

1934

KENYA

1934

23336

23336

C0533/452

Reports by Mr S.H. Wimbush.
on his Forest Utilisation Course
or Timber Trade.

Previous

4076/33 EA.

22808 EA.
Wimbush.

Subsequent

4/2/34

11/1

Mr. Innes

11/6

10/7

C.S. Forestry
Handwritten
Nominal

Prof. R.S. Troup (c.o) _____ 14 Nov 34

Encls. reports by Mr Wimhurst on hardwood lumber
imports into U.K. & possibilities of export of Kenya Timbers, & Progress
Report, & E.A. Forest Cuts. & Visit to Home & Foreign.

The necessary action was taken on
file of Wimhurst (22808 EA) (v.v.)

P. H. J.

11/6/35

✓

SM

Windsor to Wood

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Reports received under cover of letter
from Prof. B. S. Trapp which is regd. as No 41
on 22808 F.A. Wombush.

HARDWOOD LUMBER IMPORTS

UNITED KINGDOM

Approved stocks of timber and logs, with
conditions, sources, and date etc.

S. H. Wimbush,
Assistant Conservator of Forests,
Kenya Colony.

11th May 1934.

... notice which...
... on the above...
... Other...
... and Birmingham...

1. METHODS OF IMPORT OF LUMBER.

BRITISH HARDWOOD IMPORTS.

(a) Imports.
Notes on the import of Hardwood Lumber, made while attached
to the firm of Messrs. Wm. Mallinson & Sons Ltd., 130 Hackney
Road, London, E.3. by Mr. S.H. Wimbush, Assistant Conservator
of Forests, Kenya.
Imports: these agents are in constant touch with the shippers

(or the millers) on the one hand and the merchants on the other

The following points are covered by the notes in this report:-
They understand conditions in the country of origin of

the lumber, and those governing the requirements for the lumber

1. Methods of Import.

in the English market, and are thus in a position to supply

2. Delivery of Lumber to Yards.

with demand. They are able to answer questions on

3. Measurement of Lumber.

questions of quality, dimensions and seasoning of the lumber

4. Inspection of Lumber.

as required by the merchants, and in particular of the lumber

5. Dimensions and classes of lumber.

existing as to the condition of the lumber received

6. Seasoning of Lumber.

by the merchants, they act as mediators between shippers and

7. Retail of Lumber.

merchants who, owing to the increasing distance, as well as

8. Degrade in Transit.

their different standards would be likely to find agreement

Appendix. Stocks of Lumber and logs, with notes
on sizes, sources, and uses etc. They have

a thorough knowledge of customary methods of business and are

The firm in whose yards the following notes and
information were obtained are merchants dealing primarily in
contract were advantageously than the shipper himself.
hardwoods and veneers. They handle only small quantities of

softwoods for special uses such as aeroplane construction and
pattern-making, and do not deal in softwoods in bulk. They
carry a very fine stock of veneers, some cut in English mills,
others cut in Paris where the firm have an associated business,
and they also retail plywood manufactured by an associated firm
in Hackney. These notes deal only with their hardwoods
Empire hardwoods in the past has partly at any rate been the
activities which are centred in their yards at Old Ford on the
River Lea and on the Thames where they have a yard opposite the
Surrey Docks. Other yards are in the provinces at Bury-St.-

Edmunds and Birmingham.

1. METHODS OF IMPORT OF LUMBER.

(a) Import through Agents.

See over.

U
I. METHODS OF IMPORT OF LUMBER.

(a) Import through Agents.

Shippers of sawn lumber from abroad commonly appoint agents at the U.K. Port of entry through whom merchants' orders are called to the shippers and who arrange import. These agents are in constant touch with the shippers (or the millers) on the one hand and the merchants on the other hand. They understand conditions in the country of origin of the lumber, and those governing the requirements for the lumber in the English market, and are thus in a position to correlate supply with demand. They are able to advise shippers on questions of quality, dimensions and seasoning of the lumber as required by the merchants, and in the event of any dispute arising as to the condition of any parcel of lumber received by the merchants, they act as mediators between shippers and merchants, who, owing to the intervening distance, as well as their different standpoints would be likely to find agreement difficult or at any rate prolonged by discussion. They have a thorough knowledge of customary methods of business and are thus in a position to arrange the financial side of any contract more advantageously than the shipper himself.

Where agents in the U.K. are not employed, shippers may make contracts direct with a merchant. This may be entirely satisfactory, but is not recommended in the case of shippers sending over woods of the import of which little experience has been obtained. It seems probable that the unsatisfactory condition on arrival of parcels of little-known Empire hardwoods in the past has partly at any rate been due to insufficient understanding by the shippers of the quality and condition of the lumber required by the merchants.

(b) Import through Brokers, and Sale by Auction.

Newn logs, round logs, curls, butts, and generally speaking all forms of unsawn timber are imported by

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firms of brokers who sell the logs by public auction after inspection by purchasers on the quay. Such logs may however, be disposed of by the brokers by private sale over-side from the ship in which case the brokers are acting as agents. This is frequently done. Merchants may also import logs through agents in the same way as they purchase sawn lumber, but certain woods are as a rule shipped to brokers who accumulate stocks in the dock-sheds until stocks (and the demand for them) warrant the compilation of a sale-catalogue. Such woods are mahogany, walnut, Ireko, whitewood, which come in the form of hewn logs from West Africa; Honduras, Cuban, Peruvian and other mahoganies shipped from Central America, and other tropical woods sent over in log form. In such cases the merchant is able to inspect the timber (in the log) before he purchases. The method of measurement of logs by the brokers and the procedure of an auction sale is described below.

BROKER'S MEASURE OF LOGS.

The contents of round logs are calculated by multiplying the square of the quarter-girth (nearest half foot) and dividing by 12. The result being in superficial feet. Logs of timbers other than mahogany are listed in the catalogue in cubic feet, the divisor in this case being 12. Mahogany logs allowance is made on the length for saw-kerf. This is not done in the case of other timbers. Each log may comprise a single sale-lot or several logs be sold together, even up to 40 logs in a lot.

Hewn logs of mahogany are measured by "brokers sale measure" with a "mahogany-rule" on which 8 inches is marked as 7, 16 inches as 14, and so on. This deduction of an inch in every 8 inches is an allowance for saw-kerf in the consequent conversion of the log by the purchaser. The length is taken to the nearest half foot and the width is measured to the full inch at a point about one third from the small end of the log, the side measured being the smallest of the four sides of the roughly squared log. If the side opposite to the

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smallest side shows a measurement greater by 3 inches than the smallest side, one inch is added to the measurement recorded for the width of the log. Allowances are made for irregularities in the log, as well as defects. The resulting volume of the log is then listed in the sale catalogue as "Sale Contents" and is given in superficial feet. The full width of the log at the butt is also listed in the catalogue together with the length; also the "extreme contents" calculated from the true width and length without any allowance for saw-kerf or defects. This is given as an indication to the purchaser of the actual size of the log.

2. Measurements. Logs of large dimensions are usually hewn logs of timbers other than mahogany are measured by "calliper measure" of the full width at midpoint of the log without any allowance for defects or saw-kerf.

The sale contents of round logs are calculated by multiplying the square of the quarter-girth underbark at midpoint (girth taken to the nearest inch) by the length (to the nearest half foot) and dividing by 12, the result being in superficial feet. Logs of timbers other than mahogany are listed in the catalogue in cubic feet, the divisor in this case being 144. In mahogany logs allowance is made on the length for defects but this is not done in the case of other timbers.

have large dimensions, reddish-brown color, and mild texture.
AUCTION SALE PROCEDURE.

Logs showing figured grain fetch a premium over plain logs. Sales are held in London about once a month, or more often. This is often very considerable and figured logs may fetch as much as three, or four times the price of plain logs. Catalogues are issued by the brokers a week or so before the date of the sale and the numbers of the sale lots marked on the logs in the dock-sheds where they lie. Prospective purchasers are thus able to inspect the logs offered for sale, to select logs suitable for their requirements, and to estimate the limit to which it will be economic to raise their bids at the sale.

and 30 per cent on prices of 5-10 per cent and upwards.

INSPECTION OF LOGS BY PURCHASERS.

The points that a purchaser will look for when inspecting logs offered for sale are shortly as follows:-
1. Shippers' mark.

In mahogany especially, logs from some shippers or are preferred to those of other shippers. Logs shipped under a certain shippers' mark may, for example, have a reputation for mild texture while other shipments may be known for their liability to splitting on conversion. In mahogany the unit of sale is the cubic foot.

2. Dimensions. Logs of large dimensions are usually preferred to smaller logs. Nigerian black walnut (*Dioscorea*) logs by the cubic foot. Prices realized for African mahoganies, Tripoli, Brazil, France, Obocoki, Freedom from defects is of primary

importance. Common defects in hewn logs are eccentric or wandering heart centres, soft or galled centres, and splits and checks, ring-shakes and star-shakes (the former combined with radial splits showing presence of "strength" in the wood), surface-splits and checks, pinworm and grub-holes etc.

An all-round good quality log will therefore have large dimensions, freedom from defects, and mild texture. Logs showing figured grain fetch a premium over plain logs. This is often very considerable and figured logs may fetch as much as three or four times the price of plain logs.

CONDITIONS OF SALE.

These are shortly as follows:-

Minimum advances in bids are 1/4d per foot on prices under 5d per foot, 1/2d on prices from 5d to 1/2d, 1d on prices of 1/- to 1/5d, 2d. on prices of 2/6d. to 4/10d, and 3d per foot on prices of 5/- per foot and upwards.

In London, the Port of London authority provides labour for loading logs into buyers carts for delivery, the cost being charged to the buyer. In Liverpool the brokers load at the buyers' expense.

Delivery must be taken within 14 days (in Liverpool) or one month (in London) from date of sale, after which the buyer has to pay rental on the logs. During this period the risk of fire is borne by the brokers. The unit of sale for squared logs of mahogany, Nigerian walnut (Lovea) and Obeche (African white wood) is the superficial foot. In squared logs of iroko and greenheart the unit of sale is the cubic foot.

Round logs of mahogany are sold by the superficial foot, but Nigerian black walnut (Mansonia) goes by the cubic foot. Prices realized for Honduras and African mahoganies, African walnuts, Iroko, Obechi, and Cuban mahogany at the first two sales of the year 1934 in London are appended.

Mahogany

Black
walnut.

Squared

Round

7	14" to 18"	11' to 22'	100 - 120 only
14"	to 18"	11' to 22'	80 - 90, 230
16"	to 18"	10' to 22'	70 - 80, 240
18"	to 22"	10' to 22'	60 - 70, 250
18"	to 22"	10' to 22'	50 - 60, 260

MAHOGANY & WALNUT SALES IN LONDON 1934

18"	to 22"	10' to 22'	24
18"	to 22"	10' to 22'	14
18"	to 22"	10' to 22'	10
22"	to 38"	16' to 22'	60
18"	to 22"	10' to 22'	75
18"	to 22"	10' to 22'	50

CHURCHILL AND SONS HARDWOOD SALE. (January 31st)

Messrs. Millison appear to take delivery of the

GOODS.	DIMENSIONS.		No. of logs.	Feet.	PRICES.	
	Width at butt or Q.irth.	Length.			Range.	Average pence.
Muras Mahogany						
Sorted logs.	20" to 38"	14' to 32'	97 32	64,251 12,902	94 to 1/6 74 to 10 1/2	12.21 8.20
and figured logs	17" to 124"	17' to 32'	12	10,756	94 to 2/6	12.61
Muras cedar (round)	19" to 27"	18' to 29 1/2'	16	16,302	104 to 1/5	13.52
American mahogany						
Lagos.	24" to 33"	14' to 25'	65	54,418	5 1/2 to 2/-	8.11
Benin			109	65,315	4 1/2 to 8d.	5.02
Nigerian Sapote	Average 35"		17	27,551	4d to 1/1	6.87
Orange River			75	66,713	3 1/2 to 8 1/2	4.47
Mahogany	7" to 17"	11' to 21'		A few logs only.		
Manonia						
Nigerian Black Walnut	14" to 30"	11' to 25'	25	29,985	4/- to 4/6	4.14
Poko						
Square	20" to 48"	13' to 30'	6	1,059	4/- to 5/-	55.75
Round	24" to 40"	14' to 22'	22	55,135	2d to 2/6	2.27
Pechi						
Mahogany Lagos	25" to 42"	15' to 26'	204	176,867	4 1/2 to 1/6	5.42
Nigerian Sapote	31" to 58"	16' to 23'	14	26,049	4d - 7 1/2	5.04
Reds Noher	30" to 48"	15' to 19'	12	15,560	3 1/2 - 5d	4.12
Walnut wood, Benin (Lovers)	21" to 32"	14' to 24'	16	18,226	4d & 4 1/2	4.02
Manonia (round)	11" to 23"	13' to 22'	25	1,225	4/6 - 6/-	5/4.
Greenheart	13" to 19"	20' to 47'	15	845	2/-	2/-

CHURCHILL & SONS SALE ON 14th MARCH 1924.

(x cubic feet)

2. DELIVERY OF SAWN LUMBER TO YARDS.

Messrs. Mellinson appear to take delivery of the greater part of their imports of sawn lumber direct from the ship. The shippers, or their agents in London, advise the merchant of the expected arrival of the ship bearing their lumber, and arrangements are then made with a company of river-barge owners for delivery of the lumber overside from the ship into barges for transport to the merchant's yards.

If delivery is not taken overside from the ship, the lumber is landed on the quay and "quay rates" are paid to the Port of London Authority for wharfrage and handling, including sorting to dimensions or to other requirements as stated by the merchant. In this case the lumber must be removed within three days or "landed rates" must be paid which include storage under cover.

3. MEASUREMENT OF SAWN LUMBER.

(a) Square-edged lumber.

On arrival at the merchant's yard the lumber may be measured on the barge as it is unloaded or it may be measured after being unloaded and stacked temporarily in the yard. Measurement of square-edged lumber is generally recorded in superficial feet of each thickness, lumber of different thicknesses being recorded separately. This is therefore a record of its face-contents, the thickness not being taken into account except for the final calculation to reduce the contents of the parcel to cubic feet. Quarter inches are measured in widths and quarter feet in lengths, in the calculation of the face-contents of each piece, the result being recorded in superficial feet, half feet being included but smaller fractions of the foot being dropped. Sawn lumber of Burma teak and gurjun however is measured and tallied by length, width and thickness of each piece, these measurements

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being recorded by running feet of stock of each specification. E-g. 10 running feet of 6" x 3", 8 feet of 4" x 2" etc. Flooring strips of all timbers and lumber of fixed specification such as sills, squares, and scantlings, are also recorded in running feet of each specification.

(b) Unedged Lumber.

Unedged boards and planks from logs sawn through and through (log-outs) are measured by length and width and recorded in superficial feet (face contents) for each thickness. Width is calculated by taking the width (to include half the wane) at a point 6 inches from each end of the piece, and in the middle, and averaging these three measurements. Quarter inches and quarter feet are measured as in square edged lumber.

NOTE ON MEASUREMENT OF AMERICAN SQUARE-EDGED LUMBER.

This is measured (at any rate in Messrs. Mallinson's yards) by the method described above under Section 3 (a). This lumber will however have been measured and invoiced by the shippers under the "American board measure" rule from which superficial feet (face contents) are read direct. The width of the piece is the measurement taken but the rule records the actual face contents for that width for any length between 9 and 10 feet. Face contents of pieces under 9 feet in length can be calculated by halving the reading of the rule for a piece twice its actual length, and by building up from the rule, face contents can be calculated for pieces of lengths over 19 feet. Half feet are marked on the rule but the American practice is to record face contents to the nearest foot, readings under the half foot being counted to the lower unit, and readings over the half foot to the upper unit. This practice of reading the rule to the nearest foot can give rise to discrepancy between the shipper's and the merchant's computations for the contents of a parcel of lumber. Merchants overlook short measure

not exceeding 2 per cent. of the total but will claim rebate for any greater discrepancy. This method of measurement of American lumber is however responsible in part for the exact lengths in unit feet to which American lumber is cut, as any fraction of a foot would be disregarded. Actually American lumber is usually imported in lengths rising by multiples of 2-feet. As regards widths, however, it can be seen that a miller would stand to gain at the expense of the merchant if he were to base his cutting of widths of lumber on the reading of the board rule, by consistently cutting widths to read a fraction over the half superficial foot on the rule.

4. INSPECTION AND GRADING OF LUMBER.

(a) American Hardwoods.

These are imported in grades as laid down by the National Hardwood Lumber Association in America. The standard grades are Firata, Seconda, Selasta, No. 1 Common, No. 2 Common, Sound Worny, and No. 3 Common. Firata and Seconda are combined into one grade in which a minimum percentage of First quality stock is laid down for each timber. These grades are based both on quality and dimensions.

(b) European Hardwoods.

These are imported on specifications of quality and dimensions supplied by the shipper in each case, but there are no recognised grading rules. Merchants inspect lumber to ascertain that it comes up to the shippers specification which is supplied with the parcel. Competition between shippers from different countries is sufficient to maintain the standard and control the price of European hardwoods.

(c) Empire Hardwoods.

Rules have recently been drawn up for the grading of hardwoods imported from those parts of the British Empire

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where no rules exist for the grading of lumber shipped to the U.K., but these are still on trial and have not yet been ratified by shippers and merchants. They include the following grades:- First Quality or Prime, Second Quality, Prime Worny, Second Worny, No. 1 Common Worny. Also grades for shorts, Strips and Squares. Messrs. Mallinson import lumber from Australia, India, and Africa. Apart from dimension stock and flooring, they only import lumber of Prime specification. It is considered that the standard of quality they expect in this lumber corresponds to the specification for Prime lumber laid down in the rules mentioned above, provided that the percentage of clear lumber in any species does not fall below the figures given in Appendix II of those rules. Messrs. Mallinson expect to receive only selected Prime lumber from Empire sources, and this means the inclusion of only a very small proportion of defective material in a Prime parcel.

5. DIMENSIONS AND SALE CLASSES OF LUMBER.

Woods which are imported in a wide range of widths are usually sorted by the merchant into sale classes based on width. Classes of bigger widths command a premium over narrower stock. The range within each class varies for different woods but a common grading is that in use for American and African whitewood viz. 6 - 17 $\frac{1}{2}$ inches in width

18 - 23 $\frac{1}{2}$ " " "

24 inches and upwards.

Sale classes of Walnut, as another example, show a smaller range of widths within each size-class, viz.

6 - 9 $\frac{1}{2}$ inches in width.

10 - 13 $\frac{1}{2}$ " " "

14 - 17 $\frac{1}{2}$ " " "

18 inches and upwards.

These size-classes are only applicable to stock of 1-inch thickness or less. Lumber over 1-inch thickness is divided into two sale classes only viz.

6 - 11 $\frac{1}{2}$ inches, and 12 inches and upwards.

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Dimensions of American hardwood imported lumber are as follows for the standard grades (figures taken from 1929 edition of the National Hardwood Lumber Rules):

GRADE	LENGTHS	WIDTHS	REMARKS
Firsts.	8 - 16 feet. Admitting 25% under 11 feet.	6 inches and up.	Percentage is based on board feet of parcel.
Seconds.	As in firsts.	6 inches and up.	5% of pieces 5" x 10' allowed, in F.A.S. grade.
Selects	6 - 16 admitting 30% under 11 feet.	4 inches and up.	6 and 7 feet lengths to be 5" wide.
No. 1. Com. and Sound Worn	4 - 16 feet admitting 10% under 7 feet.	3 inches and up.	5% only of 3" pieces.
No. 2. Com.	4 - 16 feet admitting 30% under 7 feet.	3 inches and up.	10% only of pieces under 5 feet long.
No. 3. Com.	4 - 16 feet admitting 50% under 7 feet.	3 inches and up.	25% only of pieces under 5 feet long.

Thicknesses cut as standard sizes in American lumber are $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, 1 inch, $1\frac{1}{4}$, $1\frac{1}{2}$, 2 inches, $2\frac{1}{2}$, 3, $3\frac{1}{2}$, 4, $4\frac{1}{2}$, 5, $5\frac{1}{2}$ and 6 inches. These are for sawn lumber. Surfaced lumber may be scant by $\frac{3}{16}$ inch on thicknesses up to $1\frac{1}{2}$ inches, and $\frac{1}{4}$ inch scant on thicknesses of 2 to 4 inches. Lumber surfaced one side only must be $\frac{1}{16}$ inch full of the dimension for lumber dressed on both sides.

American hardwoods are generally cut in lengths which are multiples of 2 feet. The grading rules allow 50 per cent. of odd lengths but these were seldom seen in the parcels of lumber imported during the period of this report.

EMPIRE HARDWOODS.

Messrs. Mallinson require lumber of Prime specification to measure 6 inches and up wide by 8 feet and up in length. From discussion with representatives of a firm of agents and

CHURCHILL AND SIMS HARDWOOD SALE. (January 5/24)

Messrs. Bullington appears to take delivery of the

GOODS.	DIMENSIONS.		No. of logs.	Feet.	Range.	Average pence.
	Width at butt or Q.Girth.	Length.				
Duras Mahogany						
Red logs.	20" to 38"	14' to 32'	27 32	64,251 12,908	9d to 1/6 7d to 10d	12.21 8.20
and figured logs	17" to 24"	17' to 32'	12	10,756	9d to 2/6	12.61
Duras cedar (round)	19" to 27"	18' to 29'	29	16,302	10d to 1/5	15.32
African mahogany						
Lagos.	24" to 33"	14' to 25'	65	54,418	5 1/2 to 2/-	5.11
Benin	Average 35"		109	65,315	4 1/2 to 8d.	5.02
Nigerian Sapele						
Orange River			17	27,531	4d to 1/1	6.87
			75	66,713	5 1/2 to 6 1/2	4.47
San Mahogany	7" to 17"	11' to 21'				
Gambusia						
Nigerian Black Walnut	14" to 30"	11' to 22'	25	29,985	4/- to 4/6	4.14
Okoko.						
Square	20" to 48"	15' to 30'	6	1,059	4/- to 5/6	35.75
Round	24" to 40"	14' to 22'	60	56,335	3d to 4d	
Bechi	30" to 42"	15' to 20'	32	55,115	2d to 2-4	2.27
CHURCHILL & SIMS SALE ON 14th MARCH 1924.						
Mahogany Lagos	25" to 42"	15' to 26'	204	176,867	4 1/2 to 1/6	5.42
Nigerian Sapele	31" to 58"	14' to 23'	14	26,049	4d - 7 1/2	5.04
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Rules have recently been drawn up for the grading of hardwoods imported from those parts of the British Empire

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where no rules exist for the grading of lumber shipped to the U.K., but these are still on trial and have not yet been ratified by shippers and merchants. They include the following grades:- First Quality or Prime, Second Quality, Prime Worn, Second Worn, No. 1 Common Worn. Also grades for shorts, Strips and Squares. Messrs. Mallinson import lumber from Australia, India, and Africa. Apart from dimension stock and flooring, they only import lumber of Prime specification. It is considered that the standard of quality they expect in this lumber corresponds to the specification for Prime lumber laid down in the rules mentioned above, provided that the percentage of clear lumber in any species does not fall below the figures given in Appendix II of those rules. Messrs. Mallinson expect to receive only selected Prime lumber from Empire sources, and this means the inclusion of only a very small proportion of defective material in a Prime parcel.

5. DIMENSIONS AND SALE CLASSES OF LUMBER.

Woods which are imported in a wide range of widths are usually sorted by the merchant into sale classes based on width. Classes of bigger widths command a premium over narrower stock. The range within each class varies for different woods but a common grading is that in use for American and African whitewood vis. 6 - 17 $\frac{1}{2}$ inches in width

18 - 23 $\frac{1}{2}$ " " "
24 inches and upwards.

Sales classes of Walnut, as another example, show a smaller range of widths within each size-class, vis.

6 - 9 $\frac{1}{2}$ inches in width.
10 - 13 $\frac{1}{2}$ " " "
14 - 17 $\frac{1}{2}$ " " "
18 inches and upwards.

These size-classes are only applicable to stock of 1-inch thickness or less. Lumber over 1-inch thickness is divided into two sale classes only vis.

6 - 11 $\frac{1}{2}$ inches, and 12 inches and upwards.

Dimensions of American hardwood imported lumber are as follows for the standard grades (figures taken from 1929 edition of the National Hardwood Lumber Rules):

GRADE	LENGTHS	WIDTHS	REMARKS
Firsts.	8 - 16 feet admitting 25% under 11 feet.	6 inches and up.	Percentage is based on board feet of parcel.
Seconds.	As in firsts.	6 inches and up.	5% of pieces 5" x 10' allowed in F.A.S. grade.
Selects	6 - 16 admitting 30% under 11 feet.	4 inches and up.	6 and 7 feet lengths to be 5" wide.
No. 1. Com. and Sound Wery	4 - 16 feet admitting 10% under 7 feet.	3 inches and up.	5% only of 3" pieces.
No. 2. Com.	4 - 16 feet admitting 30% under 7 feet.	3 inches and up.	10% only of pieces under 5 feet long.
No. 3. Com.	4 - 16 feet admitting 50% under 7 feet.	3 inches and up.	25% only of pieces under 5 feet long.

Thicknesses cut as standard sizes in American lumber are $3/8$, $1/2$, $5/8$, $3/4$, 1 inch, $1\frac{1}{4}$, $1\frac{1}{2}$, 2 inches, $2\frac{1}{2}$, 3, $3\frac{1}{2}$, 4, $4\frac{1}{2}$, 5, $5\frac{1}{2}$ and 6 inches. These are for sawn lumber. Surfaced lumber may be scant by $3/16$ inch on thicknesses up to $1\frac{1}{4}$ inches, and $1/4$ inch scant on thicknesses of 2 to 4 inches. Lumber surfaced one side only must be $1/16$ inch full of the dimension for lumber dressed on both sides.

American hardwoods are generally cut in lengths which are multiples of 2 feet. The grading rules allow 50 per cent. of odd lengths but these were seldom seen in the parcels of lumber imported during the period of this report.

EMPIRE HARDWOODS.

Messrs. Mallinson require lumber of Prime specification to measure 6 inches and up wide by 8 feet and up in length. From discussion with representatives of a firm of agents and

of another firm of merchants, it seems probable that a small percentage (say 10 per cent.) of lengths 6 - 8 feet would be admitted in prime lumber of an otherwise desirable timber in which lengths of straight logs are inclined to be short. Such lumber however would have to be exceptionally clear of all defect.

Thicknesses to which lumber is sawn follow the standards laid down in the American grading rules. They are consistently cut full by 1/16 inch, and in some shipments 1/8-inch full on a thickness of 2 inches was not uncommon. This remark also applies to widths of imported dimension stock.

Widths of standard grades are frequently cut to the exact inch, 6, 7, 8, 9, etc. but as measurement is made to the nearest quarter-inch this is not strictly necessary, though it gains favour to do so, as it facilitates measurement and calculation of face-measure. In the same way, exact lengths in a shipment of sawn lumber will gain the favour of the merchant, and especially of the kiln-operator if the lumber goes to the drying kilns where exact lengths in unit feet facilitate loading

FLOORING STOCK.

(a) Flooring strips.

The usual dimensions in which unprepared flooring strips are imported are 1 x 3 inches, 1 x 3 1/2, 1 x 4, 1 x 4 1/2, 1 x 5 inches, and 1 1/2 inch strips in the same widths. Lengths of flooring strips are usually 6 feet and up, but 4 feet lengths may be allowed, e.g. in Australian blackwood and walnut and American oak. Prepared flooring strips are also imported in some woods. American oak strips of 1 x 3 inches rough dimension are imported finished to 15/16 x 2 1/2, and 1 x 4 strips finished to 15/16 x 3 1/2 inches. These strips are imported tongued and grooved, end-matched and hollow-backed. American hard maple is also imported in finished strips in lengths from 2 to 16 feet. Tasmanian oak kiln-dried tongued and grooved flooring strips, finished 7/8 x 35/16 are imported in long lengths of 16 to 20 feet.

(b) Flooring Blocks.

Block strips for the manufacture in the U.K. of flooring blocks are imported in the following dimensions:-
1 1/2 and 1 3/4 inches thick by 3, 3 1/4 and 3 1/2 inches wide, in lengths of 19 inches and up, rising by multiples of 9 1/2 inches. Blocks are commonly manufactured to lengths of three times the width. Austrian oak block strips are also imported under different specifications for lengths, which rise in multiples of 2 inches from 10 to 40 inches in length. Austrian oak and hard maple are the principal woods used for blocks. Other woods are Philippine spitung, Indian gurjun, and Australian jarrah.

DIMENSION STOCK.

Timber cut to special sizes is imported for use in various industries. Among the commonest of such sizes are waggon planks (railway carriages), sills (mostly used in the furniture trade and for mantels, doorsteps, windowills) and squares (furniture trade), specifications of which will be found below under "Notes" and of air-drying since import.

6. SEASONING OF IMPORTED LUMBER.

(a) Condition of Import.

The condition on import of sawn lumber as regards dryness seems to vary considerably between different species, and also between separate shipments of the same species. In this respect some Australian ships appear to be making a practice of kiln-drying lumber to a "shipping-dry" condition and this appears to give very satisfactory results for Tasmanian oak and myrtle. Australian walnut on the other hand appears to be shipped in a green, or only partially air-dried condition to judge from the recent arrivals seen in the yards.

The only actual figures obtainable for moisture content of imports were those taken from timber tested before kiln-drying. These are tabulated below. The second column gives the number of instances from which figures were obtained in each species.

SPECIES, pile 12	THICKNESS	EXTREME M/C	AVERAGE M/C
Silver Greywood	1", 1 1/2"	34% to 52%	45%
Australian Walnut	2", 2 1/2"	40% to 70%	53%
	1", 1 1/2"	17% to 44%	37%
Silky oak	1", 1 1/2"	15% to 39%	25%
	1", 1 1/2"	25% to 53%	35%
American ash	2", 2 1/2"	39% to 50%	45%
Gurjun	2", 3"	31% to 50%	45%
Tasmanian oak	Flooring	25% to 28%	27%
Australian blackwood	"	29% to 32%	30%
" Jarrah	"	25%	27%
African mahogany	"	22% to 29%	25%
	"	45% to 65%	55%

The last item represents imported hewn logs saw locally. The uniformity of dryness of the flooring strips is due to kiln-drying by the shippers. This is generally done by the Australian shippers.

In column 4, the higher figure in each species probably represents timber freshly imported and sent direct to the kilns, while the lower figure was probably obtained from a parcel that had received some period of air-drying since import.

As American sawn lumber is usually imported on a guarantee of 90 days in stock prior to shipment, the figures for American ash may represent the condition of such lumber on arrival, or possibly after some further period of drying in the merchant's yards.

(b) Air-Drying of Lumber in Yards.

On arrival at the yards imported sawn lumber is stacked for air-seasoning. Piles are made in the open with corrugated-iron sheeting as a roof to each pile. Lumber is sorted into lots of one thickness, and each lot is sub-divided into the size-classes (based usually on widths) in which it is retailed. A separate pile is thus made of every size-class for each thickness. The piles are built up on foundations of box-bottoms 3 inches high, made in 6" x 2" creosoted deal in 12 feet lengths, laid parallel at two feet intervals. Binders of 3" x

x 2" seal are laid on the foundations and the bottom row of the lumber pile is thus raised 12-inches (9 + 3) above the ground level. Half-inch sticks are used to divide layers of boards, and are spaced at 2-foot intervals so as always to be placed vertically above foundations. Intermediate sticks are sometimes used, for thin stock ($\frac{1}{2}$ " and $\frac{5}{8}$ ") that is liable to warp. For lumber over 2-inches in thickness $\frac{3}{4}$ inch sticks are sometimes used. Even so air-conditions between 2" planks of ash appear to be suitable to the development of blue-stain on the timber although surface checks were apparent in other planks from the same pile. The boards to be dried are laid with a space of about an inch (or rather less) between adjacent boards.

The period for which boards are left to season in the open is not fixed. A merchant who values his reputation in the trade will not retail timber as being "air-dry" unless it has been sufficiently seasoned to have dried out fully. In the case of retail orders specially stipulating a thoroughly dry condition in the timber a determination of moisture content may be made of a sample board from the pile, but generally speaking yard managers know from experience (and with the help of yard records) whether or not a board of timber is dry enough for manufacture. A glance at the yard-stocks-ledger will show how long the timber has been in stock and whether, therefore, it may be expected to have reached an air-dry condition. If a board, selected at random from several removed from the pile is sawn in two an experienced man can estimate with some accuracy its approximate moisture content

(c) Kila Drying of Lumber.

Artificial seasoning in drying kilns is used chiefly to complete the drying of lumber which has already received some period of air-seasoning, but which has not reached the degree of dryness required for the use to which it is to be put by the purchaser. This applies more particularly to lumber

use for purposes where a moisture content of less than 19% is necessary. Air-seasoning in England will not normally bring the moisture content of sawn lumber below 16% - 18% of its dry weight owing to the natural humidity in the air. For many kinds of manufacture timber should be in a drier condition than this if no shrinkage of the wood during or after manufacture is to be expected and in this case kiln-drying must be done.

Secondly, it may be necessary to hasten the drying of lumber owing to shortage of sufficiently air-dried material to fulfill an order. Again, it may give better results to control the drying of some species of timber from the green to the air-dry state, to avoid serious degrade which might occur in air-drying, or to shorten (in the case of an exceptionally slow drier) a long period of air-seasoning when the capital tied up in the timber is non-productive. In many circumstances, therefore kilns are a great asset to a timber merchant. A short description of the kilns in use in Messrs. Mallinson's yard on the Thames-side is appended.

Goodall Kiln. This is a brick-kiln with cavity walls, external overhead fans, and interior steam heating coils placed on the side walls. The kiln is 50-feet long by 10-feet wide by 8-feet high, and will accommodate on the average about 1000 cubic feet of timber. A feature of this kiln is the curved floor of the well of the kiln which is used to assist circulation. Two fans are placed on the roof of the kiln which deliver a flow of air vertically down the wall at the back of one set of heating coils. The air then follows the curved floor of the well beneath the timber, where low pressure adjustable steam jets are placed at intervals, then up the opposite wall off which it is returned

through the timber to the heating coils, to be re-circulated via the well of the kiln after mixture with the fresh air entering from the fans. Some of the air passes straight up the wall of

the kiln after passing through the well and escapes over the false roof into the mixture-chamber from which it is drawn and blown into the kiln again by the fans. This kiln appears to produce uniform and rapid drying, and is easily controlled.

The following schedule is one that was seen applied to a load of 2-inch planks of Australian walnut. These were dried from the green state to 11% moisture content in 30 days.

Day of run.	Dry bulb temperature.	Humidity	Day of run.	Dry Bulb Temperature.	Humidity.
1	110° F.	91%	13	130° F.	80%
6	114° F.	78%	15	130° F.	53%
7	122° F.	76%	18	130° F.	44%
9	124° F.	67%	20	134° F.	46%
10	126° F.	65%	26	138° F.	40%
11	128° F.	63%	28	Steamed for 3 hours at 140° and 100% humidity.	
			30	do.	

On unloading the timber which was mostly 20 feet lengths of 6-inch wide planks, there were some surface checks and end-splits in about 10% of the pieces. A prong test cut on the 28th day showed slight case-hardening stresses to be present. The final steaming was given to relieve these stresses. Few pieces showed any degree from bow, but it was remarkable that free-side bend had appeared to some extent in almost every piece. Each plank was however passed inspection by the customer for whom they were dried provided that it would finish to 5-inches by 20 feet of straight square edged material when dressed. As the planks were generally over 6-inches wide this could be obtained in 90% of the material.

EXTERNAL BLOWER KILNS.

Messrs. Mallinson also have a set of three adjacent kilns in which circulation is produced by an external fan situated outside the kilns forcing the air by way of a tunnel

into the kilns. The kilns are of older design than the Goodall kiln recently installed and drying is not altogether uniform. This is largely due to the dry air entering the kiln not being thoroughly mixed with the air moistened by the steam-sprays before it reaches the timber and an uneven rate of drying is produced on the inlet and outlet sides of the kilns. When all three kilns are not in simultaneous operation this drawback can to a certain extent be remedied by passing the air through an empty kiln before it enters the loaded kiln. A personal knowledge of the kilns enables the best to be got out of their drying capacity and they are in constant use.

7. RETAIL OF SAWN TIMBER.

Retail of sawn timber is based on the measurements made at the time of import or arrival at the merchant's yard. The face-measure of each piece (or dimensions, see section 3 (a)) is marked on it with blue chalk at the time of measurement and inspection. In many cases the timber is then in an unseasoned state and air-seasoning will produce some shrinkage, but this is not taken into account in making up retail invoices, except in special cases, e.g. when a fairly large quantity of kiln-dried timber is being sold, of a species that shows considerable shrinkage on drying out in kilns; a parcel of sawn timber of this description would be re-measured after kiln-treatment and retail based on its dry measurements. This practice shows the importance of cutting timber full to thickness to ensure that it will hold up to its standard thickness in an air-dried state. As regards shrinkage on width it is of course the merchant's business to see that timber will hold up to the face-measure at which it is invoiced by him, but if re-measurement has to be done after air-seasoning this will add to the cost of import and retail of the timber and will consequently prejudice the merchant against handling this timber. Furthermore, the cost of the difference in volume of the timber on import and that

on retail will have to be borne by the merchant. This is a sound reason for timber to be shipped in a dry rather than a green state, especially in the case of a species that shows considerable shrinkage on drying.

8. DEGRADE IN TRANSIT.

Imported in sawn timber of some sizes.
An inspection on arrival at the merchant's yard of a parcel of sawn boards that have been shipped green will generally show the common defects that are caused, such as end-splitting, surface-checking, warping (cupping, twisting etc.) by such treatment. As to the degree of dryness which timber should reach before shipment, this will depend upon a consideration of the atmospheric equilibrium conditions in the country of shipment and also of those expected in England at the time of arrival of the timber. Experience alone will show to what moisture content the timber should be dried so as to suffer the least possible degrade due to the change. But it would seem practicable to dry the timber at any rate to a percentage moisture content suitable to the atmospheric conditions in the more humid climate of the two. It is realized that this advice would not be of much help when the difference in atmospheric humidities between the two countries is great, as in some parts of the tropics, but for the highlands of East Africa equilibrium conditions probably do not differ greatly from those of Great Britain. Variations during the year will of course occur but will not have a wide range in ever-green forest regions.

Imported in sawn timber of some sizes.

MADE IN INDIA

Other sizes, some selected

Imported in boards

SOUNDLY DISTRESSED

Other sizes, some selected

Imported in sawn planks

average 12%

Notes on Stocks of Sawn Lumber and Sawn Logs held in Messrs. Wm. Mallinson's Yards.

1. INDIAN, EMPIRE AND EAST INDIAN WOODS.

APITONG.

Other names, Samar, Bastard teak.
Imported in sawn planks 3" - 6" thick, 6" - 12" wide, 10' and up long. Used as waggon planks in railway trucks.

BORNEO RED CEDAR (Shorea spp.)

Imported in sawn boards and planks 1" - 4" thick, 8" and up wide.

INDIAN SILVER GREYWOOD (Terminalia bialata)

Other name, Greywood.
Imported in prime sawn lumber and in logs.

Sawn lumber, 1" - 4" in standard thicknesses, 6" - 18" (average 9") wide, 8' and up long. (Parcel imported 9/5/34 in boards 1" to 3" thickness, was very green. Narrow thickness boards very irregular in thickness, cut with plate-saw, thicknesses however not very full. End-splits frequent in thicker stock).
Log-cuts. Sawn locally from imported logs to boards 1" to 3" thick, 16" - 25" wide, 10' - 25' long. Logs often rifty and shaly.

WHITE CRUGLAN (Terminalia bialata).

Saywood of same tree as Indian Greywood.
Imported in sawn lumber of same sizes.

HALDU. (Adina cordifolia).

Other name, Burma satiwod.
Imported in boards. Only 1" and 1" held in stocks.

GURJUN. (Dipterocarpus spp.)

Other name, Empire bagas.
Imported in sawn planks 3" & 4" thick, 6-9" wide, in lengths 6-20' (average 12'). Also in flooring strips, 6' and up long of standard dimensions.

TEAK (Tectona grandis).

Other names, Rangoon, Burma & Moulmein teak.
 Imported in sawn boards, planks, scantlings, and squares.
 Grades of lumber imported. Firsts and Bantams.
 Sizes, First Quality boards and planks 1/2" - 5" thick.
 6" - 16" wide (average 9"), 6' and up long, graded for retail
 as 6-14 feet and 14' and up.
 Bantams 2 1/2" to 6" thick, 3' to 5' 9" long.
 Scantlings 3" x 2" to 5" x 4", 6' - 14' long.
 Squares 6" x 6", 5" x 5", 4" x 4", 3" x 3", 2" x 2", 6'-14' long.
 Flooring strips in lengths 6' and up long, average 11 feet.
 "Keys" 2 1/2 x 3 7/16 x 6 or 7 inches for wedging rails.

Milling. Appears to be done by band-saw entirely, thicknesses
 and widths are cut consistently 1/16" full.

INDIAN LAUREL WOOD (Terminalia tomentosa).

Imported in round logs, sawn locally and stocks
 held in boards and planks 1/2" to 4" thick, 17" to 24" wide and
 8' to 19' long.

2. AMERICAN WOODS.

ASH.

Imported in sawn lumber or occasionally in
 round logs. Sawn lumber rarely cut less than 1" thickness.
 Imported in standard thicknesses to 4". "F.A.S." ash in
 widths 6" and up, 8' and up long. Graded for retail on widths
 6" - 11 1/2", 12" and up. "Selects" grade in widths 4" and up
 to 14", in lengths 6' and up. Logs imported in the round and
 sawn locally to thicknesses 1/2" to 5", 14" - 20" wide, 12' -
 20' long.
 Complaints by merchants of presence of pin-worm and grub holes
 in parcels of lumber of selects grade are not infrequent.
 Superfluous wane and surface splits are other defects that
 appear to escape the notice of the shippers.

American ash lumber is mostly taken by the motor industry who purchase lumber kiln-dried to under 14% moisture content. Lumber is imported green, and seasoned in stick in the open until required for manufacture when it is sent to the kilns for the completion of the drying. F.A.S. and select grades are those in which Messrs. Mallinson hold stocks. Ash is also used for tool handles etc. by the agricultural industry. Sports goods such as tennis rackets, cricket stumps and balls, are also made from ash but English wood is generally preferred to the American variety.

MAPLE (Acer saccharum (Hard maple, sugar maple).

Imported in the form of sawn lumber and finished flooring, tongued and grooved, end-matched and hollow-backed. Sawn lumber. Prime quality in thicknesses 1" to 4", 5" and up wide, 8' - 20' long. Graded for retail on widths, 6" - 11", 12" and up. Small stocks of 1/2, 5/8 and 3/4 inch also held in widths 8 to 11".

Flooring. 1" x 4" finished 25" x 5 1/2" face, and 1 1/2 x 4" finished 1 1/16" x 5 1/2", in lengths 2' to 16'.

Lumber and flooring are shipped both from the U.S.A. and from Canada. The flooring is usually imported in wired bundles of strips, 6 strips to each bundle which is marked with the average length of the pieces in the bundle. Lengths vary only about 6 inches in any one bundle. Finished flooring is imported kiln-dried.

MAGNOLIA.

Sawn lumber imported in thicknesses of 1/2 to 2 inches. Sorted for retail on widths, 6-17 inches, 18-23 inches, and 24-inches and up. Lengths run 6-17 feet. Specification of 1 x 12 inches and wider is often called for, in use for fascias. The motor industry uses a lot of this wood, for which 5/8" is that mostly in demand.

AMERICAN WHITEWOOD (Liriodendron Tulipifera).

(see over)

AMERICAN WHITEWOOD (Liriodendron Tulipifera)

Other names Canary whitewood, Yellow poplar.

Imported in sawn lumber and round logs.

Lumber is imported in all thicknesses from 3/8 to 4-inches and is graded for retail on widths, 6-17, 18-23, 24 inches and up. Stock 3/8 to 1 inch thick is usually planed both sides. Saps graded must be free from sapwood-stain. F.A.S. grade must be clear of sap. "Stained Saps" grade will admit sound stain, and also No. 1 Common. Selects must grade F.A.S. one face, and No. 1 Common or poorer face. Retail price is believed to be about 10¢ for 1" planed or unplanned stock of F.A.S. Wide widths stock is used for table and counter tops and fascias. Clear sap grade is used as a core for veneering for pianoforte cases. The motor industry takes most of the Selects and F.A.S. logs are imported peeled, in diameters 18 inches and up, 10 to 16 feet long. They are used for veneers and must be of prime quality.

AMERICAN BLACK WALNUT.

Imported in sawn lumber and round or hewn logs. Sawn lumber in all grades, and thickness 3/8 to 4-inches, graded for retail on widths 6 - 9½, 10 to 13½, 14-17½, 18 inches up. 1½ inch stock is only sorted to 6-11, and 18 and up wide. Lengths as per Grading Rules. Also shown 4-7 feet in thicknesses up to 2 inches and standard widths. Logs sawn locally to ½-inch, up to 5 inches, in thickness, and measure 12-24 inches wide, 7 - 15 feet long (Cf. Australian walnut, 20-36 inches wide). F.A.S. quality is used for panels and interior fittings, gun-stocks and air-screws. Retail price about 1/1d per sup-er-foot. Steamed Walnut is classed as a separate grade, on same rules as standard grade, but sapwood is admitted without limit. This process imparts the heartwood stain to the sapwood. Logs, after sawing into planks thro' and thro', are close-piled in a kiln, with sawdust still remaining between the planks, and steamed at high temperature for a period of one to two weeks. The wood

The sapwood is then found to have darkened to the heartwood and Russian is considered to be intermediate between these colours. Japanese is only obtainable in shorter lengths. It is wild

CANADIAN BIRCH.

Imported in sawn lumber, wavy hewn logs, and round logs for veneering purposes.

Sawn lumber comes in thicknesses 1 to 4 inches, 4 inches and up wide, 8 feet and up long.

Hewn logs, usually with a heavy vene on each edge, come in 8 to 16 feet lengths, giving when sawn, boards up to 24 inches wide. Round logs imported are specially selected as they are used entirely for rotary cutting to veneers.

Sawn lumber goes mostly to the furniture trade for chair-seats, frames, and table legs, and when stained to a mahogany finish for toilet seats. Increasing quantities are being used by the motor industry. Small squares are imported for manufacture into bobbins. The veneers are largely used in the manufacture of plywood.

PORT ORFORD CEDAR.

Boards. Mallinson hold stocks only of log-cuts, sawn locally from imported round logs. Boards run up from 25 to 30 inches wide in lengths of 4 to 8 feet only. AMERICAN OAK (see below).

3. EUROPEAN WOODS.

O A K. ... apart from comparatively small quantities of English oak, most of the oak used in the U.K. is imported from the U.S.S.R., Poland (Vollynian), Japan, Italy, Yugoslavia (Austrian) and Russia. It is imported in round logs, of which the largest supplies come from Poland, sawn logs (wainscots and boules from the Continent), and sawn square-edged lumber which comes in large quantities from American and Japan. Austrian (or Slavonian) oak has the mildest texture and is used largely in the cabinet trade. Vollynian is much less mild.

and Russian is considered to be intermediate between these two. Japanese is only obtainable in shorter lengths. It is mild but lacks strength.

Billboards may be shipped as billets squared on three sides as described above, or the billets may be sawn thro' and thro' and sawn square-edged lumber is imported in all thicknesses from 1/2 inch upwards, in widths 4-8 inches, and in lengths 6 feet and upwards. The principal uses of sawn lumber are for furniture, panelling and wainscots and all interior trim, structural work in buildings, railway waggon construction and ship-building.

A 3-M. Special dimensions in which sawn oak is imported are as follows:-

Waggon planks, 3, 4, and 5 by 12 inches, in various lengths from 8 to 16 feet, used in waggon construction.

Sills, 2, 3, and 4 inches by 6 inches or 8 inches and wider in lengths 8 to 16 feet, used in furniture manufacture, and for window sills, mantelpieces and doorsteps.

Coffin-oak boards, 5/8, 3/4, and 1 inch thick, by 12 inches and wider, in lengths 12-feet and up.

Dimension stock, Squares from 1 1/2 inches upwards in various lengths from 2feet up to 6feet.

Flooring is stocked in standard sizes, both for strips and blocks.

Logs in the round are imported from Poland but they are usually sawn in the country of origin into boules or wainscots before shipment. Boules are simply logs sawn thro' and thro' and re-banded with wire into log-form. Wainscots are obtained by cutting out a 3-inch centre plank from a log, and squaring the top and bottom of each of the resulting flitches to give 8 inch face. The result is a piece of timber squared on three sides with the fourth side formed by the wavy circumference of the log. Flooring strips and squares are cut from the pieces left after cutting the flitches to their 8-inch faces, while the centre plank of the log, measuring 3" by the diameter of the log and known as the "crown" plank, is sold with other crown planks under that specification. Wainscot planks are obtained from

and Russian is considered to be intermediate between these two. Japanese is only obtainable in shorter lengths. It is mild but lacks strength.

Sawn square-edged lumber is imported in all thicknesses from 1/2 inch upwards, in widths 4-36 inches, and in lengths 6 feet and upwards. The principal uses of sawn lumber are for furniture, panelling and wainscots and all interior trim, structural work in buildings, railway wagon construction and ship-building.

A. S. M. Special dimensions in which sawn oak is imported are as follows:-

Wagon planks, 3 1/2, 4, and 5 by 12 inches, in various lengths from 8 to 16 feet, used in wagon construction.

Sills, 3 1/2, 3, and 4 inches by 6 inches or 8 inches and wider in lengths 8 to 16 feet, used in furniture manufacture, and for window sills, mantelpieces and doorsteps.

Coffin-oak boards, 5/8, 3/4, and 1 inch thick, by 12 inches and wider, in lengths 12-feet and up.

Dimension stock, Squares from 1 1/2 inches upwards in various lengths from 2-feet up to 8-feet.

Flooring is stocked in standard sizes, both for strips and blocks.

Logs in the round are imported from Poland but they are usually sawn in the country of origin into boules or wainscots before shipment. Boules are simply logs sawn thro' and thro' and re-bound with wire into log-form. Wainscots are obtained by cutting out a 3-inch centre plank from a log, and squaring the top and bottom of each of the resulting flitches to give 6 inches face. The result is a piece of timber squared on three sides with the fourth side formed by the waxy circumference of the log. Flooring strips and squares are cut from the pieces left after cutting the flitches to their 6-inch faces, while the centre plank of the log, measuring 3" by the diameter of the log and known as the "crown" plank, is sold with other crown planks under that specification. Wainscot planks are obtained from

and makers of garden furniture also use large quantities but much of this is supplied in English beech of which logs run to 12 to 20 inches diameter, in lengths of 12 to 20 feet.

WALNUT.

English walnut is stocked by Mallinsons in logs sawn thro' and thro' of which centre planks run 12 to 30 inches wide, in lengths of 6 to 13 feet. French walnut is imported in similar form, but a great variety of thicknesses is available. Stocks are held of 1-inch, 1-inch full, $1\frac{1}{8}$, $1\frac{1}{4}$, $1\frac{3}{8}$, $1\frac{1}{2}$, rising by multiples of $\frac{1}{8}$ inch to 6 inches in thickness. Widths are from 15 to 26 inches and lengths 7-10 feet. The sawn logs are peeled and steamed in France before shipment.

Walnut butts, both English and French, are in demand for slicing veneers. Small veneers find a ready market for radio-set cases.

HORNBEAM.

French hornbeam is imported in round logs which are sawn locally. They measure 5 to 12 inches diameter and 5 to 10 feet in length. English logs are rather larger, reaching 20 inches in diameter and 20 feet in length. Hornbeam is used for the action parts in pianos and also for blocks. Only small quantities however are marketed.

4. AUSTRALIAN WOODS.

Several Australian hardwoods have made considerable progress in the English market within the past five years, mostly for purposes of interior trim such as panels, and floors. Messrs. Mallinson have done much in the introducing of these woods to the public in conjunction with the shippers' London agents. Australian or Queensland walnut is perhaps the most notable wood. It is now in considerable demand for purposes where walnut is chosen for its decorative appearance, and it has been used for a variety of such purposes. Other woods now known

in the English market are blackbean, blackwood, jarrah and karri, maple, myrtle, Tasmanian oak, and silky oak.

Australian millers cut all square-edged lumber full to thickness. Widths are often cut in unit inches, but lengths run in random measurements.

From an examination of the lumber in Messrs. Mallinson's yards, Australian millers appear to use band-saws extensively in their mills, but lumber sawn with circular saws is also shipped. Little attempt at air-seasoning prior to shipment seems to be made, to judge from figures obtained in Messrs. Mallinson's yards. (see page 8) but flooring strips, both the finished flooring and the unprepared strips, appear to be kiln-dried (unprepared strips to about 30% moisture content) in Australia. Some shippers also kiln-dry their sawn boards before shipment, notably of myrtle and Tasmanian oak. Lumber appears to undergo thorough inspection before shipment. Only Prime clear grade is wanted by Mallinson's and as a general rule the parcels of lumber received during the period under report were satisfactory except for one parcel of walnut which included many boards showing "dot" and which should not have been overlooked by the shippers. Two apparent defects which it has been decided by discussion between agents and merchants to allow are gum streaks in Tasmanian oak and white heartwood in myrtle. The latter was at first considered to be sapwood but on examination was found to be uncoloured heartwood and has since been admitted in Prime grade lumber. Small knots in myrtle sometimes give grounds for complaint where these have been admitted in undue proportions by the shippers. Some notes on stocks held by Messrs. Mallinson are appended.

BLACK BEAN (Castanospermum australe).

Sawn lumber imported in thicknesses of 5/8 to 8 inches. Widths run from 6 to 18 inches and lengths from 8 to 16 feet. Lumber is sorted for retail into two width grades.

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6-11½ inches, and 12 inches and up. No sapwood is allowed. Logs imported in the round are sawn to 1 to 3 inch thickness and shew 16 to 36 inches diameter. They are in lengths of 9 to 19 feet.

BLACKWOOD. (Acacia melanoxylon.)

Sawn lumber is imported 1 to 3 inches thickness, 6 inches and up in width, 4 to 16 feet in length. This includes flooring strips of 1 inch x 2, 3, 4, and 5 inches dimensions and 5" to 6 inch squares. Retail price of boards is about 1/3 per foot super and flooring is believed to be about 1/- per foot super as compared with Austrian oak at 10d and American maple at 1/1d.

Logs are held of 2 to 34 inches diameter and 13 to 20 feet in length, sawn to ¾ to 2 inches thickness.

JANRAN (Eucalyptus marginata.)

Sawn lumber is stocked in thicknesses from ¾ to 6 inches, in widths 4 inches and up, in lengths 7-20 feet. Flooring strips are held in sizes of 1 x 3 inches, 1 x 4 inches, 1½ x 3 inches, and 1½ x 4 inches, in 6-25 feet lengths. Karri flooring (E. diversicolor) is held in the same sizes but it appears doubtful whether much distinction is maintained between these two woods in flooring sizes.

AUSTRALIAN MAPLE (Flindersia sp.)

Sawn lumber is stocked in thicknesses of ½-inch to 4 inches, 6 to 18 inches in width, and 8 to 20 feet in length. It is sorted for retail into two width grades, 6 to 11½ inches, and 12 inches and up.

AUSTRALIAN MYRTLE (Nothofagus Cunninghamii)

Sawn lumber is stocked in thicknesses from 5/8 to 3 inches, 4 inches and up wide, and 8-14 feet in length. Squares in similar lengths are held in 3 x 3, and 4 x 4 dimensions. A few sawn logs are also held in stock.

SILKY OAK (Cardwellia sublimis).

Sawn lumber is stocked in thicknesses rising from 1/2 inch to 6 inches, in widths of 6-18 inches, in lengths of 8 - 20 feet. Lumber is sorted for retail into two width grades, 6-11 1/2, and 12 inches and up. Lumber is usually sawn on the quarter to show the figure which is characteristically associated with the wood by the public.

Logs run from 32 - 42 inches diameter and 13 - 20 feet in length.

AUSTRALIAN WALNUT (Endiandra palmerstonii)

Sawn lumber is imported in specifications similar to that of American black walnut, and is sorted for retail into the same width-grades. Flooring strips are also imported in 1 inch and 1 1/2 inch thickness, 3, 4, and 5 inches wide, in 4 - 12 feet lengths.

Logs imported are of 20 to 36 inches diameter and 4 - 20 feet in length.

Australian walnut has an interlocked grain, which often twists and turns in a most irregular way. This makes it a difficult wood to season successfully and stresses set up in the wood may cause warping when kiln-dried lumber is manufactured. Messrs Mallinson, however, seem to be able to kiln-dry 2 inch boards to the satisfaction of their clients, and this fact gives encouragement to attempts to season other refractory Empire hardwoods.

The price paid by the merchants for this wood is stated to have been about 8/- per cubic foot at the time of its introduction to the English market. This price has at least been maintained and is probably considerably higher.

TASMANIAN OAK (Eucalyptus obliqua)

Sawn lumber imported in thicknesses from 1/2-inch to 6 inches, in widths 6 inches and up, and in lengths of 8 - 16 feet. Squares of 2 1/2, 3 1/2, and 5 inches are also imported in

lengths of 4 - 10 feet. Flooring strips (unprepared) are imported in usual specifications. Prepared t. and g. flooring, kiln dried by shippers, is imported in bundles, 3 dozen strips to a bundle. Strips are laid in layers, three strips fitted in each layer, eleven layers to a bundle, which, together with two strips laid along each side of the bundle make up a full 3 dozen. The four edges are protected by laying a half-width strip along the side of each edge, tongued or grooved so as to fit the four lateral strips. These bundles are of 16, 18 or 20 feet in length and are bound with wire at 3' intervals. The strips are finished $7/8 \times 3^{5}/16$ face.

MOUNTAIN ASH (Eucalyptus regnans.)

The wood is very similar in appearance and texture to Tasmanian oak and the two woods are probably not always distinguished in the merchant's yard.

WEST AFRICAN WOODS.

INKO. (Chlorophora excelsa.)

Other names, African teak, odum.

Sawn lumber is stocked in thicknesses from $\frac{1}{2}$ -inch to 6 inches. Widths run from 6 to 37 inches and lengths from 10 feet upwards. Flooring strips in 1 x 4 inches dimensions are stocked in lengths from 8 feet upwards. Stocks of sill dimensions are 3 inches by 6 and 7 inches, 10 feet and up in length. This lumber is largely obtained from imported hewn logs that are sawn locally. Boards are sorted for retail into two width-grades, 6 - 15 $\frac{1}{2}$ inches and 16 inches and up.

ONECHI. (Triplochiton scleroxylon and T. africanum.)

Other names. African whitewood, Empire whitewood, Ayous.

Imported in hewn logs and sawn locally to thicknesses from $\frac{1}{2}$ inch to 6 inches, 6 inches and up wide, 8 feet and up long. Lumber is sorted for retail in the same width-grades as American whitewood, 6 - 17 $\frac{1}{2}$, 18 - 23 $\frac{1}{2}$, and 24 inches upwards. Retail

price is believed to be about 6d. per super foot for 1 inch boards, as compared with 10d. for American whitewood.

REPORT ON
POSSIBILITIES OF EXPORT
OF
KENYA TIMBERS
TO
ENGLAND.

By:- S. H. Wimbush,
Assistant Conservator of Forests,
Kenya Colony,

August, 1934.

INTRODUCTION.

Although Kenya is situated in the tropic zone, the high altitude of the highlands where the main forests are situated causes climatic conditions dissimilar to those usually found within the tropics. The forests therefore are of a different type to the moist rain forests common to such tropical countries as West Africa and Malaya. In these countries, although geographically far removed from one another, the rain forest contains the same wide range of timbers, including woods for structural purposes, durable hardwoods, purely decorative woods, and a variety of decorative or non-decorative utility woods. Their forests, moreover, are extensive and their resources of these different timbers considerable.

West Africa has a rich forest flora from which the most suitable timbers for each class of utilisation can be selected. For example, four different species of timber are shipped from West Africa in the "mahogany" class, and two different genera in the "walnut" class, in addition to one general utility wood, and one decorative hardwood.

Kenya is more poorly served. Her forests are of a drier semi-temperate type, in which the range of species is limited. There are no "true" mahoganies, nor woods which could pass under the trade name of "walnut", "oak" or other established decorative timbers. Her timbers must therefore stand or fall on their own merits under their own distinctive names.

Kenya has four woods in common use in the Colony, and some half-dozen other woods in occasional use. Apart from these many other species occur in smaller quantities throughout the Highland forests, while in the less extensive coastal forests the range of species is great but at present unexplored to the same extent. The four common woods exploited by saw-millers are:-

East African camphor, (Ocotea usambarensis),

African olive, (Olea Hochstetteri).

Podo (Podocarpus spp.),

East African Pencil Cedar (Juniperus procera).

East African camphor is a medium hardwood of pale yellowish brown colour when freshly cut, darkening on exposure to a deep brown. When lightly stained and polished it has some resemblance to woods in the "mahogany" class, and its working and polishing qualities are comparable to those of African mahogany. It is obtainable in large sizes.

African olive is a highly decorative hardwood, with very fine and even texture, of a light brown colour marked with irregular dark grey-brown veins or streaks. The wood is very hard but works well to a fine and uniform finish.

Podo, although a conifer, would probably be classed commercially as a light hardwood. It has excellent working qualities and is a first-class joinery wood, but its plain yellowish appearance would prevent its use for decorative work. It is in general use in Kenya for utility purposes.

Pencil Cedar, as its name implies, is similar in appearance and characteristics to the Florida pencil cedar (Juniperus virginiana) of the eastern American States, now imported by English pencil manufacturers for the manufacture of their more expensive grades of pencils. There is no manufacture of pencils in Kenya Colony but the timber is exported to England for this purpose. It is the commonest tree in the Colony and is in general use for a variety of purposes such as building (both interior and exterior work), furniture, fittings, and outdoor work in contact with the ground for which it is particularly suited owing to its resistance to insect damage.

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EXPORT POSSIBILITIES FOR

KENYA TIMBERS.

1. The exploitation of timber in Kenya Colony has developed to the stage when the local market is unable to consume the total output of the mills when these are working up to their normal cut. It is not within the references of this report to consider what is the safe annual cut of the different timbers that grow in the Kenya Forest Reserves. This, however, has been considered by the Forest Department in the Colony, with the result that there seems no reason to curtail the present rate of cutting of the East African pencil cedar (Juniperus procera), while the cut of hardwoods may be safely increased. This report deals with the latter only, giving information relating to the marketing of Kenya hardwood timbers in England.

TIMBERS SUITABLE FOR EXPORT AND PAST TRIALS IN ENGLAND.

2. There are four timbers common in the highlands of Kenya which are accessible in sufficient quantities to warrant export. They have been used within the Colony during the past 15 years for many purposes, exterior building, bridging, railway sleepers, railway waggon, motor bodies, interior joinery work in houses and office construction, flooring, panelling, furniture and cabinet making, etc., and their characteristics and behaviour in use are fairly well known. They have been tested and examined at the Forest Products Research Laboratory in England, and as the outcome of experience and research enough is now known about them to warrant taking steps to introduce them on the market in Great Britain.

3. These four woods are:-

- East African pencil cedar (Juniperus procera),
- " " saumhur wood, (Ocotea usambarensis),

ditions. Other tests will also be carried out to investigate the use of olive for other purposes such as cabinet wood.

African olive (*Olea Hochstetteri*)
Podo. (*Podocarpus gracilior* & *P. milanjianus*)

of these four, the first - pencil cedar - has been in use for some time. There are no recent attempts to introduce pencil-manufacture in England for some time, and no introduction of Podo timber being reported to Great Britain. It is needed to manufacturers. The problems connected with the increased use of this wood for pencils are dealt with in a separate report.

4. East African sampher wood has not to my knowledge been imported into Great Britain to the order of a timber merchant. At any rate I have not met any merchant with previous knowledge of the wood. Trials of the timber on a commercial scale were undertaken by the Forest Products Research Laboratory at Princes Risborough, Bucks, in 1933. They included fitting up a branch post office in London with sash and fittings of campher, as well as other smaller works at Princes Risborough and elsewhere.

5. African olive. Messrs. Wm. Mallinson & Sons, (a London firm of hardwood timber merchants) have had two parcels of this wood in flooring strips. They were not enthusiastic about it but have recently supplied material for the floor in the Council Chamber at the London Chamber of Commerce so that the wood can now be seen in London. They also have a few square feet of flooring laid in their showrooms. Messrs. The Acme Flooring Co., of Barking also received a parcel of flooring strips from Kenya in 1932, but had complaints to make about the shrinkage and manufacture of the strips. These two instances represent our past experience of commercial trials of olive in England. At the time of writing (August, 1934) a parcel of 1,200 cubic feet of olive flooring strips have recently arrived at the Forest Products Research Laboratory, Princes Risborough after 3 months air-seasoning in Kenya before shipment. This flooring is to be laid by the Office of Works in several different places and will represent a scientific test of the wood under practical and con-

ditions. Other tests will also be carried out to investigate the use of olive for other purposes such as cabinet making both in the solid and veneers, and turnery work.

6. Podo. There are no recent instances to my knowledge of Podo timber being exported to Great Britain. Tests on the two Kenya species (and one from Tanganika) were carried out in 1933 at the Forest Products Research Laboratory. It is a high-class joinery wood but has a plain appearance compared with olive or camphor and therefore is more in the class of utility rather than decorative work.

MARKETING POSSIBILITIES OF KENYA TIMBERS.

7. Experience in the past with Camphor and olive assisted by laboratory and practical tests of the woods show that they are fully the equal of many woods now in use in Great Britain. Uses for these timbers are suggested in the reports on tests made at the Forest Products Laboratory.

8. Camphor. The uses for which camphor appears suitable are for these purposes requiring timber of good dimensions, easy working qualities, and some decorative appearance, i.e. panelling and high-class joinery work such as interior fittings for shops and offices. No special uses for the wood have been revealed by tests at the Forest Products Laboratory. The use that camphor is imported at will have to compete with those now ruling for such woods as Oak, mahogany and walnut which are largely used for interior fittings. It has been difficult to get information as to prices paid by merchants to shippers, but the following is believed to represent approximate cost to merchants of some woods used for interior trim and joinery work. In every case the basis taken is the cost of 1" prime boards (or "First and Seconds" quality in American woods) c.i.f. U.K. post quantities available, and 5% there for 3% there is hope that

Central American mahogany	9d. to 1/- per super foot.
African mahogany	6d. to 9d.
American plain oak.	3 ¹ / ₂ d. to 4 ¹ / ₂ d.
" black walnut	7d. to 9d.
French walnut	10d.
Iroko or African teak	7d. (sawn in Uganda).
Borneo Red cedar.	5/6d. per cubic foot.
Philippine lauan	5/- to 4/-

Prices realized for logs at a recent auction in London were as follows:-

African mahogany. Lagos logs,	4 ¹ / ₂ d. to 6 ¹ / ₂ d. per super foot.
Benin "	5 ¹ / ₂ d. to 5 ¹ / ₂ d "
West African iroko logs	3/9d. to 5/6d. per cubic foot.

It should be possible to put camphor boards on the market at prices comparing favourably with those quoted above for sawn boards of mahogany, walnut and iroko, but camphor would leave little chance against the Borneo and Philippine woods, as far as price is concerned.

The strikingly handsome appearance of this wood combined with its wear-resisting qualities of hardness and pervasiveness of grain suggest the use of aliva for flooring. Prices paid by importers for flooring strips however are at present low.

It is believed that 5/- to 4/- per cubic foot is the maximum price now paid by importers for decorative woods in flooring sizes, e.g. pinkade from Burma, while for flooring strips of commoner woods such as oak, teak, jarrah, maple, very much less is paid, - jarrah about 4/-, teak 4/6d. and oak anything from 2/6d. to 4/- per cu.ft. Olive in flooring sizes is likely to be sold as a luxury wood for decorative purposes rather than as a general utility wood, partly because of its appearance and high price, but also on account of the comparatively small quantities available, and for these reasons there is hope that

it may be possible to get merchants to pay a price for the wood which will make it possible to supply the timber in flooring sizes.

The remarks made in the last paragraph on olive as a luxury wood for flooring apply equally to olive in saw boards and planks. Any leading merchant who can be persuaded to take an interest in olive might be able to find a market for the wood for highly decorative (and therefore high-priced) work, such as panels, furniture and cabinet making.

As a turnery wood olive is excellent, both from its working properties and its finished appearance. It would make attractive and easily-turned door-knobs, for which imported partridge wood is largely used. It seems therefore that the best chance we have of marketing olive in England is by introducing the wood to high-class furniture and cabinet makers, to the wood turnery trade, and to firms who specialise in hardwood flooring.

10. Both sassafras and olive, as new woods of Empire origin, come under the same category as the Australian hardwoods which have been put on the market during the past ten years. - The prices that merchants are likely to pay will therefore have to bear comparison with the prices that they pay for these Australian timbers, and as a guide to what may be expected the following approximate prices of some Australian timbers are given. These are prices per cubic foot, s.i.f. London, and the range covers the varying specifications in which these timbers are supplied:-

- Silky oak (Grevillea robusta) 6/6d. to 7/6d.
- Tasmanian oak (Eucalyptus obliqua, Eucalyptus regnans) 4/6d. to 5/-
- Blackwood (Acacia melanoxylon) 5/- to 7/-
- Tallow wood (Eucalyptus microcorys) about 6/-
- Spotted gum, (Eucalyptus maculata) 5/- to 6/-
- Turpentine, (Syncarpia laurifolia) 4/6d. to 6/6d.

Of these woods the first three, silky oak, Tasmanian oak, and blackwood have been marketed to some extent in London and the provinces, together with Australian (Queensland) walnut (Endiandra Palmerstonii), blackbean, (Caesalpinia australis) and Tasmanian myrtle, (Nothofagus Cunninghamii) during the past few years but little is known of tallow wood and spotted gum. Turpentine has been used largely on the Clyde for marine construction works in place of greenheart (Quercus Rodicci) which costs nearly double the price of turpentine.

Other Australian woods are Queensland walnut and blackbean. These are now in considerable use in London. Walnut is believed to cost about 10/6d. and blackbean about 8/- per cubic foot, c.i.f. London.

11. Podocarpus. The report on the preliminary tests on three East African species of Podocarpus carried out at the Forest Products Research Laboratory, Princes Risborough suggested the following uses for the wood:-

"..... a joinery wood comparable to such general joinery timbers as American whitewood and American hazelpine (Liriodendron tulipifera and Liquidambar styraciflua respectively), used for panel framing, shop and counter fittings, display cabinets, drawer linings, shelving, handiwork in schools, etc."

American shippers are now quoting the following approximate prices c.i.f. U.K. port for these woods:-

Hazelpine (listed as "plain Sappan")	
F.A.S. quality 1" x 12" to 15"	3d. per super foot.
The small " " 1" x 22"	4d. " " " "
" " 1" x 6" and up (average 8")	3d. per super ft.

These are the prices with which Podocarpus would have to compete if exported from Kenya to the United Kingdom as a general joinery wood.

In Scotland and the north of England Port Orford cedar (Cupressus Lawsoniana) is stocked by merchants for use in shop-

fittings and also for interior finishings such as beadings and skirtings. It is believed that the wood of Podo is somewhat similar to that of Port Orford cedar and might find a market for similar purposes at a rather higher price than that paid for the general utility whitewoods. It is believed that merchants purchase Port Orford cedar at about 5/- per cubic foot, but the quantities/^{used} are decreasing owing to competition in this market from British Columbia pine (Pseudotsuga taxifolia) and western red cedar (Thuja plicata), which are imported at lower rates (3/- to 4/6d. per cubic foot). If the price likely to be paid for Podo is too low for exports to show a profit efforts must be made to find outlets for increasing consumption within the East African dependencies such as its use for boxes or matches, on which separate reports are being submitted.

12. Pencil cedar. Apart from its use for pencils a few small parcels of planks have reached England in the past. These have been shipped to the order of merchants who receive occasional enquiries for the wood, generally in thin boards for cupboard linings and the inside of clothes chests, a use for which the wood is suited owing to its aromatic nature which is believed to make it moth-resistant. A few planks of East African pencil cedar were seen among the stocks of Messrs. Wm. Mallinson & Sons, and Messrs. Joseph Gardner & Sons both London firms. Small quantities of Florida cedar are imported in log-form to Liverpool (Messrs. Joseph Gardner & Sons; Messrs. Irvin and Sellar, Ltd., and Richard Forshaw & Co., Ltd.,) but stocks held are negligible. The small trade in this wood for linings has probably dwindled since Florida cedar for pencils ceased to be imported in logs, and slats were begun to be shipped. Florida cedar logs seen in Liverpool were 7 to 12 inches diameter and 4 to 10 feet long. They were roughly trimmed to a square or cubical shape, and showed considerable branch-knots on their sides as well as some slight ingrown bark. No heart rot was seen in the logs. Messrs. Irvin

a Sellar stated that the logs seen (imported some years ago) cost them about £10 per ton. Messrs. Churchill & Sim's Market Report for July, 1934 gives the nominal price of 4/- to 6/- per cubic foot for pencil cedar.

It might be worth while to give the London representatives of Kenya sawmilling interests a chance to try to awaken some renewed interest in this timber, but it is doubtful whether merchants will pay a price for it at which it would be economical to ship a parcel. For linings the timber would best be shipped in planks 4" to 6" thick for deep-sawing by buyers to thin boards, but the liability of the wood to interior fungus pockets would make this risky.

METHODS OF ORGANISING IMPORTS TO THE UNITED KINGDOM.

13. Various markets have been suggested for camphor, olive and podo in Great Britain. The question arises as to what steps should be taken to promote and establish a trade in these woods as imports to the United Kingdom.

It is important first of all to make arrangements for introducing the woods to merchants by representation to them of the qualities and possible uses of the woods. Such facts should be illustrated by small samples of the woods, and backed by statements as to previous tests, commercial contracts carried out in the woods, either within the Colony or better still in England where the finished work can be seen. Other information to merchants should include sizes and supplies available within the Colony, prices at which the woods can be shipped, etc. On all these points merchants will require information and satisfaction before placing an order for a trial shipment. I suggest that the proper people to carry out this preliminary work are a firm of agents in England through whom contracts between shipper and merchant for future supplies should then be made.

14. It is a common practice for shippers of timber from abroad to appoint agents at the United Kingdom port of entry through whom merchants orders are conveyed to the shippers and all arrangements made. They are able to advise shippers on all questions relating to sizes, quality, etc. of timber required by the merchants, and in the event of any dispute arising as to the condition on arrival of any shipment they act as mediators between the two parties who, owing to intervening distance as well as to their different standpoints, are likely to find agreement difficult. They have a thorough knowledge of customary methods of business and are thus in a position to arrange the financial side of any contract more advantageously to the shipper than the latter would be able to do by correspondence with the merchant.

15. Approximately equal quantities of logs are imported through the ports of London and Liverpool but the great majority of sawn hardwoods imported into Gt. Britain come through the port of London. It is in London therefore that leading firms of merchants dealing in hardwoods generally have their headquarters. This is the port at which ships sailing from East Africa discharge their cargoes, and for these two reasons London seems to be the best sales centre for Kenya timbers.

16. An alternative course to adopt with a view to introducing Kenya timbers to the English market is to employ one of the larger firms of timber-brokers who would advise as to specifications of a trial shipment which they would receive and hold pending sale by private contract with clients or by public auction. Brokers do not have their own timber yards and such a consignment would therefore be at the shippers expense as regards storage charges until disposed of. Brokers who have held public auction sales of hardwoods in London during the past year are Messrs. Churchill & Sim (29/31 Clements Lane, E.C.4.) and Messrs. Foy, Morgan & Co. Ltd., (149 Leadenhall Street, E.C.3.Y).

Before agreeing to handle such a consignment the brokers would require information and satisfaction as to supplies and sizes of the timber available in the same way as would the merchants. But in the use of a broker the shipment is made on consignment only and the shipper has the greater risk of the parcel failing to find a buyer than he has if a trial shipment is made by forward contract through agents between merchant and shipper.

17. There seem to be to be arguments against importing a hitherto unknown timber through a large firm of a brokers. They are as follows:-

- (a) A broker's main interest is bound up in these woods which are imported in large quantities to an established market. Unless supplies in the country of origin of a new wood are large and his turnover likely to increase to large dimensions the wood is of little interest to the broker.
- (b) A broker who deals in timbers from many sources is not likely to take the same trouble in introducing a new wood unless it falls into the category of already established woods such as mahogany or walnut. His business is to supply the fashion in hardwoods rather than to influence it.

An agent or small broker on the other hand has a more limited field of business, relying more on his success in obtaining orders from merchants than does the broker. A new wood is to him a new source of business which will only pay him if he gives personal attention to pushing its sale.

- (c) It is believed that brokers charge a higher rate of commission than agents which is an important consideration when there is a narrow margin between the minimum economic shippers quotation and the maximum merchant's

offer. Brokers' charges are believed to be 5 per cent. as against the agents' charge of 2 1/2 per cent. For introducing a new wood, however, an agent may demand the broker's commission to cover the cost of initial introduction of the wood to buyers.

18. I submit that an enterprising firm of agents with a sound reputation amongst merchants in London and other hardwood centres, who are known to have made some success in the past with introducing new timbers, would be the right firm to handle the introduction of our Kenya timbers to the London market.

INTRODUCTION OF TIMBERS TO MERCHANTS AND ARCHITECTS.

19. The following paragraphs suggest the methods to be adopted if and when agents are appointed in London representing the East African shippers.

20. To introduce the East African campher and African Olive to London hardwood merchants as new timbers which can be supplied to merchants' orders, a representative of the firm should personally call on selected merchants who are considered likely to be interested and to assist in promoting a trade in these woods. It would, in my opinion, be a great advantage if someone representing the East African Timber Co-operative Society, who is familiar with these woods in the Colony could accompany the agent's representative. It would be at the discretion of the agents to ^{approach} architects also with whom lies the specification of the species of timber to be used in any new building with a view to bringing our woods to their notice. Copies of the reports on tests of Kenya timbers made at the Forest Products Research Laboratory could be obtained from the Director and should be supplied to architects together with hand samples of the woods.

21. The agents will require to be supplied with full information about the timbers. This I think should take the form of hand

samples of the woods together with copies of a leaflet giving the particulars that merchants will want. These should include:-

- (a) Specification of sawn sizes, noting especially average widths and lengths obtainable.
- (b) Quantities available.
- (c) Consistency of supplies as governed by: (d) & (e)
- (d) Frequency of sailings from East African ports.
- (e) Climatic conditions as affecting exploitation.
- (f) Methods of sawing (quarter or plain).
- (g) Seasoning of timber before shipment.
- (h) Suggested uses.
- (i) Instances of previous work in England.

Samples should be of a handy size. They might be sawn $1\frac{1}{2}$ " thick x $4\frac{1}{2}$ " wide x 6" long and finished to 1" x 4" pieces. It is an advantage if hand samples are finished with moulded edges to shew the working qualities of the wood. In the case of olive 6" lengths of tongued-and-grooved flooring (finished to $7/8$ " x $3\frac{1}{2}$ ") would make good samples of flooring material.

22. A difficulty that will arise with the first shipments to England of any timber will be the length of time that must elapse between the manufacture of the timber in Kenya and its arrival in England. Assuming one month for cutting and stacking, three months air-seasoning, and one month in transit, this makes a total of five months that will be required to execute orders for a trial shipment. It may be found possible to shorten this by reducing the drying period to two months, but this will still keep the merchant waiting four months for his timber. For a trial shipment it is believed that this is not an unreasonable period but in the case of repeat orders the supply would have to be speeded up somewhat. The only way to do this will be to cut ahead of orders and to stack the timber for drying until shipment is ordered. It is fully realised that there are considerable difficulties in the way of doing this, both financially

and practically, but it is certain that timber of campher and olive will suffer serious degrade in transit due to warping and other defects, if shipped in the green state. The increase in cost to shippers of air-drying timber will be partly offset by decrease in the cost of ocean freight, resulting from the lighter weight of the wood.

MANUFACTURE OF TIMBER FOR EXPORT.

Freights.

23. The following figures for freightage on timber were obtained from the Commissioner, H.M. Eastern African Dependencies, Trade and Information Office, London.

KENYA AND UGANDA RAILWAY.

Freight on rail, 6 cents per ton mile, loading by sender.
Unloading at Kilindini -/90 per ton, plus 5 per cent surcharge.
Harbour charges - 5/- per bill of lading ton, plus 5 per cent surcharge.

Shipping Freights, per Conference lines.

Sawn Timber.

Cedar, olive, iroko, 80/- per 20 cwt.

Campher and Podo. 45/- " " "

ditto for lengths over 50ft. 80/- per 20 cwt.

subject to surcharge of 10 per cent. and deferred commission of 10 per cent. on the original rate.

24. Based on these figures, freights c.i.f. London work out at the following approximate figure:-

Railway freight at Nairobi - Kilindini 19/80 per ton.

Unloading at Kilindini 1/95 " "

Harbour charges. 5/25 " "

26/00 " "

Total cost of freight to London thus works out at 76/- per ton on cedar, olive and iroko and 71/- on campher and podo.

25. Rates per cubic foot for freight on timber from Kenya at different weights depending on degree of dryness of the timber are estimated as follows:-

Timber.	At wt. per c.ft. of	Freight Nairobi - London. (shillings)	Additional railway freight up-country from e.g. Maji Mazari. (100 miles) (shillings)	Total freight from an up-country mill to London, per cu.ft.
	80 lbs.	2.04	0.25	2.29
Olive, cedar	50 "	1.70	0.22	1.92
& iroko.	45 "	1.52	0.20	1.72
	40 "	1.35	0.18	1.54
Camphor & Podo	50 "	1.58	0.22	1.80
	45 "	1.43	0.20	1.63
	40 "	1.25	0.18	1.43
	35 "	1.10	0.15	1.25

It is believed that olive timber will weigh about 80 lbs. per cubic foot, and camphor about 45 lbs. per c.ft. after 3 months air-drying in reasonably dry weather.

These figures show the freights on these timbers from Nairobi to London after 3 months air-drying to be just over 2/- per cu.ft. for olive and just under 1/3d. per cu.ft. for camphor.

Shipping rates on sawn timber from Mombasa to London compare not unfavourably with those from other Colonies and Dominions to London. The rates on camphor at 45/- and olive at 50/- per cwt weight of shipping dry timber work out at 1ld. and 1/4d. per cu.ft. respectively. Freights from other parts of the Empire on sawn timber are approximately as follows:-

Malay, Philippines & Borneo.	1/3d. per cubic foot.
Ceylon.	1/1d. " " "
Australia.	1/4d. " " "
New Zealand.	1/3d. " " "

Shipping rates on logs from West African ports to London have been until recently 43/- per ton. These have now been reduced to 36/- per ton, largely through the action of the United African Company who adopted the principle of chartering their own

steamers, thus forcing the shipping line to reduce their rate in order to regain the freightage of timber to England.

Kenya is however at a great disadvantage in the fact that heavy cost on railage has to be incurred in transport from the highlands to the coast; a matter of 400 miles, making an additional charge of 8d. per cubic foot on all timbers exported.

26. A note on charges against imported timbers between c.i.f. delivery London and retail by merchants is included. These are borne by the importer, not the shipper.

Landing rates.

6d. per cu.ft. at "landed rates" (lumber not removed within 3 days of landing)

or 3d. per cu.ft. at "quay rates" (lumber removed within 3 days of landing)

Garbage.

About 1½d. per cubic foot delivery from docks to merchants yards. There still remain other charges to the merchant which he considers in estimating his retail price for the timbers. These include cost of storage and handling in his own yards, overhead charges and finally his own percentage of profit.

Sizes of Sawn Hardwood Lumber.

27. The Imperial Institute Advisory Committee on Timbers published in October 1933 a set of Grading Rules and Standard Sizes for Empire Hardwoods. The standard sizes contained in the rules apply to timbers intended for export from the Colonies to Gt. Britain and may be taken as showing correctly the minimum dimensions of timber of different grades that merchants expect to receive.

28. The rules state that boards and planks of prime or First Quality timber must have a minimum width of 6 inches and a minimum length of 8 feet. They give no information however on the average widths and lengths of pieces that merchants expect to get in a parcel of timber. Such average dimensions of course vary with different timbers but it may be assumed that high averages in lengths and widths more especially widths, will attract a merchant.

and may be an important feature in a wood that has no other outstanding characteristics (such as an exceptionally handsome appearance) in its favour. This will apply particularly to camphor.

Widths of prime boards of the Australian woods now on the market run from 6 to 18 inches, and lengths 8 to 20 ft. Average figures are not known but are estimated to be 11 inches in width and 12 or 13 feet in length. As a standard for comparison the following are average figures for imported sawn boards of F.A.S. Honduras mahogany:- average width of 11 shipments of 1" boards 10 1/2 inches, average length 13 feet.

29. It should be realised that these figures apply to boards of Prime quality only of which a high percentage (80 per cent. to 90 per cent. in Australian woods) must be clear of all defects.

Experience alone will show what proportion of the mill run output from camphor logs will come up to these requirements, but there is no doubt that selection of boards of good quality and high average dimensions will leave the greater portion of the mill output to be disposed of elsewhere.

30. The case for the sale of sawn boards of olive is less promising as regards average sizes obtainable. Selected logs would, however, probably average 18 inches diameter. Selection of the widest boards free from sap and defects from a number of trees may possibly give an average width of 10 inches, and if this can be maintained by careful selection from the sawn output the good price that should be realised for these boards on account of their handsome appearance will offset to some degree the much lower price paid for flooring strips of the same wood.

GRADING.

31. The remarks made in the last three paragraphs apply to timber of First Quality or Prime grade only, as laid down by the Imperial Institute Grading Rules for Empire Hardwoods. It may be as well

to quote here the specification given for First Quality timber.

First Quality or Prime. - Boards and planks to be 6 inches and up wide, and 8 feet and up long. They must be flat, well cut and full to thickness and have parallel edges. All pieces containing less than 8 feet face measure must be free from defects. Pieces containing from 8 to 12 feet face measure will admit one standard defect. Pieces containing from 12 to 16 feet measure will admit two standard defects, and over 16 feet face measure three standard defects. At least X per cent of the material as a whole must be free from defects; the value for X for the principal timbers concerned is stated in Appendix II. A standard defect is one defined in the attached schedule."

The percentage of the material which must be free from all defects has not been fixed for East African camphor or olive. This value will have to be fixed as the result of experience gained and agreement reached between millers, merchants and the Imperial Institute Committee.

There is little hope of exporting the lower grades of a newly introduced timber except in sizes for special purposes such as flooring strips. Second quality and wormy material would be unlikely to find a market except at very low prices.

In selecting prime sawn boards of camphor and olive, it should be remembered that merchants in London inspect on the worse face of the board and the Imperial Institute rules specify the same procedure for initial grading.

32. Special defects that should be looked for in grading camphor boards:

- (a) Stain or discoloration in the wood usually associated with knots, ingrown bark or adjacent heart-rot.
- (b) Cross-fractures, sometimes known as "thunder shakes" not always noticeable on the face of a sawn board but showing up after dressing and made prominent when the board is polished.
- (c) Sapwood on one edge of a board, not obvious when the wood is freshly cut but darkening to a deep chocolate colour when exposed to the air for some weeks.

33. Olive flooring strips. The Imperial Institute Grading Rules state (on page 12) that "the grading of dimension stock, e.g. flooring, must be the subject of special agreement between shipper and buyer."

The inclusion of strips showing sapwood on one face (i.e. one face only clear of sapwood) is likely to prove a difficulty in shipping flooring strips of olive. In the case of no other hardwood, to my knowledge, is sapwood permitted by London merchants in contracts for flooring strips, and it may be impossible to persuade buyers to accept olive strips that show sapwood on one face. This is a point for discussion and arrangement between the agents (assisted if possible by someone with personal experience of converting olive logs) and the merchant. The wood of the heart and sap in olive only differ in colour and it is believed that the inclusion of sapwood on one face will not increase the liability of movement of the strips after the floor has been laid. The objection to sapwood is entirely on account of its appearance, but provided that one face of each strip is clear of sap and that this face is laid uppermost the floor when laid will not be in any way inferior in appearance or behaviour to a floor laid with material entirely free from sapwood. If this fact is impressed on buyers it may be possible to arrange for the inclusion at any rate of a proportion of strips showing sap wood on one face in any future shipment.

SAWING BOARDS AND DIMENSION STOCK.

34. In sawing boards from fresh logs it is important to remember that shrinkage will take place as the board dries. Except in the case of dimension stock in which width as well as thickness is specified (such as in flooring strips) the only shrinkage that need be taken into account is that on thickness. A quarter-sawn board will shrink in its thickness more than a flat-sawn board. The following shrinkages in thickness should be allowed for in sawing camphor and olive, to produce material of full dimension; the figures are based on a tangential shrinkage of about one inch per foot in olive and half an inch per foot in camphor in drying from the green to an air-dry condition.

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ALLOWANCE FOR SHRINKAGE ON THICKNESS.

Timber.	Boards up to 1 1/2" thick.	1 1/2" to 2" boards. 2" to 3" boards.			
		Flat-sawn.	Quarter-sawn.	Flat-sawn.	Quarter-sawn.
Camphor	1/8"	1/8"	1/8" full	3/16"	3/16" full
Olive	3/16"	3/16" full	1/4"	1/4" full.	5/16" full.

In cutting dimension stock e.g. flooring strips the above allowances should be made for shrinkage in thickness, and the following allowances made for shrinkage in width.

ALLOWANCE FOR SHRINKAGE ON WIDTH OF DIMENSION STOCK.

Timber.	Dimension stock of width.			
	3"	4"	5"	6"
Camphor	3/16"	1/4"	1/4" full	5/16"
Olive	1/4"	3/8" full	7/16"	1/2"

These estimates allow for production of air-dry material full to measurement (see next paragraph).

34. All flooring material is imported full to thickness and full to width, and boards similarly must arrive in the merchants' yards showing full thickness. This is an important point. Material that is bare in measurement will cause great dissatisfaction. Shipments of American and Empire hardwoods seen in merchants' yards generally show thickness at least 1/16" full (and in many cases 1/8" full) on a thickness of 2 inches. In sawing material for export therefore the miller should aim at producing the timber full to measurement in the air-dry condition and should make ample allowance for shrinkage, by cutting material oversize on the basis of the figures given in the preceding paragraph.

35. SIZES OF SAW BOARDS AND FLOORING.

Boards. Thicknesses in which sawn boards and planks are imported into the United Kingdom are as follows:-

3/8", 1/2", 5/8", 3/4", 1", 1 1/4", 1 1/2" and 2" rising by 1/8 inches to 6".

In deciding the correct thicknesses in which to export boards the use to which the material is expected to be put must be considered. Sizes suitable for boards for joinery and cabinet work, and for dimension stock of flooring and cabinet squares are contained in the Imperial Institute Grading Rules as a "Memorandum on Sizes of Empire Hardwoods".

Flooring.

(a) Strips. In addition to the sizes for flooring included in the memorandum quoted above, i.e.

1" x 4", 1" x 4 1/2", 1 1/4" x 4", 1 1/4" x 4 1/2".

considerable quantities of 1" x 3" and 1 1/4" x 3" flooring are also imported. Lengths of flooring strips are usually 6 feet and up, but 4 feet lengths are included in some contracts.

(b) Blocks.

Block strips for the manufacture in the United Kingdom of flooring blocks are imported in the following dimensions:-

1 1/4" and 1 1/2" thick by 3, 3 1/2 and 3 3/4 inches wide, in lengths of 19 inches and up, rising by multiples of 9 1/2". Blocks are commonly manufactured to lengths of three times their widths.

35a. PACKING FOR SHIPMENT.

Risk of damage and loss in shipment is considerably reduced by bundling boards and flooring strips for transit. As far as possible boards of uniform width and length should be included in a bundle. Where this is not possible the widest and longest boards should be put in the centre of the bundle and the narrowest and shortest boards on the outsides. Boards are commonly bundled in half dozens. A suitable metal band for binding boards in bundles is supplied by the Packers Supply Co., New Malden, together with

a small hand machine for tightening and fastening the band (the Agripta Tin Plate Banding Machine).

36. SEASONING TIMBER FOR EXPORT.

Previous experience with flooring material of olive points to the fact that some air-drying is necessary before shipment if serious degrade is to be avoided.

The following figures relate to a trial consignment of Olive 1½" flooring strips sent from Kenya to England in 1954.

AIR-DRYING OF AFRICAN OLIVE FLOORING STRIPS

Shipment of 1200 cubic feet cut in Kenya, air-seasoned for two months to four months and shipped to England.

Consign- ment No. and Origin.	M/s on arrival Nairobi		Period in stack. months.	M/e after seasoning.		M/e on arrival in England.		Remarks.
	Average	Extreme		Average	Extreme	Average	Extreme	
1	47.6	32% to 66%	4½	13.4	12.4 to 16.5	14.2	13.0 to 15.1	
2	43.8	39% to 57%	2½	17.2	13.8 to 20.2	14.9	13.4 to 17.1	
3	43.0*	33% to 57%	1½	22.9	17.7 to 30	14.8	16.3 to 18.4	*Logs by 1½ months after fell- ing.

Material consists of 1½" strips, cut to 3½" and 4" widths.

The trees from which the material was sawn were felled between December and February i.e. in the dry season, and air-drying was in progress between January and June in a season when the April-May rains were poor. From these figures it can be seen that the 1" strips dried to about 23% moisture content in about 2 months to 17% in rather less than 2½ months, and to 14% in rather over 4 months. It is considered that 20% should be the maximum average moisture content of sawn timber at time of export to England and that timber dried to 15% will be likely to suffer less degrade from warping in transit than rather wetter material dried only to a 20% moisture content.

Equilibrium conditions in S. England are believed to be about 20% in winter and 15% in summer. By 'equilibrium condition' is meant the point at which wood will stabilise in its moisture content if left to adjust itself to atmospheric conditions.

37. As regards camphor and podo, no experience has been gained as these woods have only reached England in logs. Camphor will probably be easier to season without degrade from warping and splitting than is olive, and podo will almost certainly be so. The behaviour of these two woods after sawing does however indicate that careful seasoning is necessary in both cases, or trouble from warping and other causes will be considerable.

38. Information on the measurement of imported sawn hardwood, at merchants' yards in London, together with other notes on hardwood imports are contained in my report on "Hardwood Lumber Imports to the United Kingdom."

CONCLUSIONS.

39. To sum up the possibilities of exporting timber of camphor, olive, and podo, I believe that for the first two, camphor and olive, there is a market in London. The attitude of merchants is not so conservative that they are unwilling to try out a new timber. There are a few leading firms who have introduced new Empire woods within recent years, and there seems no reason to think that camphor and olive should not be marketable in the same way, provided that shippers can quote competitive prices.

40. It must be fully realised, however, that in most cases only selected material of prime quality has been shipped in these newly introduced woods, and that the greater part of the mill output must be disposed of in the local market.

41. A great deal depends upon the general appearance, including sizes, quality of manufacture, and condition on arrival, of the first shipments that reach London, so that especial care is necessary in selecting and seasoning material for trial orders.

42. Undue delay in shipping further orders resulting from a trial consignment makes merchants uneasy. They have had difficulty in the past on this score, generally caused by adverse climatic conditions holding up extraction, or infrequency of sailings from ports of shipment. They would welcome assurance that future orders could be supplied with promptness.

43. Kenya is not badly situated as regards the above points. Extraction is rarely held up to the degree experienced in countries with more extreme climates. It is within five weeks voyage of London, with frequent sailings from Mombasa. It has a local market which should be able to absorb material from which stock for export has been selected.

44. As regards freight rates on timber to London, Kenya is not fortunately situated. The forests lie 400 to 600 miles from the

port of shipment to which timber has to be transported by rail, and the direct shipping route to England passes through the Suez Canal where heavy dues are payable. Cost of freight on timber from mill to merchant will represent 25 to 33 per cent of the price likely to be obtained for the material in London. This is a serious consideration.

45. It is impossible to forecast the success or failure of attempts to place Kenya timbers on the English market, but one point affecting this is outstanding - that all things being equal between two woods for a general or for a special purpose the cheaper of the two will be the one in use. The price at which a timber can be marketed depends firstly on cost of production and secondly on transport costs. Wherever production costs are equal as regards two woods from different sources, the deciding factor will be the cost of freight from mill to English port. In this respect Kenya timbers are placed at a disadvantage owing to the heavy railage costs incurred before shipment.

46. To secure a market in London for new timbers requires considerable effort and perseverance by representatives of the shippers' interests, on the lines indicated in this report. There are times, when business in timber is very slack, when it would be foolish to attempt to interest merchants in new enterprises. The impression gained by visiting a few firms has been that a slack period has passed, and that merchants in London are interested in opportunities to try new timbers provided that data are available as to past experience of the woods, supplies available, and other points dealt with in this report.

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FOREST UTILISATION COURSE.

PROGRESS REPORT.

1st SEPTEMBER to 31st DECEMBER 1933.

(S.N. Wimbush, Kenya)

Places of Residence.

1st September to 2nd December. Princes Risborough.

4th Dec. to 9th Dec. - Messrs. F. Chambers & Co.
Pencil Manufacturers, Nottingham).

18th-24th Dec. Ditto.

11th-16th Dec. - Imperial Forestry Institute at
Oxford.

Forest Products Laboratory, Princes Risborough, Preliminary Work.

During the period spent at Princes Risborough the different sections of the Laboratory were visited and a general study made of their activities, with special reference to subjects of interest as regards Kenya woods.

From the Laboratory office files acquaintance was made with the enquiries that have been received in the past from outside sources concerning Kenya timbers. The present position as regards investigation into the properties of Kenya woods under the auspices of the Empire Timbers Committee was noted to be as follows:-

1. EAST AFRICAN CAMPHOR (Ocotea usambarensis).

Preliminary tests were carried out in 1931 at the F.P.R.L. Princes Risborough, under the auspices of the Empire Timbers Committee. Reports from these tests stated that its high price (4/- per cubic foot) would restrict it to work of a more or less expensive character and its use was recommended for panelling, good-class joinery work such as interior shop-fitting, veneers, and turnery.

Major tests were undertaken in 1933 at the F.P.R.L. and the Laboratory tests were completed in the autumn, with the

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exception of tests which are being made in co-operation with the Wool Industries Research Association as to the possible use of the timber for clothes chests and library fittings, as the aromatic odour of the wood appears to make it possible that articles held in containers of this wood may be protected from attack by insects (such as clothes-moths). This test is now in progress at the W.I.R.N.A. Leeds.

Arrangements have been made with the Post Office for a branch office in West Kensington to contain dadoes and fittings of campher-wood. This work is now in progress, the veneers being cut by Messrs. John Wright, manufactured into plywood panels by the Laminated Wood Products Ltd., and the joinery work and construction by Messrs. Limpus & Co.

At the Building Research Station at Watford a door and two windows for a controlled weather house are being made from campherwood. This wood is also being used in the Entomological Laboratory extension at Princes Risborough.

2. EAST AFRICAN PENCIL CEDAR (Juniperus procera).

The use of this timber is aimed at as a substitute for the Virginian pencil cedar (J. virginiana) at present the principal timber used by pencil manufacturers. The two main objections to using the African wood as at present imported are:-

- (i) its poor whittling qualities as compared with the American wood, and
- (ii) its liability to warp after manufacture.

Special investigations have been made on (i) at the F.P.N.L., resulting in a process being evolved (but not as yet published) for softening the wood and thus improving whittling. As regards (ii), investigations were being made in 1933 in co-operation with a firm of pencil manufacturers into the causes of this warping, but on the eve of tangible results, the firm expressed their desire to discontinue the research and the work is now held up. The officer in charge of the

work at the F.P.R.L. was approached with a view to continuing the investigation, possibly in co-operation with some other firm of manufacturers, and the question was at the end of the year under consideration by the Director of the F.P.R.L.

3. AFRICAN OLIVE (Olea Hochstetteri).

Preliminary tests under the auspices of the Empire Timbers Committee were carried out at the F.P.R.L. at Princes Risborough in 1930. The results published in February 1931, included suggestions for the use of the timber for flooring, cabinet-making, interior decorative work and for articles of turnery such as ash-trays, candle-sticks, fancy boxes, door knobs, chessmen; also motor-car fittings such as dashboards and arm-rests.

A shipment of timber to the Acme Flooring Co. in 1932, which was found on arrival in England to be badly sawn and poorly selected, proved unsatisfactory and the Company were unwilling to proceed with the use of the timber.

In 1933, Messrs. Mallinson laid an experimental floor with some African olive but this firm also had considerable complaints to make about the condition of the timber and its behaviour after laying in strips for flooring.

In 1935, various public departments agreed to lay experimental floors (the War Office, L.C.S. and Post Office) and at the present time, the arrangements now having been completed, the necessary timber is now being cut in Kenya for shipment to England.

4. PODO (Podocarpus gracilior and P. milanianus).

Preliminary tests under the auspices of the Empire Timbers Committee are now being carried out at the F.P.R.L. (including tests on Podocarpus usambarensis).

LABORATORY STUDIES, COMMERCIAL GRADING.

The new Empire Hardwoods Grading Rules prepared by the Advisory Committee on Timbers have been studied. Two

timbers from British Honduras at present undergoing investigation at the Laboratory provided material on which the grading rules have been tried out. The following parcels of timber of these species were graded:-

SANTA MARIA

5 logs cut to $2\frac{1}{2}$ " waney planks.

4 logs cut to $1\frac{1}{2}$ " waney boards.

Parcel of $1\frac{1}{2}$ " square-edged boards, graded before and after kiln-drying.

BANAK

Parcel of $2\frac{1}{2}$ " and $2\frac{3}{8}$ " square-edged planks, before seasoning.

Parcel of 1" square-edged boards, after seasoning.

CONVERSION.

Losses in conversion from log to square-edged lumber were studied in respect of the following:-

9 logs of Santa Maria converted to boards;

1 log " " " " " flooring strips.

Loss in trimming and machining strips of Trinidad Mora was studied, the strips being selected and trimmed at the F.P.R.L. and then machined to T and G. finished flooring by the Acme Flooring Co., to whose shops a visit was made to watch the machining operation. A report on this visit is appended to this progress report.

STRUCTURE AND IDENTIFICATION OF WOODS.

The structure of woods in general was studied in the Wood Structure Section of the Laboratory, and in particular that of Kenya woods. An identification key based on macroscopic features was made, using the hand specimens of woods held at Princes Risborough, augmented and checked with those held at the Wood Structure Section of the Imperial Forestry Institute at Oxford where a week was spent in December. In the light of this work done on Kenya woods, two woods were suggested for trial in the manufacture of loom shuttles for the textile industry, and arrangements were set on foot for the

supply of a small quantity of material from Kenya.

KENYA WOODS FOR SPECIAL PURPOSES.

1. E.A. PENCIL CEDAR (Juniperus procera).

A fortnight was spent at the Stapleford Factory of Messrs. F. Chambers & Co. (Pencil Manufacturers) who use this wood almost entirely in their pencils. A report on this visit is appended to this report.

2. E.A. CAMPHORWOOD (Quercus usambarensis).

Major tests in the Laboratory had just been completed at the beginning of September when the course under report was started, but the commercial tests of this wood have been followed closely up to date. These have already been mentioned in a previous paragraph. Notes are being made on each stage of the tests and will be incorporated in a final report.

(sgd.) S.H. Wimbush.
Asst. Cons. of Forests,
Kenya Colony.

EAST AFRICAN PENCIL CEDAR.REPORT ON VISIT (BY MR. WIMBUSH) TO MESSRS. F. CHAMBERS & CO.'S
PENCIL WORKS AT STAPLEFORD, NOTTINGHAM.

During December I visited Messrs. F. Chambers and Co's pencil works near Nottingham, and also paid a short visit to the Anglo Pencil Co., of Long Eaton. Both are comparatively small firms.

Output.

Messrs. Chambers probably manufacture about 120,000 gross of pencils annually which is estimated to be about one tenth of the total manufactured in Great Britain. The Anglo Pencil Co., are a smaller firm and have only been working a few years. They re-sell some of the slats received from Kenya after treating them by their softening process.

Woods in use for Pencil Manufacture.

Chambers use East African cedar entirely for their lead pencils and colour-pencils, but import small quantities of American treated Incense cedar which is used for manicure- and eyebrow-pencils. These require a very soft wood to hold the soft "filler" that these pencils contain.

The Anglo Pencil Co., use rather more Incense cedar than Chambers, making their copying pencils and some of the cheaper lines of lead pencils in this wood. Apart from these they use East African cedar.

PENCIL MANUFACTURE. General Account.1. Raw-material.

Wood for pencil manufacture is imported in the form of slats. A slat measures $7\frac{1}{2}$ " in length and $3/16$ " in thickness. Its width depends on the number of pencils that are to be manufactured from it. A 6-ply slat, i.e. one that will (when paired with a similar slat) give 6 pencils, should measure $3\frac{1}{2}$ " in width. 4-ply and 4-ply slats are commonly used.

2. Machining and Filling in.

Edging. Slats that have uniform width require no further trimming before manufacture, but if their width is not uniform they are put through an edging machine with rotating cutters which trim them to the correct width. They are then hoppered to the grooving machine which cuts six equally-spaced longitudinal grooves on one face of the slat, and at the same time planes the surface to a smooth finish. Each groove must have a depth of exactly one half of the diameter of the pencil-lead or "slip" with which it is to be filled. To ensure perfect fitting of the slips in the grooves a few slats are machined and tested with specimens of the slips which are to be used for the batch of pencils under manufacture. The grooving cutters are adjusted until the slips show a perfect fit in the grooves. Slats are then fed to the grooving cutters without interruption until the batch is completed.

Filling in.

The grooved slats then receive a coating of glue on their grooved surfaces and are paired with the grooved surfaces inwards, lead slips having been filled in to the grooves. Each glued pair of 6-ply slats thus constitutes 6 pencils. In this form the paired slats are clamped into presses, 24 pairs to a press, until the glue has dried.

3. Shaping the pencils.

- On being taken out of the presses the paired slats have their ends trimmed to given an exact length of seven inches, the nominal length of a pencil. They then pass to the shaping machines.
- Trimming.**
- The machine consists of a pair of cutters, held between discs mounted on a spindle. The cutter edges are ground to six semicircular grooves, the radius of each groove being half the diameter of the resulting pencil. The slats pass twice through the machine which shapes one side of the slats at each cutting, the slats being turned over between the two operations. The second cut thus completes the evolution of 6 pencils from each pair or 6-ply slats.
- Shaping.**
- The pencils are then sanded by machine to a smooth finish and are then known as "plain" pencils, ready to receive whatever colour and polish is prescribed for them.
- Sanding.**

4. Polishing, stamping and printing.

Plain pencils on leaving the machine-shop pass either into plain stock until required to fulfil an order, or if required at once for finishing to order are sent straight through to the polishing department.

- Here the pencils are fed singly from a hopper through a channel-like reservoir holding the dye-polish. From this channel each pencil in turn emerges into conveyors consisting of strips of endless belting, supporting the pencil by its two ends only, which carry the pencils, their polish drying rapidly all the time, to a container some twenty feet away. This operation is repeated for each coat of paint that the pencil is to receive. There may be as many as six coats for the best grade pencils.
- Polishing.**

- The pencils are then stamped (maker's name e.g. "F. Chambers", commercial name of pencil grade, e.g. "Stanto", hardness grade of the slip, e.g. "H.B.", the words "Made in England" or "Empire Cedar", etc.), or in the case of pencils made for customers' advertisement purposes they are ink-printed with whatever matter the customer requires and fixed with a cellulose finish.
- Stamping.**

- The pencils may then be pointed, butts dipped in other dyes or fitted with erasers, etc. before passing to the examining room where faulty pencils are rejected, the good pencils then being packed for delivery.
- Pointing etc.**
- Examining.**

Pencil grades.

Messrs. Chambers recognise three grades of pencils in their manufacture. These are called:-

"Penny", made from 3rd class slats.

"Sterling", made from 2nd class slats.

"Best", made from 1st class slats.

Lead-slips and polishes are used in quantities relative to the grade of pencil required.

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Prices.

Retail prices for pencils are between one penny and fourpence each (or 12/- to 48/- per gross). Wholesale prices appear to be only half retail prices. Pencils printed to customers' orders for advertisement purposes are supplied from "Penny" stock and charged for at 9/- to 11/- per gross. There is a busy trade in this line, especially towards the end of the year.

Pencils are supplied by Messrs. Chambers to Governments, both Home and Dominion, but prices were not stated.

EAST AFRICAN CEDAR PENCIL SLATS.

1. Grading of slats.

Pencil slats are usually graded into three classes. It used to be the practise for manufacturers to pay different prices according to the grade of slats supplied. Lately it seems to be more common for slats to be purchased in mill-run quality, which includes slats of all three classes.

Messrs. Chambers purchase slats from the Marmanet Saw Mills in Kenya and although they pay on mill-run quality, they stipulate a certain minimum percentage for 1st slats and a maximum percentage for 3rd class slats in each consignment. This therefore entails grading of slats in Kenya before despatch. The Anglo Pencil Co., also purchase mill-run quality from two other mills in Kenya, but do not lay down what percentage of 2nd and 3rd quality slats they will accept. Actually the millers sell this mill-run quality as containing some 3rd class slats, but in point of fact they try to remove all such slats before shipment of any consignment. The difference in practise is accounted for by the fact that whereas the millers supplying the Anglo Pencil Co. have no confidence in their native sorters, the Marmanet mill who supply Chambers have trained natives to sort with a fair degree of efficiency.

In any case both pencil firms re-grade the slats after treatment by their softening processes so the question of the efficacy of native sorting affects the manufacturers rather than the purchasers of the finished pencils.

Specification of a First Class Slat.

It is difficult to put on paper any complete specification for a 1st class slat and no such specification is to the writer's knowledge obtainable. Generally speaking (1) the slat must be sawn on the quarter to show the growth rings on its radial face, (2) it must also show on its radial face these growth rings as straight unwavering vertical lines parallel to the sides of the slat, (3) it must be of a uniform red colour, and of course (4) it must be cut to the specified dimensions with a good sawn finish. This last applied to all three classes of slats.

2. Milling of slats.

Pencil manufacturers who have used or are now using American (Virginian) cedar for pencils expect a high quality of sawn finish in the slats they purchase, together with uniform cutting to standard dimensions. It is unfortunate that Kenya suppliers appear not to have realised fully the standard to which manufacturers are accustomed in this respect.

Messrs. F. Chambers & Co., have no complaints to make about the cutting of the slats they are now receiving from Kenya which although not perhaps cut as perfectly as American slats, are still quite satisfactory. The Anglo Pencil Co., on the other hand, who purchase slats from other mills in Kenya, have been receiving some poorly cut material, some of which they have unfortunately re-sold to two larger pencil firms after treatment by their softening process. These firms have written to complain of the poor cutting of the slats received by them.

Common faults in slat-cutting are:

1. Thickness scant or over, thickness tapering from one side of the slat to the other, giving a wedge-shaped slat. Thickness tapering from one end to the other of the slat,
2. Length or width scant or over.
3. Saw-marks on slat faces.
4. Rough edges to the slats.

3. Packing slats for shipment from Kenya.

Slats have in the past been shipped from Kenya in wooden cases, 4800 6-ply slats to one case, equivalent to 100 pencil gross.

Manufacturers find these cases unwieldy for handling and checking up consignments, and the common practise now is to send slats packed in smaller quantities.

Messrs. Chambers receive slats packed in lots of 800 6-ply slats, equivalent to 16-2/3 pencil gross. The slats are packed tightly edge to edge, the parcel bound with hessian, and battened. This is known as a "bale". Six bales are the equivalent of one case. Chambers state that slats travel well when packed in this way and that breakage is rare.

Another method, described by Messrs. Chambers as being used by the Aynek Syndicate of Tilbury for packing slats for delivery to pencil firms in England, is to tie slats in bundles of 50, packed tightly edge to edge, 16 bundles being bound with hessian to form a bale. No battens are used.

4. Manufacturers' difficulties with E.A. cedar.

The following are briefly the difficulties that Messrs. Chambers meet with in the use of East African cedar for pencil manufacture:-

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1. Hardness, or poor whittling properties of the wood compared with Virginian cedar and American Incense cedar.
 2. Warping of the finished pencils.
 3. Pick-up of the grain of the wood in machining during manufacture.
 4. Rot in the wood.
 5. Colour.

Each of these points is dealt with shortly below:-

1. Hardness.

The cause of this appears to lie in the structure of the wood substance. Both Chambers and the Angle Pencil Co., have their own processes by which the wood is made milder and suitable for manufacture into all grades of pencil. Their processes are probably similar to that used by the Aynek Syndicate of East India Docks.

2. Warping.

East African pencil cedar appears to be more prone to warping with changes of moisture than the weathered wood of Virginian cedar and the treated wood of American Incense cedar imported into England. Messrs. Chambers believe this to be due to the grain not always running vertically in the tangential plane, but spirally round the axis of the tree.

The fact that the tangential surface of a quarter-sawn slat is under $\frac{1}{4}$ inch wide makes it hardly practicable to sort slats for straight and spiral grain before shipment from Kenya, as the direction of the grain is not readily determined at a glance on such a small surface.

It may be possible however to detect the presence of spiral grain in a standing tree. Whether it would be practicable to select only straight-grained trees for pencil manufacture is another matter.

It is undoubtedly practicable however to dry the slats after milling to a suitable moisture content before packing for shipment, and careful drying of the slats should help to reduce warping in the resulting pencils. The Kenya suppliers of Messrs. Chambers' factory are now air-drying their slats to 20% moisture content before shipment. Chambers state that when this is done very few slats warp when unpacked in England, but that if slats are shipped after hurried drying to a higher moisture content than 20%, there is considerable warping when the slats are unpacked, awaiting treatment prior to manufacture, and therefore, presumably, more likelihood of warping of the pencils made from the remaining slats of the consignment. Chambers claim that their treating process reduces the tendency to warp in the wood. This may be so, but it would seem that the method of drying the slats after the treating process would have more importance in prevention of warp. It was not seen how this is done, but the slats have been dried to about 10% moisture content when they are brought from the treating plant to the storage room in the factory. Chambers attach great importance to the necessity for slats to be stored after treatment for at least one month under factory conditions of temperature and humidity before manufacture. By these methods they claim during 1935 to have reduced the percentage of pencils rejected in

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final examination to a low figure, rejects on account of warping during November being less than 1 per cent.

3. Machining and pick-up.

In Chambers' factory what appears to be an unnecessary number of slats have to be rejected after passing through the grooving machines owing to poor machined finish, the grain having "picked-up" to a greater or less degree. A good machine-finish is essential to ensure a tight fit for the lead-slips and to render the seam of the pencil invisible after manufacture. An examination of the grain of slats selected from the rejects showed that this tendency to pick-up of the grain was always associated with spiral grain. It is therefore largely dependent on the angle at which the cutters meet the grain, i.e., a spiral grained slat put through the machine with the cutters running into or against the grain will undoubtedly "pickup", when it would probably machine to a smooth finish if the slat were fed the other way on to the cutters. But here again the difficulty of detecting the grain on the narrow tangential surface of the slat makes examination by the operator impracticable. From experiments made in Chambers' factory with various cutting angles on the grooving-cutters, it appears however that the angle to which the cutterfaces are ground can alleviate this difficulty. A short account of the experiments made is included at the end of this report.

4. Rot.

East African pencil cedar is often infested by the fungus *Fomes fustiginus*. As it frequently occurs in very small "pockets" its presence may remain undetected in a slat but become apparent on machining during manufacture. Experienced sorting in Kenya might help to reduce the number of affected slats shipped to England.

5. Colour.

Both Messrs. Chambers and the Anglo Pencil Co., complain that East African pencil cedar has a less uniform red colour than has Virginian cedar which is the criterion in all comparisons of woods used for pencils. The public, which bases its criticisms of other pencils on those made from Virginian cedar, expects a uniformly dark red colour showing clearly the grain in the wood, i.e. the growth rings. In East African cedar the growth rings are less clearly marked than in the Virginian cedar, and the wood also has a lighter and less uniform colour, streaks of paler wood being prevalent. These two firms claim that their treating processes help to tone down the lack of uniformity of colour in the wood and also to darken it. They appear not to consider colour to be in any way associated with whittling qualities, but regard the problem as one of overcoming a prejudice on the part of their customers who expect pencils similar in colour to those made from Virginian cedar. Both firms appear to have considered the possibility of dyeing the wood of East African cedar but do not at present make any attempt to do so. * Messrs. Chambers are in fact using slats containing the white sapwood for the manufacture of a cheap pencil.

* See note on following page.

CONCLUSIONS.

In spite of the fact that, so far as is known,

see note
flow.

neither Messrs. Chambers nor the Anglo Pencil Co., are trying methods of dyeing the wood(x) to resemble Virginian cedar, it seemed to be this problem, together with that of warping of the pencils, which worries them most. Both firms appeared to be satisfied with the results of their processes for softening the wood.

Note on Dyeing.

Since writing the above report some slats treated by the Anglo Pencil Co. have been shown to the Officer in charge Chemistry, who states that they appear to have received some dyeing treatment.

(sgd.) S.H. Wimbush,
Asst. Conservator of Forests,
Kenya Colony.
19/1/34.

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EAST AFRICAN PENCIL CEDAR.

MACHINING EXPERIMENT.

TO TEST EFFECT OF CUTTING ANGLE ON MACHINED FINISH MADE
AT MESSRS. F. CHAMBERS' FACTORY AT STAPLEFORD.

The first operation in the manufacture of pencils from slats is that of cutting the grooves to hold the lead-slips, the grooving machines at the same time planing the surface of the slat between the grooves. In East African cedar slats machined in the factory the finished surface was found to be in many cases poor, the grain having been "picked-up" by the cutters.

The following experiment was made to see whether the degree of tearing of the grain was affected by an alteration in the cutting angle. By "cutting angle" is meant the angle which the face of the cutter at its edge makes with the normal to the finished surface.

The machine on which the experiment was made consists of a pair of grooving cutters held at either end by steel discs mounted on the spindle. The cutters themselves are not straight but semicircular. The advantage of this appears to be that the sharpness angle is larger than if straight cutters were used, resulting in greater rigidity without loss of clearance.

The slats selected for cutting were very badly cross-grained, unsuitable for manufacture, and therefore expected to show up the tendency to torn-out grain to the fullest degree.

The slats were divided into three lots, with 70-80 slats in each lot. The first lot were machined with a cutting angle of about 14° , this angle representing that in general use in the grooving operation in the factory. The cutters were then re-ground to a cutting angle of about 11° and the second lot of slats machined.

The cutters were then again removed and re-ground, this time to a cutting angle of about 8° , and the third lot of slats machined with the cutters ground to this angle.

The three lots of slats were then examined. Slats showing good machine-finish and those showing picked-up grain were counted for each lot. The results were as follows:-

Cutting Angle	Slats cut	Machinefinish good.		Machined surface picked-up	
		No.	Percentage.	No.	Percentage.
14°	80	27	34%	53	66%
11°	74	30	41%	44	59%
8°	70	48	68%	22	32%

Finally with the cutters still working at an 8° cutting angle 24 3rd class slats were machined. Of these 22 showed a good machine-finish and 2 slats showed slight pick-up of the surface.

In the cutting of the three lots of cross-grained slats a few slats in which spiral grain could be detected on the edges were fed to the machine so that the cutters would work against the grain. This generally resulted in tearing of the grain, as was to be expected, but the degree of tearing was less drastic with the 8° cutting angle than with the 14° angle.

From this small experiment it cannot be stated definitely that a cutting angle of 8° will give better results all round than 14°, but there is at least an indication that the cutting angle used has some effect on the quality of the machined finish.

(sgd.) S.H. WIMBUSH
19/1/34.

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VISIT TO THE AGNE FLOORING & PAVING CO.,
RIVER ROAD, HANNOY

(S.H. Wambush, 15th Nov. 1933)

Notes on visit to the works of the above company on November 15th 1933, to see 3" and 4" strips of Mora excelsa being tongued and grooved for strip and block-flooring. Mr. FitzGerald representing the A.F. & P. Co. showed us round the yards where large quantities of flooring strip timber is air-seasoned in stacks up to 100 feet in height. Timbers seen were mostly Jarrah, Oak (Austrian), and Canadian Maple. These woods are kept for periods averaging 4 to 5 years in stack before conversion and have usually had two to three years preliminary air-seasoning, prior to shipment. Mr. FitzGerald gave it as his opinion that such long air-seasoning is necessary to produce good flooring material, and that kiln-drying in no degree produces the same results. Mr. FitzGerald stated that 3/- per cubic foot is about the price now paid for Jarrah strips for flooring. He pointed out that the low prices paid for flooring make it necessary that suppliers must first find a market for the larger sizes of any timber that it is intended to sell for flooring, only the smaller sizes being kept for sale to flooring manufacturers at the very much lower prices paid for such material. As an instance he quoted a recent purchase of Austrian oak strip flooring material at 2/6d per cubic foot of which 75 per cent. was cut on the quarter. These strips were selected from material 6ft. over after the sale of the bigger planks for joinery, panelling etc. Mr. FitzGerald cited an instance where his Company had bought logs for conversion to flooring strips. He stated that the wastage in conversion was 60%. This high figure for wastage in conversion makes it uneconomical to convert whole logs into flooring strips.

AIR-
DRYING.

PRICES
FOR
FLOORING
TIMBER.

AFRICAN
OAKS.

Mr. FitzGerald showed me some samples of flooring blocks cut from a consignment of Olive received in 1932 from the Burnt Forest Mills in Kenya. The consignment was cut and shipped in the green state and had suffered heavy degrade in

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END

in transit from warping. The timber was kiln-dried on arrival and manufactured into blocks, but tests on these blocks were too unsatisfactory to give the A.F. & P. Co. any confidence in their behaviour after laying for flooring.

Mr. Fitzgerald pointed out some block flooring laid in the entrance hall and corridor of the Company's Offices, under which run heating pipes. These blocks are of Baikia plurijuga (Rhodesian Teak) and have shown no signs of shrinkage or expansion since the floor was laid. He added that his Company has recently made a contract for large quantities of this timber from S. Rhodesia, cut in narrow widths from material left over after cutting sleepers for the railway some three years ago.
