street, and the main suburban station, Flinders Street. It is impossible to imagine a site better placed to enable the Division to maintain close contact, on the one hand with the main city centre of the timber industry, and on the other, with the most important body of timber users, the public generally. Tenders for the new laboratories close on 7th October, 1935.

A party of students from the Australian Forestry School, Canberra, spent a week in Melbourne during September. The students put in two days in the laboratories of the Division, and the activities of the various sections were explained and demonstrated by the various section heads. Later, visits were made to a number of typical wood working and wood using plants in Melbourne and suburbs.

PERSONAL

Mr I.H. Boas, Chief, Division of Forest Products, is at present in South Africa at the Empire Forestry Conference. At this year's conference, special attention is being given to forest products matters, and before arriving in South Africa, Mr Boas visited U.S.A., Canada and England to investigate timber matters. While in England, he attended a meeting of the Timber Advisory Committee of the Imperial Institute. This committee prepared grading rules for empire hardwoods, but the sections referring to Australian timbers did not meet with the approval of Australian producers. As a result of the discussion, some of the difficulties have been eliminated and the question is to be further discussed at the conference. Mr Boas will return to Australia about the middle of November.

Arrangements have been made for Mr C.S. Elliot, Senior Seasoning Officer of the Division of Forest Products, to proceed to U.S.A., Canada, England and the Continent to study the latest developments in seasoning and to establish closer contacts with officers carrying out seasoning work in Forest Products institutions abroad. Mr Elliot will leave by the "Lurline" on 9th November, and will be absent for twelve months.

The Trustees of the Science and Industry Endowment Fund have appointed a junior research student in timber pathology to the Division of Forest Products. Miss Shirley Hoetts was the successful applicant for the studentship, and she has commenced investigations in the Division into the problems of decay in Australian timbers. One of the main features to be investigated is the problem of brittle heart in Australian timbers. Preliminary investigations have shown that it is probably associated with fungal attack.

Following on field investigations into the grading of timber in Victoria and South Australia, two officers of the Utilisation Section of the Division of Forest Products are at present carrying out mill studies in Tasmania. One of the officers, Mr A.J. Thomas, is at present studying the southern mills, and will later proceed to the north east,

while the other, Mr F.E. Hutchinson, is carrying out similar work at the north west mills and will later proceed eastward. These investigations are part of an Australia-wide study of the grading of Australian timbers and are to provide information to assist in the formulation of standard grading rules for classes of Australian timber.

NEWSLETTER
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THE PRESERVATIVE TREATMENT OF GREEN TIMBER BY DIFFUSION PROCESSES

Australia in the near future is likely to be confronted with the problem of the supply of suitable timber for poles, sleepers, and general constructional work. In other parts of the world the solution of this problem is found in the effective use of various preservatives and preservative processes to confer durability on naturally less durable, but otherwise suitable, timbers. Unfortunately, in Australia, limited success only has attended the efforts to develop suitable processes, for the truewood of the eucalypts generally is very hard to treat.

For the past few years in Germany, considerable work has been done on the preservative treatment of timber, both green and air dried, by a process depending on diffusion for the penetration of the preservative materials. Briefly, the process consists of immersing the timber in concentrated solutions, or of embedding it in a paste of the preservative which thus penetrates by diffusion through the timber. Salts of an inorganic nature are used as the preservative.

Considerable success is claimed for this method of impregnation. Statements have been made that spruce and white oak, two timbers notoriously difficult to treat with creosote, are impregnated with ease. If this is so, then it may be practicable to impregnate our eucalypts which, in some respects, are similar to white oak (*Quercus* spp.) in structure.

Considerable work must be done, however, before a decision can be made whether the process is suited for use with Australian timbers. To this end, a series of small scale preliminary tests have been established, using two Victorian eucalypt species, namely, Messmate (*E. obliqua*) and Mountain Ash (*E. regnans*). From these experiments, it is hoped to obtain information along the following lines:-

(a) Whether such eucalypt timbers can be penetrated by preservative material in this way, and the time necessary to effect certain depths of penetration.

(b) Whether the concentration of preservative obtained is sufficient to afford protection against agents of destruction, such as decay and termites.

(c) The effect of moisture content on penetration. Previous experiments in Europe and U.S.A. have indicated that the rate of penetration is dependent upon the moisture content of the timber.

(d) The effect of the dimensions of the material on the penetration obtained.

(e) Whether better results are obtained using pastes or solutions of varying concentrations.

If the results of these preliminary experiments warrant it, further tests of larger timbers will be made. It is hoped that large size constructional timbers which have been freshly cut can be successfully impregnated in this way, thus avoiding the inconveniences and complications usually associated with the drying of such materials.

SEASONING NOTES

Timber is used for a very wide range of requirements and in some of the special uses the conditions of service are very exacting. Thorough seasoning is nearly always a requisite, and in the case of timber used in large sizes, this very often presents a serious problem. Recently a manufacturer using a dense Australian timber in planks about 10 inches wide and 4-5 inches thick, was faced with a sudden increase in demand for his product and insufficient supplies of seasoned timber to meet it. The methods of seasoning used normally required several years to produce a satisfactory product, so that some modifications had obviously to be made. The manufacturer approached the Division of Forest Products and samples were forwarded for investigation purposes. The timber at one stage of manufacture had to be cut into pieces about 5 inches long along the grain and the first tests were made with the object of finding out whether this docking to short lengths could be carried out on the green planks to obtain the advantage of more rapid drying from the end grain of the timber. Kiln tests of these billets were also made and although the best drying schedule has not yet been determined, it has been demonstrated that it will be possible to kiln dry this material in a matter of some two months.

The Division of Forest Products is always willing to advise on problems of this sort and, where necessary, kiln tests in the experimental kilns of the Division can often be arranged without interfering unduly with the programme of work. The Division has five experimental kilns, four of which are provided with automatic control equipment. The control for the fifth kiln is at present on order and is expected to arrive at an early date.

A HUMAN DISEASE DUE TO TERMITES (WHITE ANTS)

In a recent report, 1934, of the Assistant Entomologist and Controller of Plant Pests for Clayton (published in the Bulletin of the Imperial Institute, Vol. 33, No. 2, 1935) there is an interesting account of a disease called "sprue" and its probable relation to termites. Sprue is a disease which affects the digestive system and in some cases causes death. An examination of houses in which the occupants had developed sprue resulted in the finding of termite infestation. The termites were "dry wood" species, i.e. they were able to live and develop in seasoned timber without the necessity of maintaining contact with the ground or with moisture. These termites make characteristic pellets which are ejected in relatively large quantities from their workings. In several cases, the termites were working in the food safes or in the kitchen and there was no doubt that in these instances food would be contaminated by the droppings. The relation between the presence of the termites and the disease is being closely investigated further by a microbiologist.

TEST OF TREATED FENCE POSTS AGAINST TERMITES (WHITE ANTS) NEAR BENALLA, VICTORIA

In February of this year, a number of small test specimens treated with various wood preservatives were exposed to the attack of termites in a badly infested area on the Benalla - Mansfield road. For protection, the test area was enclosed with a fence composed of round and half-round posts of Victorian red stringybark (*E. macrorrhyncha*) and apple box (*E. stuartiana*), timbers common in the district. These posts were treated by the hot and cold bath process with two preservatives:

(a) A mixture of 70 parts of creosote and 30 parts of crude oil.

(b) A solution containing 3½ per cent. by weight of zinc chloride and 2 per cent. by weight of white arsenic.

These two preservatives are at present giving good results in a test of treated fence posts in Western Australia.

It was found that the sapwood of the posts treated with the oil preservative was completely penetrated, but that incomplete penetration was secured in some of the apple box posts treated with the water solution. The average adsorptions per cu.ft. of treated post were 7 lbs. for the oil preservative and about 0.7 lb. for the zinc chloride and arsenic estimated as dry salts. The preservatives will be exposed to severe test conditions. Should they prove successful, it will be of considerable interest to pastoralists in Victoria as both preservatives are cheap and available in large quantities. The posts will be inspected

annually, and their condition compared with that of the untreated controls.

HARDWOOD TIMBER FOR CASE STOCK

Hardwoods because of their superior strength and nail holding power have many advantages for case manufacture. In the past they have not been as popular as they should be partly because of their greater weight as compared with softwood case timbers and partly because they have often been used in an insufficiently seasoned condition. However, for some years past, kiln dried case timbers from eucalypts of the mountain ash type have been a feature of the Victorian and Tasmanian trade, and such material has proved highly satisfactory. This development followed experiments by the Division of Forest Products on the rapid drying of thin case stock.

The possibility of extending this phase of utilisation to the somewhat denser eucalypts of the northern States has been under consideration for some time. Obviously, the first stage in determining the value of kiln dried case stock must be the determination of suitable conditions for drying this material in the kiln. Experiments have recently been completed by the Division of Forest Products on the kiln drying of mature blackbutt (*E. pilularis*) for case sides and ends and suitable drying schedules have been developed. Similar tests on immature blackbutt are about to be commenced.

SLEEPER TESTS IN VICTORIA

It is common knowledge that Australia's heritage of very durable timbers is being rapidly depleted, and each year further difficulty will be met in meeting with demand for such items as sleepers, poles, bridge timbers of the durable class of timbers such as grey box, red gum, ironbark. In Victoria, the position is more acute than in some of the other States. In order to study the suitability of the less durable Victorian species for railway sleepers, a co-operative project has been drawn up by the Victorian Forests Commission, the Victorian Railways and the Division of Forest Products. The object of this is to study the treatment of the various less durable species, to treat and install a number of these in test tracks carrying varying traffic loads and to obtain data on the lives of such sleepers when compared with the present durable timbers, such as grey box and yellow stringybark.

It is realised that some of the softer timbers may need protection in the form of sleeper plates in order to prevent rail cutting. Two different types of sleeper plates will be used, together with unplated sleepers. In one type of plate, a new departure from standard Victorian practice is proposed, special provision being made in this plate for independent fastening of the plate to the sleeper and the rail to the plate.

The test will comprise about three thousand sleepers, and should give very valuable information which will permit better utilisation of our existing forests, and also assist materially in the development and tending of the future timber supplies of Victoria.

BREVITIES

Following upon a seasoning class held at the laboratories of the Division of Forest Products, Melbourne, during the first week in October, five students of the Victorian Forests Commission's Forestry School at Creswick spent a few days in the various sections of the Division. The operation of the timber preservation plant, strength testing machines and the box testing drum were explained and demonstrated, and lectures on the latest developments in control of wood borers, timber utilisation and wood chemistry were given.

Tenders for the erection of the new Forest Products Laboratory at Yarra Bank Road, South Melbourne, closed with the Works Branch of the Department of the Interior, Melbourne, on October 7th. The successful tenderers were John R. and E. Seccull, Pty. Ltd., St Kilda. Piles for the foundations are at present being obtained and work will proceed at an early date.

Mr I.H. Boas, Chief, Division of Forest Products, returns to Melbourne on the "Oronsay" on November 18th. For the past seven months he has been on a visit to U.S.A, Canada and England, followed by attendance at the Empire Forestry Conference recently completed in South Africa.

Mr. H.E. Dadswell, Senior Wood Anatomist to the Division of Forest Products, returns to Melbourne on the "Esperance Bay" on the 14th November, after a visit to U.S.A., Canada, England and Holland.

Mr A.W. Mackney, M.Sc., a graduate of Sydney University, joined the staff of the Division of Forest Products on 1st November. During the absence abroad for two years of the Senior Chemist of the Division, Mr W.E. Cohen, Mr Mackney will carry out investigations on the chemistry of Australian timbers.

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NEWSLETTER
Forest Products

1935##047

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THE MANUFACTURE OF PAPER FROM PINES

From time to time notes have appeared in this News Letter regarding the possibility of utilising resinous pines for the manufacture of newsprint, fine printings, and writings. It has been pointed out that if this is both technically possible and economically sound, it will be of great importance to the outstanding problem of utilising the thinnings from pine plantations. Because of this, the visit of Mr I.H. Boas, Chief of the Division of Forest Products, to the laboratory in Savannah, Georgia, where Doctor Herty and his team of workers have been at work for some years on the pulping of resinous pines, is of particular importance.

Doctor Herty's work is financed by the Chemical Foundation, a body which took over German patents during the war and which uses the profits from these to finance essential developments in the industry in the United States of America.

The plant of Savannah consists of a complete semi-commercial unit for pulping and paper making, and in addition a very well equipped chemical and testing laboratory. Doctor Herty's claim is that, by properly controlling the cooking conditions, particularly in the early stages of the pulping process, he can get a good white bleached pulp suitable for blending in newsprint or for high grade writings and paintings without any pitch troubles. He confines this claim entirely to sapwood and readily admits that the heartwood of the pines cannot be pulped satisfactorily. On the basis of this work he suggests that the process be used on young pines in which heartwood has not developed at the time of logging. Such material would be mainly the product from the thinnings of pine plantations.

Further, Doctor Herty asserts that he can grind such pines into a good grade of mechanical pulp suitable for newsprint. The wood is not really very resinous, though resin flows freely when the pine is topped. This resin is largely formed at the wound and is not present in the wood.

Inspection of the work showed that both these claims seem to be well established and that Doctor Herty and his co-workers have successfully overcome the technical difficulties in the pulping of pines and the manufacture of white papers. This leaves the very important question as to whether the process can be worked economically in competition with pulp from other sources (spruce, hemlock, fir).

This question is far more difficult to answer. Doctor Herty placed his cost of wood at a very low figure indeed, so low that it could return nothing to the forest. With such a cheap raw material he shows that his process produces paper at a very favourable cost. Before this claim can be accepted several difficulties have to be overcome. If the paper company owns the timber and is satisfied with making a profit on the paper only, it may be possible to get wood supplies at the figure quoted. Also it is easy to work out a low cost from relatively small quantities, but much more difficult for very large quantities over a long period of time when transport costs get higher and higher. Further, it is not quite certain that blue stain, which rapidly discolours the sapwood of pine logs, is not going to prove a far more serious problem than is anticipated, unless the paper mill can run continuously with very small reserves of wood.

The whole question of the economics of Doctor Herty's process needs close investigation. He and his fellow workers deserve a great deal of credit for having at least provided a solution of the technical aspects of the problem. It is, however, not safe to build plans for large scale production on the information so far available. Only the first step has been taken. The equally important question of economics has still to be answered.

THE USE OF SMALL TREES

A problem exercising the minds of foresters in most countries is that of making efficient use of the small timber which, in the process of thinning, is removed from plantations or regenerating areas. This particular question was studied by a special Committee of the Empire Forestry Conference which was held recently in South Africa.

The conclusion reached by this Committee was that there is no general solution to the problem. Several methods for the utilisation of thinnings have been developed, but in each case their success depends on local conditions. It is possible for example in parts of the Union of South Africa where pine plantations have been established near the centres of population to develop successfully the box making industry. A factor which makes this possible is the cheap native labour. There are a few excellent examples of very complete utilisation of this kind in South Africa, but they would not be possible in many other countries. Only especially favourable economic factors can make the complete conversion of small logs into boxes a profitable undertaking. At the Forest Products Institute in Pretoria especial attention has been given to the problem of utilising small timber and with considerable success, but it is very necessary to keep in mind the special circumstances that exist. In addition to very cheap labour there is the factor that very low grade timber is accepted in South Africa. Such a condition has developed because of the fact that South Africa is practically a treeless country. Success in these small industries carries with it the grave danger that there may grow the idea that they can be indefinitely extended. This is not so. As more of the South African plantations approach the thinning stage, larger and larger quantities of small logs will be produced. The outlet for these will then become crowded. It is only as a plantation scheme approaches its maximum development that the real problem of thinning disposal makes itself felt.

In the meanwhile, in some cases, it is possible to establish a number of small industries; in other, and probably in the majority of cases, it is a question of leaving the plantations unthinned or paying for the cost of thinning with the reward of bigger and better timber when the crop is harvested.

In South Africa as in most other countries the old story of making paper has raised great hopes. Needless to say, the prospects in this direction are more than doubtful.

To summarise the position re. the use of thinnings, it can be said that for each area there may be possible one or more industries which can be profitably established or which may pay a part of the cost of the thinning operations. In very few places, however, will there be such a combination of favourable conditions that large volumes of thinnings can be utilised with profit.

NEW FOREST PRODUCTS LABORATORY

An interesting feature of the new laboratory of the Division of Forest Products is the special provision that has to be made for foundation owing to the very low bearing capacity of the soil. The main building will stand on an area of river silt which has here a depth of over 100 feet and sufficient stability will be provided by a combination of friction piles covered with a reinforced concrete raft.

The piles, many of which have already been driven, vary in length from 40 to 50 feet and are being obtained from the Victorian forests. Any species obtainable, which will provide the requisite length and diameter, can be and is being used, irrespective of its durability.

It is not generally known that timber decay is due to the action of wood destroying fungi which need for their development an adequate air supply. The tops of the piles will be cut off a foot or two below ground level which means in this locality that the whole pile will be in water logged soil with insufficient air supply

to support the growth of fungus. Hence, rotting of the timber will be impossible.

BUTTER BOXES

Some time ago, the Division of Forest Products of the Council for Scientific and Industrial Research developed a method for spraying hoop pine butter boxes to prevent wood taint in the butter. This was later made compulsory for all hoop pine boxes for export.

It is interesting to note that during the recent visit of the Chief of the Division to England, enquiries elicited the fact that complaints in regard to wood taints had disappeared since the sprayed boxes began to arrive in London.

The process has been taken up by a dairy factory in Canada with success, and a cheese factory in U.S.A. is also experimenting with the process. The simplicity, cheapness and effectiveness of the process will undoubtedly lead to its very wide adoption in those industries in which the product is liable to be affected by volatile oils form the timber containers.

WOODEN FIRE TOWER IN WESTERN AUSTRALIA

The erection of a wooden fire lookout tower as designed by the Division of Forest Products for the Western Australian Forests Department, has just been completed. Mr I. Langlands, Timber Testing Officer of the Division, supervised its construction. The tower is 110 feet high (the tallest in Western Australia), 20 feet square at the base and 8 feet square at the top. It was wholly constructed of jarrah, green material being used in the framework and dry material for the stairs which run up the centre of the tower. In the construction of the tower, metal timber connectors of the split ring type were used. This is the first time on record that such timber connectors have been used with hardwoods. Each of the four sides of the tower were completely assembled on the ground. The bolt holes were then drilled and each piece carefully marked, after which the sides were dismantled and the grooves for the connectors cut, using the bolt holes as guides. The tower was then assembled piece by piece, scaffolding being used for the bottom 15 feet only. Each of the four reinforced concrete footings was 6 feet 9 inches deep and 5 feet square. During the whole of the construction which took six weeks, no unusual difficulties were encountered.

BREVITIES

Mr W.E. Cohen, B.Sc., Senior Chemist of the Division of Forest Products, has been awarded a Commonwealth Fund Service Fellowship for the period of 20 months and will be leaving for the United States of America on the "Monterey" sailing December 11th. While abroad he proposes to investigate recent advances in the chemistry of forest products and in related subjects. The greater portion of his time will be spent at the University of Wisconsin with which institution the United States Forest Products Laboratory co-operates.

The Commonwealth Fund derives its income from moneys left in trust by Mrs Stephen V. Harkness of New York and its Service Fellowships are open to Government servants in the British Empire. The object of both these and the general Fellowships is to give international opportunities for eduction and travel to young men and women of character and ability, and opportunities are offered to British Students to study at American Universities, in order to promote the mutual amity and understanding of Great Britain and the United States.

Five Fellowships are offered each year to men who are holding appointments in the Government Service overseas, and it is interesting to note that this year three out of the five were granted to Australian graduates.

Mr Cohen is a Western Australian and a graduate of the University there, where he obtained his Honours Science degree specialising in chemistry. He has been on the staff of the Council for Scientific and Industrial Research since 1927 and for the past five years has been in charge of the chemical work of the Division of Forest Products.

INTERNATIONAL ASSOCIATION OF WOOD ANATOMISTS

During the course of the recent Sixth International Botanical Congress held in Amsterdam during the first week in September, the International Association of Wood Anatomists took the opportunity of having several meetings and discussions. Some thirty members of the Association were present at these meetings, including seven members of the Committee. The Division of Forest Products was represented by its Senior Wood Anatomist, Mr H.E. Dadswell. At present the Association has a membership of 87 representatives of 25 different countries and all these members are connected in some way with the study of wood anatomy. Such an intensive study of the structure of wood will eventually lead to better methods of identification, since the general knowledge of wood will be greatly increased.

At the meetings in Amsterdam, the Secretary of the Association, Professor S.J. Record, gave a paper in which he outlined the various problems confronting the anatomist. One particular point was greatly stressed and that was the need for greater co-operation between the wood anatomist and the taxonomist, especially with regard to botanical relationships and to the formation of new species. It has been found numerous times that the examination of wood structures gives the key to botanical relationships which were previously obscure. It is, therefore, hoped that in the future systematic botanists will give greater consideration to the structure of the wood of the tree or shrub which they are examining.

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