



**REPORT**

on the operations of the

**FORESTS**

**DEPARTMENT**

**WESTERN  
AUSTRALIA**

**FOR THE YEAR**

**ENDED 30th JUNE**

**1964**

---

*Cover . . .*

"The centre tree is one of the superior ('plus') trees of *Pinus pinaster* selected in Portugal for breeding purposes. The tree is 85 years old and approximately 86 feet high."

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# REPORT

*on the operations of the*

# FORESTS DEPARTMENT

WESTERN AUSTRALIA

*for the year ended*

30th JUNE, 1964

*by*

A. C. HARRIS, B.Sc. (Adel.) A.A.I.M.M.

*Conservator of Forests*



PRESENTED TO BOTH HOUSES OF PARLIAMENT

Forests Department,  
PERTH,  
30th September, 1964

TO THE HONOURABLE MINISTER FOR FORESTS

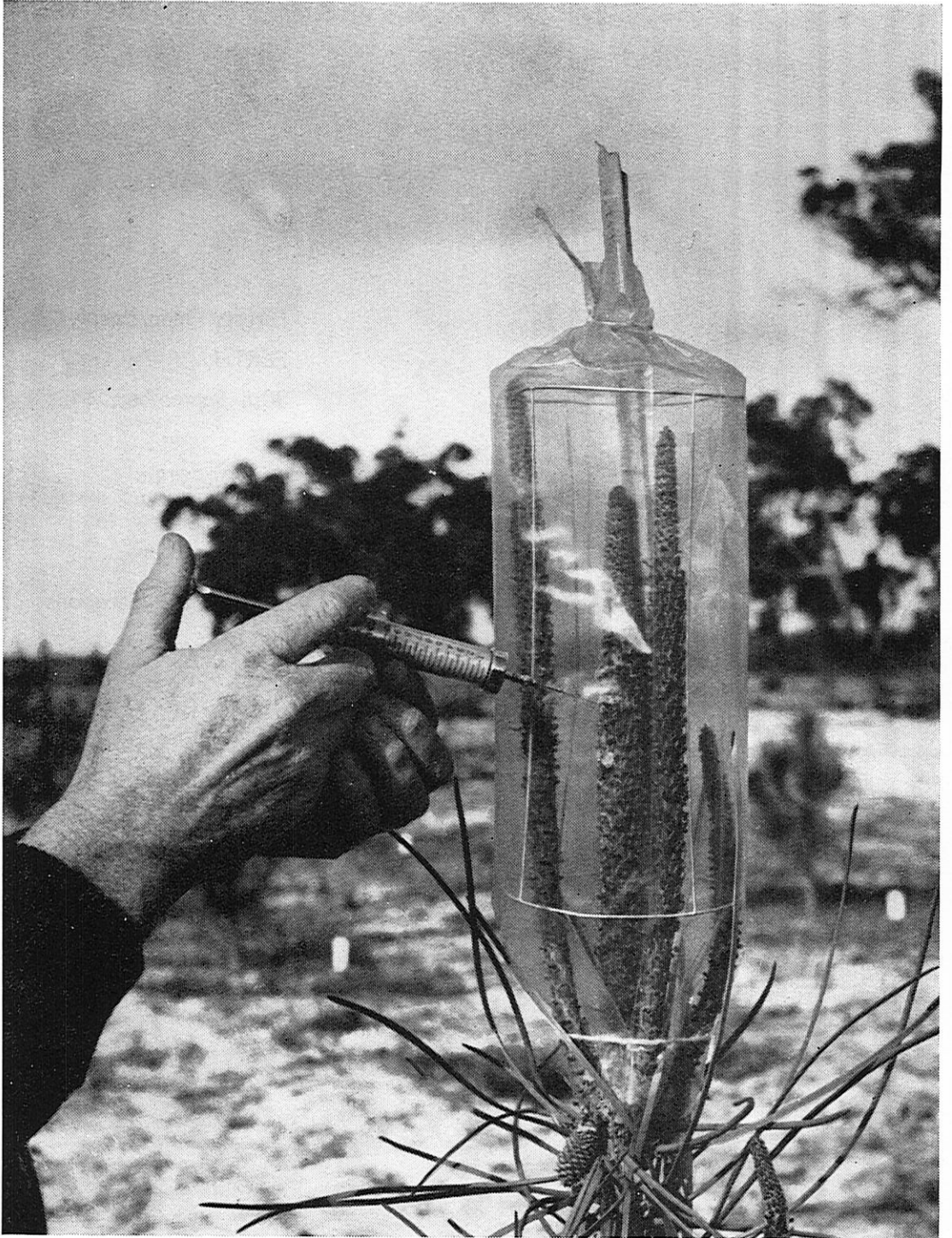
Sir,

*I have the honour to transmit herewith my report on the operations of the Department for the year ended 30th June, 1964.*

*Yours faithfully,*

A. C. HARRIS,

*Conservator of Forests.*



“ Controlled pollination of a selected scion of *Pinus pinaster*. The shoots are protected by sausage skin casing to prevent pollination by undesirable strains and selected pollen dust is injected by a hypodermic syringe.”

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## PRINCIPAL OFFICERS

Conservator of Forests	....	....	....	....	....	A. C. HARRIS, B.Sc. (Adel.), A.A.I.M.M.
Deputy Conservator	....	....	....	....	....	W. R. WALLACE, Dip.For. (Canb.).
Superintendent	....	....	....	....	....	G. E. E. BROCKWAY, B.Sc. (Adel).
Superintendent	....	....	....	....	....	D. W. R. STEWART, B.Sc. (For.), Dip.For. (Canb.), Dip.For. (Oxon.).
Superintendent	....	....	....	....	....	D. R. MOORE, B.Sc. (Adel).
Fire Control Superintendent	....	....	....	....	....	A. J. MILESI, B.Sc. (Adel).
Utilization Officer	....	....	....	....	....	H. C. WICKETT, M.Sc. (Adel.), B.For.Sc. (N.Z.), A.M.I.E. (Aust.), Dip.For. (Canb.).
Secretary	....	....	....	....	....	E. S. BUDD.
Accountant	....	....	....	....	....	E. G. BAKER, A.A.S.A.
Registrar	....	....	....	....	....	R. K. REID.



## LIST OF COMMON AND BOTANICAL NAMES OF TREES USED IN THIS REPORT

Brown Boronia	....	....	....	....	....	<i>Boronia megastigma</i>
Brown Mallet	....	....	....	....	....	<i>Eucalyptus astringens</i>
Bull Banksia	....	....	....	....	....	<i>Banksia grandis</i>
Californian Redwood	....	....	....	....	....	<i>Sequoia sempervirens</i>
Coral-flowered Gum	....	....	....	....	....	<i>Eucalyptus torquata</i>
Dwarf Sugar Gum	....	....	....	....	....	<i>Eucalyptus cladocalyx var. nana</i>
Jarra	....	....	....	....	....	<i>Eucalyptus marginata</i>
Karri	....	....	....	....	....	<i>Eucalyptus diversicolor</i>
Marri	....	....	....	....	....	<i>Eucalyptus calophylla</i>
Maritime Pine (Pinaster Pine)	....	....	....	....	....	<i>Pinus pinaster</i>
Monterey Pine (Radiata Pine)	....	....	....	....	....	<i>Pinus radiata</i>
Powderbark Wandoo	....	....	....	....	....	<i>Eucalyptus accedens</i>
River Gum	....	....	....	....	....	<i>Eucalyptus camaldulensis</i>
Sandalwood	....	....	....	....	....	<i>Santalum spicatum</i>
Sheoak	....	....	....	....	....	<i>Casuarina fraseriana</i>
Sugar Gum	....	....	....	....	....	<i>Eucalyptus cladocalyx</i>
Teak	....	....	....	....	....	<i>Tectona grandis</i>
Tingle (Red)	....	....	....	....	....	<i>Eucalyptus jacksoni</i>
Tingle (Yellow)	....	....	....	....	....	<i>Eucalyptus guilfoylei</i>
Tuart	....	....	....	....	....	<i>Eucalyptus gomphocephala</i>
Turpentine	....	....	....	....	....	<i>Syncarpia glomulifera</i>
Wandoo	....	....	....	....	....	<i>Eucalyptus redunca var. elata</i>
W.A. Blackbutt (Yarri)	....	....	....	....	....	<i>Eucalyptus patens</i>

## FORESTS DEPARTMENT

### I. STATISTICAL SUMMARY OF MAJOR OPERATIONS

#### Timber Production (in cubic feet).

Total Production Sawn Timber	16,088,169
Exports—Interstate	2,798,186 (17.4 per cent.)
Overseas	2,468,142 (15.3 per cent.)
Local Consumption	10,821,841 (67.3 per cent.)

#### Recent Trends in Production and Consumption.

Year	Production			Total Export	Local Consumption	Sawmills	Monthly Average of Men Employed
	Sawn	Hewn	Total				
	cub. ft.	cub. ft.	cub. ft.	cub. ft.	cub. ft.	No.	No.
1925-26	14,522,733	6,277,952	20,800,685	12,001,384	8,799,301	.....	.....
1937-38	11,720,642	2,573,540	14,294,192	7,545,744	6,748,448	134	3,112
1945-46	8,869,847	14,041	8,883,888	3,373,025	5,510,863	128	2,876
1950-51	12,571,635	1,183	12,572,818	2,342,492	10,230,326	256	4,047
1951-52	14,717,112	.....	14,717,112	2,373,553	12,343,559	280	4,708
1952-53	16,973,332	1,761	16,975,093	3,965,188	13,009,905	306	5,395
1953-54	18,343,974	1,454	18,345,428	3,858,956	14,486,472	299	5,724
1954-55	18,915,967	4,561	18,920,528	3,477,249	15,443,279	279	5,879
1955-56	19,213,771	5,308	19,219,079	4,568,034	14,651,045	274	5,804
1956-57	17,798,984	3,790	17,802,774	4,679,979	13,122,795	261	5,574
1957-58	17,487,573	742	17,488,315	5,671,712	11,816,603	268	5,227
1958-59	17,758,023	1,310	17,759,333	6,465,021	11,294,312	260	5,155
1959-60	16,625,475	.....	16,625,475	6,167,132	10,458,343	265	5,037
1960-61	15,783,370	.....	15,783,370	5,212,532	10,570,838	238	4,790
1961-62	15,801,067	.....	15,801,067	5,660,639	10,140,428	236	4,906
1962-63	15,593,099	.....	15,593,099	5,482,513	10,110,586	221	4,725
1963-64	16,088,169	.....	16,088,169	5,266,328	10,821,841	214	3,448*

\* This figure no longer includes 1,088 persons employed in associated yards in the Metropolitan Area.

#### Total Cut

Log Volumes (in cubic feet)	49,651,089	}	Jarrah	35,940,018
			Karri	8,736,677
			Wandoo	2,362,754
			Pine	1,846,092
			Other	765,548

#### Made up as follows :—

From State Forest and Crown Land	39,431,089 (79.4 per cent.)
From Private Property	10,220,000 (20.6 per cent.)

#### Value Produced

Total Value Sawn Timber (on mill skids)	£11,348,800
Total Value of Other Forest Products	£2,893,800

#### Source and Use of Funds

##### Source :

##### Revenue—

Royalties on Timber, etc.	1,075,884	988,731
Departmental Sales of Logs, etc.	549,697	486,135

General Loan Fund	1,625,581	1,474,866
Federal Aid Road Grant	175,000	125,000
	76,000	76,000

	1,876,581	1,675,866
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##### Use :

Consolidated Revenue Fund	545,087	486,113
Reforestation Fund	1,128,401	941,266
General Loan Fund	175,000	125,000
Treasury Employment Relief Funds	10,017	68,498

	1,858,505	1,620,877
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**Forest Area**

Additions to State Forest	5,116 acres
Excisions from State Forest	387 „
Land purchased for Pine Planting	335 „
Total Area of State Forest	4,459,038 „

**Reforestation**

Cut-over area treated for regeneration	58,437 „
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**Afforestation**

Area planted with pines, 1963	2,620 „
<i>Pinus radiata</i>	1,865 acres
<i>Pinus pinaster</i>	751 „
Other species	4 „
Total area of pine plantation established	38,156 „
<i>Pinus radiata</i>	14,560 acres
<i>Pinus pinaster</i>	23,194 „
Other species	402 „
Total experimental area (additional)	762 „

**Management**

## Survey :—

Theodolite Surveys	121 miles
Other Surveys	217 „
Map Sheet Compilation	1,240 sq. miles

## Assessment :—

Air Photo Interpretation	1,544,000 acres
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## Engineering, new works :—

Road and Tracks	438 miles
Telephone Lines	24 „
Houses and Buildings (No.)	11

**Protection**

Controlled Burning	890,552 acres
Fire Outbreaks :—	
Number	281
Area Burnt	21,455 acres

**Nurseries**

## Hamel and Dryandra :—

## Trees produced for—

Forests Department	85,959
Private Buyers	94,432

**Sandalwood**

Quantity exported	531 tons
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Eight

## 2. REVENUE AND EXPENDITURE

Revenue from all sources was £1,625,581 compared with £1,474,866 the previous year.

Of the net revenue £972,899 (£907,149) was transferred to the Forests Improvement and Reforestation Fund. Expenditure charged against this Fund was £1,128,401 (£941,266) and the balance in the Fund at 30th June, 1964 was £185,421 (£204,001) which included reserves for Building, £75,000 and Fire Control, £100,000.

The return from thinning operations in Departmental pine plantations was £73,559 (£80,959).

## 3. THE FOREST AREA

### State Forests (Forests Act, 1918-1954)

The total area of State Forest at 30th June, 1964, was 4,459,038 acres which is an increase of 4,729 acres compared with the total area at 30th June, 1963.

During the year, additions totalling 5,116 acres were made to State Forest and 387 acres were excised and reverted to the Lands Department.

	June, 1963 Acres	June, 1964 Acres
Jarrah	3,187,853	3,190,157
Karri	171,047	171,041
Jarrah and Karri (mixed)	654,320	655,266
Jarrah and Wandoo (mixed)	176,815	176,815
Tuart	5,995	5,995
Tingle Tingle	10,726	10,687
Karri and Tingle (mixed)	13,885	13,885
Sandalwood	1,930	1,930
Pine Planting	174,555	176,041
Mallet	57,031	57,069
Miscellaneous	152	152
	<u>4,454,309</u>	<u>4,459,038</u>

### Timber Reserves (Forests Act, 1918-1954)

The area held under Timber Reserve at 30th June, 1964, was 1,844,865 acres, which is an increase of 5,514 acres on the area at 30th June, 1963.

	June, 1963 Acres	June, 1964 Acres
Jarrah	82,020	88,644
Wandoo and Jarrah	50,260	53,520
Jarrah and Karri	Nil	78
Pine Planting	5,908	5,908
Mallet	648	648
Sandalwood	23,100	23,100
Mining Timber, Firewood, etc.	1,677,415	1,672,967
	<u>1,839,351</u>	<u>1,844,865</u>

### Land Alienations, etc.

During the year ended 30th June, 1964, 225 applications for land (and road protections and closures) were received covering a total of 519,276 acres.

The Department agreed to the release as follows—

Alienations			Mineral Claims and Leases (Pastoral-Grazing)		
Timber Zone		Outside Timber Zone	Timber Zone		Outside Timber Zone
State Forest	Crown Land		State Forest	Crown Land	
acres 1,320	acres 13,165	acres 508,430	acres 5,562	acres 1,625	acres 11,040

No. of alienations approved .... 85  
No. of Leases approved .... 19

#### 4. SAWMILLING, TIMBER INSPECTION AND FOREST PRODUCE

##### Timber Production and Distribution

The production of 16,088,169 cubic feet of sawn timber was an increase of 495,070 cubic feet on last year's figure. Of this total production 3,311,280 cubic feet were obtained from timber from private property, an increase of 150,436 cubic feet on last year.

During the year ended 31st December, 1963, 214 mills were registered, of which 116 operated on Crown Land and 98 on Private Property. Details of the intake of mill logs and production of sawn timber are given in the accompanying tables.

The annual intake of logs (1829-1964) is shown in appendix 5.

Departmental plantations yielded 1,781,588 cubic feet of pine thinnings, which was an increase of 22 per cent. on last year's figure.

The following quantities of logs were used in local plywood factories :—

	Cubic Feet
Karri .....	135,516
Other .....	127
Pine .....	97,416
Total .....	233,059

Sawn sleepers produced during the year amounted to 3,792,227 cubic feet of which 1,449,311 cubic feet were from private property. Of the sleepers produced 2,309,081 cubic feet were inspected and a further quantity of 88,286 were re-inspected during the year. Other sawn timber inspected during the period amounted to 872,402 cubic feet.

Distribution	Sleepers		Other Sawn Timber		Total
	Karri	Jarrah and Other Species	Karri	Jarrah and Other Species	
Interstate .....	cub. ft.	cub. ft.	cub. ft.	cub. ft.	cub. ft.
Overseas .....	Nil	587,632	892,542	1,318,012	2,798,186
Local .....	Nil	1,756,790	221,638	489,714	2,468,142
Total .....	Nil	1,447,805	1,716,406	7,657,630	10,821,841
Total .....	Nil	3,792,227	2,830,586	9,465,356	16,088,169

##### QUANTITY OF SAWN TIMBER PRODUCED FROM CROWN LANDS AND PRIVATE PROPERTY FOR THE PAST TWO YEARS

Year	From Crown Lands		From Private Property		Total Quantity	Estimated Value of Timber Obtained
	Sawn Timber other than Sleepers	Sawn Sleepers	Sawn Timber other than Sleepers	Sawn Sleepers		
1962/63 .....	cub. ft.	cub. ft.	cub. ft.	cub. ft.	cub. ft.	£
1963/64 .....	9,989,864	2,442,391	1,727,255	1,433,589	15,593,099	10,851,950
	10,433,973	2,342,916	1,861,969	1,449,311	16,088,169	11,348,800

##### TIMBER PRODUCTION

PRODUCTION OF TIMBER FOR YEAR ENDED 30th JUNE, 1964 (EXCLUSIVE OF MINING TIMBER, FIREWOOD, PILES AND POLES)

	Mill Logs in Cubic Feet								Totals	
	Jarrah	Karri	Wandoo	Yarri	Sheoak	Marri	Pine	Other	In Log	Recovery of sawn Timber
Crown Lands .....	27,854,298	7,994,735	1,180,605	459,841	98,082	7,630	1,781,588	54,310	39,431,089	12,776,889
Private Property .....	8,085,720	741,942	1,182,149	126,736	14,635	465	64,504	3,849	10,220,000	3,311,280
Total .....	35,940,018	8,736,677	2,362,754	586,577	112,717	8,095	1,846,092	58,159	49,651,089	16,088,169

In addition to the above, 39,081 tons of Wandoo logs were treated for Tannin extract.

## Firewood Production and Consumption

The firewood consumption for the State was estimated at 711,050 tons of which 36 per cent. was used for industrial and mining fuel. The quantity of sawdust burnt as fuel was 125,311 tons.

The following table accounts for approximately 49 per cent. of the firewood consumed, the balance being obtained from private property for which specific records are not available.

Of the total quantity consumed 44 per cent. was obtained from Crown Land.

	Crown Land Tons	Private Property Tons	Total Tons
<i>Production</i>			
Domestic Firewood—			
Firewood Permits (South-West) .....	53,352	172	53,524
Mill Waste sold as firewood (estimated 50 per cent. of total) .....	39,325	18,511	57,836
Domestic use on Goldfields .....	24,974	....	24,974
Total Domestic Firewood as shown by returns	117,651	18,683	136,334
Industrial Firewood—			
Supplied under License, Nos. 3 to 8 Pumps .....	17,276	....	17,276
Other Pumps .....	475	....	475
Factories, etc. ....	65,968	173	66,141
Mill Waste sold as firewood (estimated 50 per cent. of total). ....	39,326	18,511	57,837
Mill Waste used as firewood .....	55,060	1,485	56,545
Total Industrial Firewood as shown by returns	178,105	20,169	198,274
Mining Firewood .....	14,372	....	14,372
Total Firewood Produced (as shown by returns) ....	310,128	38,852	348,980
<i>Consumption</i>			
	Tons		
Domestic (estimated) .....	440,000	(at 2 tons per dwelling)	
Industrial .....	238,927	(ex Govt. Statistician)	
Pumping Stations .....	17,751	(as per F.D. Returns)	
Mining .....	14,372	(as per F.D. Returns)	
	711,050		

## Other Forest Produce

Piles and poles obtained from Crown lands during the year amounted to 832,497 lineal feet compared with 709,589 lineal feet for the year 1962-63. Of this total, 26,444 lineal feet were produced from Departmental operations. Returns from private property show 159,555 lineal feet produced as compared with 90,702 lineal feet for the previous year.

There were approximately 510,235 posts and strainers cut from Crown lands during the year, of which 9,519 were produced by this Department. Records received show 19,936 posts obtained from private property, but this is only a small percentage of the total production from this source.

Of the total of 319 tons of Mallet bark produced, 134 tons came from Departmental Mallet Plantations, the balance being from private property.

Apart from sawn timber supplied by sawmills 17,608 tons of mining timber were used. This was all from Crown lands, 12,070 tons being from the inland forests.

There was a slight decrease in the number of Christmas trees sold. The number sold was 10,282 as compared with 11,089 for the previous year. Revenue for Christmas trees was £1,736.

The following table shows the quantity of minor forest produce obtained during the year. The estimated total value of this forest produce was £2,893,800.

FOREST PRODUCE NOT ELSEWHERE INCLUDED IN PRODUCTION TABLES  
1963-1964

Description of Forest Produce	South-West Division and Agricultural Areas			Northern, Central and Eastern Goldfields	Totals
	Supplied by Department	Other Crown Lands	Private Property*		
Mining Timber .....	.....	5,538	.....	12,070	17,608
Sleepers for Goldfields Woodline .....	.....	.....	.....	10,216	10,216
Charcoal, includes 41,597 tons ex Wundowie .....	.....	41,634	.....	.....	41,634
Piles and Poles .....	26,444	789,553	159,555	16,500	992,052
Fence Posts and Rails .....	9,519	115,297	19,936	385,419	530,171
Strainer Posts .....	1,504	4,000	.....	.....	5,504
Mallet Bark .....	134 3 2	.....	184 14 2	.....	318 18 0
Wandoo Timber for Tannin Extract .....	.....	27,231	11,850	.....	39,081
Bean Sticks, etc. ....	.....	5,300	.....	5,110	10,410
Boronia Blossom .....	.....	512	2,637	.....	3,149
Stone .....	.....	79,515	.....	.....	79,515
Sand .....	.....	3,411	.....	.....	3,411
Scout Staves .....	432	.....	.....	.....	432
Sawdust consumed as fuel† .....	.....	125,311	.....	.....	125,311

\* Complete figures from private property are not available, only information furnished to the Department has been included.

† Apportionment between Crown Land and Private Property unknown.

### Sandalwood

Although adequate stocks of sandalwood pieces were available throughout the year, on several occasions logwood was in short supply. In spite of this, orders for export have been met and it is expected that steps taken to increase supplies of logwood will bring a satisfactory result.

A total of 422 tons of sandalwood was delivered during the year as compared with 468 tons for the year ended the 30th June, 1963, and this quantity was made up as follows:—

Crown Lands—		Tons
Logwood (including roots and butts) .....	.....	341
Pieces .....	.....	76
Private Property—		
Logwood .....	.....	5
Total .....	.....	422

Exports amounted to 531 tons compared with 469 tons for the previous year.

No orders for logwood were placed by oil distillers, but 56 tons of roots and butts severed from the logwood at Fremantle were delivered to them for distillation purposes. In addition they purchased approximately 3 tons of Sandalwood from private property.

The quantity of sandalwood oil distilled was 4,909 lb. and 5265 lb. were exported interstate and overseas during the year.

## 5. TIMBER UTILIZATION

### Design and Construction

A three-legged fire lookout tower, 70 feet high, was designed and has been erected at Wanneroo at three-quarters the cost of the usual four-legged construction.

The new sawmill at Dwellingup was completed and brought into production during the year. Prints of the working drawings of the building and the simple equipment installed in it are available to interested parties. There has been an appreciable demand for these prints.

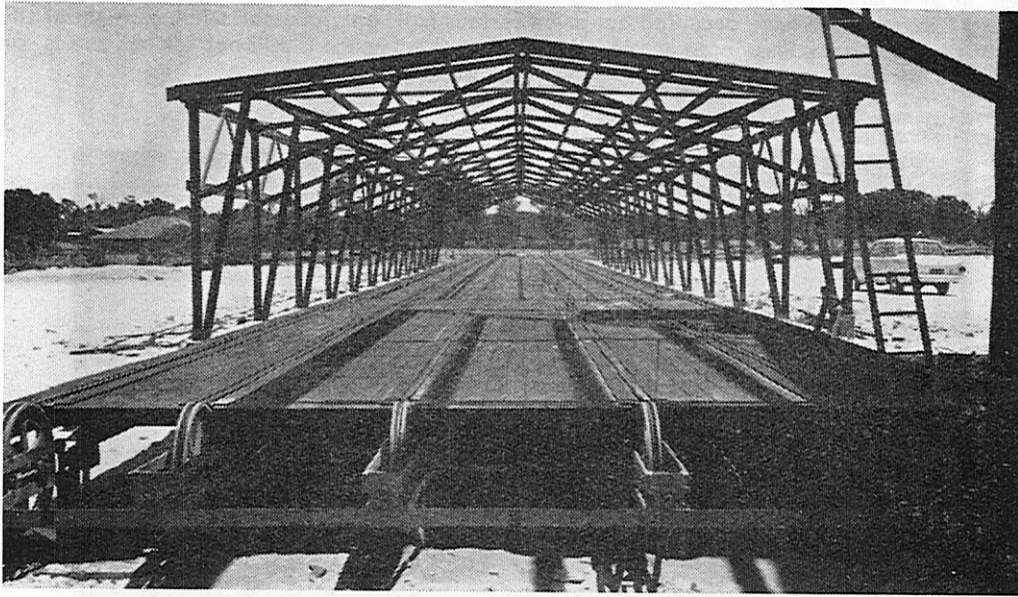
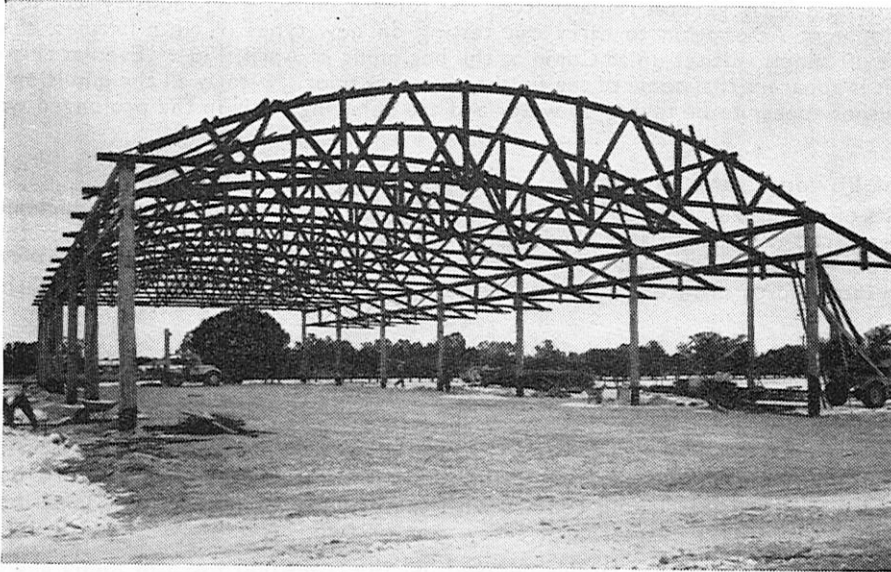
A small breaking down unit is in course of being added to Harvey pine sawmill.

A conical sheet steel waste burner has been set up to burn sawdust waste at Ludlow pine and tuart mill.

### Grading Rules

Three meetings of the Western Australian Joint Timber Committee were held during the year. The draft rules for flooring, lining, siding and mouldings have been submitted to postal ballot and should be available in printed form fairly soon. Draft rules have been prepared for moulded door and window stock to replace A.S. No. 0-36-1948.

Twelve



"The use of timber for constructional purposes is illustrated in the above photographs.

Top : Thirteen Karri bowstring trusses were used in the roof construction of a new sawmill built by Whittakers Building Supply Co. at Welshpool. Each truss has a nailed laminated top chord and spans 62 feet clear and has a 12 ft. cantilever. The round posts are of jarrah.

Bottom : Jarrah was used at the same mill to cover this 200 feet long "green chain" sorting table."

### **Tests of Treated Sleepers**

Three thousand karri sleepers have been treated with 3 per cent. pentachlorophenol in furnace oil at 1,000 pounds per square inch and despatched to the test sites near Katanning, Wilga and Claremont. The test plot at Claremont has been included to allow the behaviour of the sleepers to be readily observed at short notice by interested parties.

### **Miscellaneous Continuing Tests**

Five years' exposure of timbers which might be considered for use as cooling tower fill has shown that radiata pine treated with copper-chrome-arsenic is vastly superior to any untreated naturally durable timber. Untreated wandoo is about equal to teak and is possibly slightly superior to untreated Californian redwood which has been a standard tower fill species for many decades.

In the Port Hedland plot of the marine borer test which compares the behaviour of various chemical treatments, creosote appears to be superior to both the multi-salt treatments and untreated turpentine. No *Limnoria* attack has been found at this plot. At the Kwinana plot, where *Limnoria* has attacked some creosoted specimens fairly heavily, the multi-salt treatments appear to be superior to creosote in resistance to both *Limnoria* and *Teredines*.

In response to a fairly general request from the paint manufacturing industry, conveyed through Timber Development Association to carry out testing on new types of clear finishes, a further test involving some 40 panels was set up at Como at the beginning of April, 1964. Even at this early stage, in July, 1964, it is apparent that some of the finishes are very poor. Nearly all the emulsion type P.V.A. and acrylic finishes appear to be taking up water and are behaving badly in the prolonged wet weather.

#### **Durability of Powder Bark Wandoo**

The results of the accelerated rot tests carried out by the Division of Forest Products in which this species was compared with jarrah and wandoo show that it is a durable timber superior to jarrah, but the great durability of both species makes it difficult to say precisely how it compares with Wandoo, and it is therefore intended to carry out a further test using a soil burial technique to establish this point.

#### **Durability of a Hewn Marri Beam**

The accompanying photograph taken in 1964, shows a marri (*Eucalyptus calophylla*) beam which was hewn in 1933 and left "in situ" ever since. Although now showing signs of breakdown in the crown and butt ends, the main body of the beam is in surprisingly good condition after 31 years of exposure.

At age 10 years, the piece of timber supporting the crown end was destroyed by fire, but the beam was undamaged. This end was left in contact with the ground to check on rot infection, but after 1954 the beam was rotated a quarter turn every year or two.

After 21 years the sapwood had largely decayed but the truewood was still sound and serviceable. Since then the gradual development of rot in crown and butt ends has been the major fault. Weathering checks up to 1 in. in depth have occurred but are a serious fault only in association with rot at the butt end. Slight termite attack was noted at age 23 years, but the damage is still not serious and is confined to the decayed sections.



*Timber Utilization*  
"A hewn marri beam 31 years old."

#### **Wooden Poles v. Steel Poles**

One of the important advantages of timber is its relative cheapness compared with most other constructional materials. This advantage was high-lighted recently when in reply to questions in the Legislative Assembly, it was stated that the average cost of supplying and erecting a steel pole in an electricity transmission line was nine times greater than for a wooden pole.

A steel pole suitable for normal street service costs sixteen times more than a wooden pole. With proper maintenance they both had the same service life but steel poles need far more maintenance.

#### **Safety in Industry**

The committee formed in 1960, consisting of representatives of the Forests Department and the Sawmilling Industry having completed its main tasks of compiling the "Sawmill Safety Code" and analysing the occurrence of accidents in the industry in order to point the way for concentrated preventive effort, it was decided that this latter phase of the attack should be more successful if it were waged from a wider front. The committee has therefore moved under the aegis of the National Safety Council and has been broadened to include union representatives. Its title is now the "Timber Industries Safety Committee of the National Safety Council of Western Australia".

## 6. FOREST MANAGEMENT

### Surveys and Map Production

The major survey network was extended by a further 121 miles of theodolite traverse, mainly on Departmental roads.

Compass and chain traverses of short lengths of less important roads not appearing on the most recent air photos, were run by Divisional staff. The distance covered was 217 miles, the greatest proportion being in the Shannon division.

One hundred and forty eight miles of "control" surveys were charted, including 40 miles of traverse of the Muja-Bunbury S.E.C. transmission line run by the Lands and Surveys Department. Compass and chain traverses totalling 191 miles were also plotted.

Standard base sheets for use in the charting of field survey and air photo mapping covering 1,240 square miles were compiled. Base sheets for several pine plantations were also prepared.

Drafting work on three (Manjimup, Kirup and Perup) sheets of the new, 4-colour, one mile to an inch litho series was continued. The Donnelly '80' litho was revised and lithographed and five temporary maps for Wanneroo, Julimar, Dale, Jarrahdale and Denmark were completed. Several "composite" maps providing coverage to meet particular management requirements were prepared for the Shannon, Pemberton, Manjimup and Kirup divisions.

### Forest Photogrammetry

Over 1,750 new air photos were received from the Lands and Surveys Department and approximately 1,349,000 acres were type mapped. Forty-one standard base maps, and 5 maps dealing with karri regrowth investigations were completed. Mapping of existing and proposed plantations covered 66,000 acres.

Photographic reductions were obtained from 38 type maps and 39 topo base sheets, and 422 prints were coloured for general use.

### Working Plans

The Working Plans Offices continued to participate in the Departmental standard type-mapping programme. One and a half million acres were the subject of air photo interpretation and 195,000 acres were mapped.

Detailed strip assessments were carried out over 1,400 acres (175 miles).

A total of 85 hardwood plots were remeasured to provide information on growth rates of native eucalypts.

Working Plan Offices carried out routine revisions of Trade Operations and hardwood and pine progress plans for all divisions.

Fire-tower and co-ordination plans were prepared as required.

Special projects carried out during the year included :—

- (i) The compilation of data for the Forest Inventory and 1965 revision of the General Working Plan, with a continual refinement of technique in the sampling, checking and presentation of volume figures.
- (ii) Work was commenced on a statistical analysis aimed at grouping the many combinations of A.P.I. types into classes within which marketable volume is strictly comparable.
- (iii) Site quality mapping of 1,711 acres was carried out, mainly within Gngangara plantation.

### Forest Engineering

Engineering projects during the year included the construction (438) miles and maintenance (4,808 miles) of forest roads, tracks and firelines. Twenty-four miles of telephone line were erected.

### Plant and Equipment

The high standard of performance of the Department's plant and equipment was maintained during the year.

Front mounted blades fitted to wheel tractors have been found most efficient in the preparation, patrol and mopping-up operations of prescribed burning in the Karri forest. Sawmilling equipment, jib cranes, tractor canopies, tanks and hose reels, a tree rake, logging jinker and pine seedling lifter were also constructed.

### Departmental Buildings

A new District Office was constructed at Jarrahdale and a new fire lookout tower in the Wanneroo Division.

A further 10 houses were built, 2 purchased and 5 sold, bringing the total number of Departmental houses to 464.

The new sawmill at Dwellingup, which replaces the one destroyed in the 1961 bushfire has been completed.



## Communications

**Radio.**—Good progress has been made with the expansion of the Very High Frequency (V.H.F.) system of radio communication. The installation of further equipment has extended the system from Harvey to cover Collie, Kirup, Nannup and Busselton divisions.

The expansion has necessitated the introduction of a second channel to reduce traffic density.

The complete system of 16 repeater stations and 123 mobile units is programmed for completion during the summer of 1964-65.

An instance of the value of the Department's V.H.F. system for purposes other than forestry, was high-lighted during the recent floods in the South-West. A radio link for the National Emergency Service was maintained between Harvey and Perth and a constant communication set up to report flood levels at the Harvey and Stirling dams. During the critical first night this information was transmitted to Perth at 15 minute intervals for the Harvey dam and 30 minute intervals for the Stirling dam.

**Telephone.**—The installation of telephones at Lewana Settlement in the Nannup Division was completed.

## 7. REFORESTATION

Past trade cutting has resulted in improved growth rates on some of the trees remaining. Surplus stems in the form of useless trees and veterans of marginal quality, as well as competing stems in sapling and pole stands are still occupying valuable growing space on these cut-over areas. Their removal at the earliest possible time is essential if the whole cut-over forest area is to be brought into a condition of maximum production.

In the Northern jarrah forests a programme of stand improvement is proceeding by means of :—

- (a) Trade cutting ;
- (b) Salvage cutting ;
- (c) Thinning ;
- (d) Cull removal by felling, or ringbarking.

The silvicultural control of felling under the West Australian system of tree-marking continued over all permits in State Forest.

During the year 58,437 acres of virgin State Forest were cut over and treated for regeneration. This consisted of 45,019 acres of jarrah, 4,519 acres of karri, 8,679 acres of wandoo and 20 acres of other species.

The total jarrah and Karri areas of State Forest treated for regeneration is now as follows :—

	Acres
Jarrah ....	2,259,759
Karri ....	106,782

## 8. AFFORESTATION

### Establishment

A further 2,620 acres of pine plantation were established during the year. Clear felling of 155 acres brings the net area of plantation at 30th June, 1964, to 38,918 acres, including experimental areas of 762 acres.

The total area of pine plantation established by the Department to 30th June, 1964, is as follows :—

Plantation	<i>P. radiata</i>	<i>P. pinaster</i>	Other Species	Total
	acres	acres	acres	acres
Wanneroo ....	7	12,367	47	12,421
Metropolitan ....	10	2,575	12	2,597
Mundaring ....	2,139	1,108	156	3,403
Gleneagle ....	97	804	24	925
Harvey ....	1,343	3,201	55	4,599
Collie ....	2,305	12	2	2,319
Ludlow ....	276	1,890	23	2,189
Willcock ....	68	595	5	668
Keenan ....	803	402	17	1,222
Grimwade ....	3,549	178	17	3,744
Nannup....	3,534	.....	3	3,537
Pemberton ....	429	62	41	532
Total Established Plantations ....	14,560	23,194	402	38,156
Experimental Areas ....	153	542	67	762
Grand Total* ....	14,713	23,736	469	38,918

\* Some experimental areas now absorbed into plantations and other areas adjusted.

The 1963 pine planting was distributed over the following plantations :—

	Pinus radiata	Pinus pinaster	Other Species
Ludlow	13		
Wanneroo—			
Yanchep		9	4
Pinjar		57	
Neaves		58	
Gnangara		447	
Mundaring	124		
Gleneagle	17	19	
Harvey—			
Myalup	13	161	
Tallanalla	112		
Collie	514		
Grimwade	325		
Blackwood	592		
Pemberton	155		
	<u>1,865</u>	<u>751</u>	<u>4</u>

### Soil Surveys

Continuous investigations are being carried out in an endeavour to locate better class soils on which to establish the fast growing *Pinus radiata*.

Details of work during the year are :—

	Acres
Detailed Surveys	19,262
Reconnaissance Surveys	6,400

### Production of Pine Timber

The total production of roundwood from pine plantations, mainly in the form of thinnings, again increased and amounted to 1,781,588 cubic feet.

The following figures show the steady rise in production in recent years :—

Year ended 30th June	Cubic feet
1950	397,347
1955	947,793
1960	1,336,825
1961	1,395,701
1962	1,435,085
1963	1,461,008
1964	1,781,588

The amount of pine used for slicing and peeling totalled 97,416 cubic feet, an increase of 18,260 cubic feet compared with last year.

The log intake of Departmental pine sawmills for the year amounted to 291,734 cubic feet (16 per cent. of all pine logged).

The woodwool industry obtained 5,350 cubic feet of smaller sized logs, and 2,240 cubic feet of pine poles were used by the pearl culture industry in the North-West for the construction of rafts for culture pots.

During the last six months there has been an increasing demand for sawn pine for structural purposes, especially for the North-West Cape project and the cooling tower for the new Muja Power Station near Collie.

An increased quantity of sawn pine was supplied to the Education Department for use in their manual training centres.

## Log Production

Logs produced by the various plantations were as follows :—

	Cubic feet	Cubic feet
Metropolitan	.....	608,636
Somerville	.....	312,602
Gnangara	.....	161,550
Collier	.....	133,934
Scaddan	.....	550
Mundaring	.....	309,397
Gleneagle	.....	1,500
Harvey	.....	325,751
Harvey Weir	.....	187,901
Myalup	.....	137,850
Grimwade	.....	226,980
Busselton	.....	269,131
Ludlow	.....	174,870
Keenan	.....	90,430
Boranup	.....	3,831
Pimelia	.....	38,365
Miscellaneous Forest Produce Licenses	.....	1,828
		<u>1,781,588</u>

## Mallet Plantations

No further planting was carried out and the total area of mallet plantation remains at 19,111 acres. No mining timber was supplied during the year but the Department produced 134 tons of chipped bark.

## Inland Arboreta

During the winter of 1963, five new arboreta were established in the agricultural areas, bringing the total to 50.

### Planting

The standard procedures developed over the past few years were carried out. These included thorough cultivation to remove weed competition, cutting and spreading of roots to prevent root coil, application of dieldrin powder as a deterrent to termites, and the erection of tree guards to prevent attack by rabbits and birds.

### Survival

The survival figure of 87 per cent. was slightly higher than for the previous year. Above average rains caused waterlogging in some of the heavier soils resulting in a higher proportion of deaths than in the better drained sands and sandy loams. This is illustrated by the following survival figures :—

Plots on heavy land	.....	80%
Plots on light land	.....	96%

### Maintenance

A mobile maintenance unit consisting of a 7-ton truck carrying a tractor and 6-disc Rotensor plough and towing a caravan, operated through the inland areas for the first time.

The unit, operated by two men, completely cultivated plots on medium and heavy soils. To minimise wind erosion, cross strips only were ploughed in light soils. This work, together with the ploughing of firebreaks around older plots and other general hand maintenance, was carried out during the months of September and October, 1963. Thirty-four plots were treated in this manner.

The co-operation of the Department of Agriculture, Shire Authorities and individual farmers in this work, was of considerable assistance and is greatly appreciated.

### Investigation

Moisture investigations in wheatbelt soils under different forms of ground cover were continued.

### Tree Nurseries

The number of trees supplied to private buyers on farms and in country towns increased by over 10,000 to 94,432.

River Gum, with 20,584 plants distributed, was once again the most popular species, followed by Sugar Gum (8,312), Coral-flowered Gum (5,445) and Dwarf Sugar Gum (5,408).

The distribution of plants from each nursery is summarised as follows :—

Nursery	Number of Plants Sold			Departmental Use		Number of Species
	Potted Stock	Tray Stock	Open Rooted Plants	Pines	Other	
Hamel	26,935	3,250	15,640	70,962	13,823	102
Dryandra	42,757	5,850	.....	54	1,120	92

### Seed Supplies

Sales of seed to Australian and overseas buyers were valued at £7,436. compared with £2,889 last year. The increase was due mainly to large orders from Morocco (238 lb.) and the Forestry and Timber Bureau. Kalgoorlie District officers collected a record 190 lb. of seed during the year.

The Departmental Seed Store at present holds seed of over 200 species valued at £12,294.

A further 1,156 lb. of conifer seed, mainly for Departmental use, was taken into stock.

## 9. PROTECTION

### FIRE PROTECTION

#### State Forest Under Protection

Indigenous Forest	.....	4,054,250 acres
Pine Plantations	.....	38,918 "
Mallet Plantations	.....	19,111 "

Adjoining this protected forest there are some 1,700,000 acres of private property, Crown lands and State Forest being held for plantation establishment on which fires must be attended to promptly as they menace protected forest.

#### The Fire Season

Figures given are for the Forest Weather Stations at Dwellingup (Jarrah) and Pemberton (Karri).

	Jarrah	Karri
Rainfall	All months except October and April well below average	Although yearly figure exceeded average by over 2 inches, rainfall for all summer months below average.
Temperature	Above average every month except April. Highest 103° in March. 27 days above 90°.	Generally mild. 12 days above 90°.
Relative Humidity	54 days below 25 per cent. 5 days below 10 per cent., 4 of these recorded in March. The Mean R/H below average.	19 days below 25 per cent. 2 days below 10 per cent., both of these were recorded in March.
Fire Hazard	7 Dangerous days, 25 Severe Summer.	2 Dangerous days, 5 Severe Summer.
Mean	5.3	4.6
Mean of Fire Seasons	5.5	4.4

#### Controlled Burning

Despite above average rains in spring and autumn, 890,552 acres of prescribed burning were carried out. The area burnt is well above the average of preceding years and the second highest on record.

During suspensions of the prohibited burning period, special burns were carried out in the Dwellingup division to control scrub growth following the 1961 fire, and in the karri region to promote regeneration.

An increase in the area burnt in the karri region is attributed to the use of " wheel blade " tractors which were found to be very efficient in preparation, patrol and mopping up operations.

Safety fusee matches were used in the majority of the controlled burns and produced very satisfactory results.

<i>Prescribed Burning</i>		Acres
General	....	830,983
Advance and Top Disposal	....	58,529
Fire Breaks	....	1,040
Total	....	<u>890,552</u>

### Detection

The new fire lookout tower at Wanneroo was manned for the first time late in the season.

<i>Manning of Towers</i>		Jarrah	Karri
First Watch	....	2/10/63	12/11/63
Last Watch	....	20/5/64	10/4/64

### Fires and Fire Damage

The total number of fires attended by Departmental gangs was 281, which, although 50 more than attended last year, is still well under the overall average figure of 352 fires.

The following table sets out the principal causes :—

Escape from Settlers' burning	....	63
Escape from Prescribed Burning	....	46
Hunters and Travellers	....	38
Deliberately Lit	....	23
Bush Workers	....	11
Children	....	18
Lightning	....	16
Mill Locos	....	3
W.A.G.R. Locos	....	8
Householders	....	3
Mill Surroundings	....	10
Mine Surroundings	....	5
Tractors	....	2
Other	....	7
Unknown	....	28
Total	....	<u>281</u>

Escapes from settlers' burning again heads the list with 22.4 per cent. compared with 24.2 per cent. last year.

The total area burnt was 21,455 acres, of which just over a third was scorched above 30 feet.

<i>Summary of Damage</i>		Acres
Slight	....	8,419
Medium	....	5,248
Severe	....	7,788
Total	....	<u>21,455</u>

<i>Points of Origin</i>		Acres
State Forest	....	140
Crown Lands	....	48
Private Property	....	93
		<u>281</u>

### Public Relations

All Divisions report continued improvement in co-operation with bush fire brigades and local organisations generally.

On a number of occasions Departmental officers and men have demonstrated the use of equipment at Agricultural Shows and other similar functions.

Once again Bush Fire Brigades have availed themselves of the offer to train with Departmental gangs and much co-operative burning was carried out in State Forest, Crown land and Reserves adjacent to private property.

## 10. SILVICULTURE, SOILS AND FIRE RESEARCH

Forest research activities have increased rapidly in recent years and to accommodate this expansion, plans have been completed for a modern research station to be built at Como.

### PINE SILVICULTURE

#### I. Tree Breeding

##### (a) Grafting

During the past twelve months, over 1,600 successful grafts were made. The total included both spring and autumn grafting of the two species, *Pinus pinaster* and *Pinus radiata*.

Autumn grafting with *Pinus radiata* was quite successful but, as for last year, results were not promising for *Pinus pinaster*.

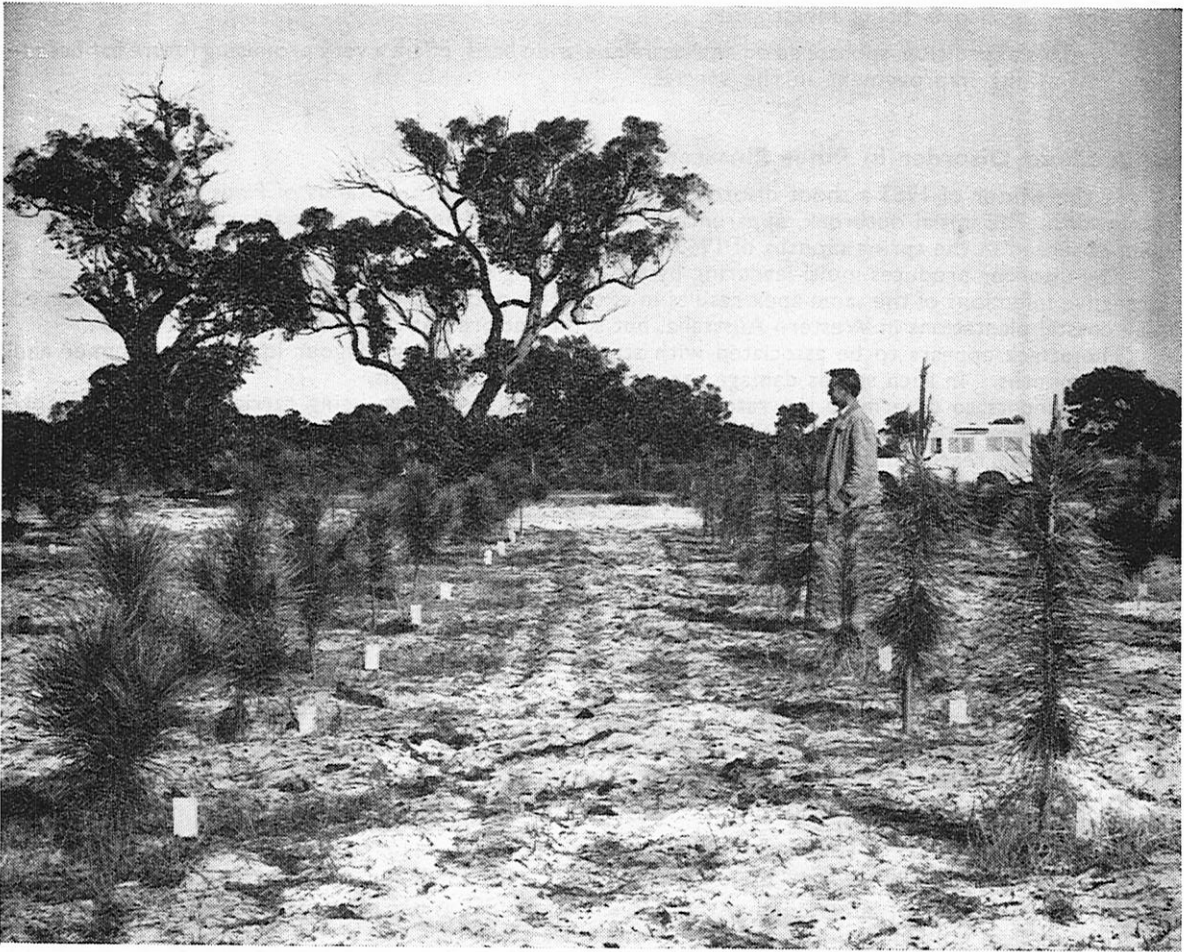
As planned, the Joondalup seed orchard of 30 acres was completely filled with *Pinus pinaster* in June, 1964.

The majority of *Pinus radiata* grafts were from local plus trees and represent an initial step towards the establishment in 1965 of a 10 acre seed orchard for this species. Due to the limited selection of suitable material available in this State, plus material from South Australia and Victoria will be included in the initial orchard.

##### (b) Controlled Pollinations

Three hundred and fifty pollinations of *Pinus pinaster* attempted during the year were successful. These crosses will provide seed in quantity to commence detailed progeny testing in 1966, of plus trees in the present Joondalup seed orchard.

Seed from 84 cones pollinated in 1961 were extracted in December, 1963. Germination tests are at present being carried out on this material.



(Pine silviculture)

“ Outplantings of grafts from 2 “ plus ” trees in the Neave’s Road scion arboretum, June, 1964. Note the difference in shoot growth between the 2 rows of clones.

The scion arboretum facilitates controlled pollination and provides further grafts for the establishment of seed orchards.”

(c) *Clonal Variation*

Material in the Neave's Road scion arboretum has developed sufficiently to reveal distinct differences between clones of *Pinus pinaster*. Apart from differences in tree form, the major variation is associated with the time of initiation and vigour of shoot extension. It appears that an important difference between clones, from the viewpoint of vigour, is the capacity for multiple flushing. Certain selections reveal a much greater capacity to flush in summer and autumn, than do others.

Foliar analyses from the arboretum indicate that significant differences in nutrient levels of the needles are associated with the present selection of plus trees.

(d) *Wood Properties*

Exploratory work carried out by the C.S.I.R.O., Division of Forest Products, confirms the superiority of the Leiria race of *Pinus pinaster* over the Landes, Esterel and Corsican in respect of properties of spiral grain, fibre length and wood density.

(e) *Portuguese Material*

The extent to which this species is used in Portugal is worthy of note. It is the chief species in the afforestation both of the coastal sands and extensive areas of upland country rendered barren for agriculture by centuries of overclearing and over-grazing. Over the past ninety years, Portugal has established some 6 million acres of forest, about half of which is *Pinus pinaster*, increasing the forested area from 7.2 per cent. to 34 per cent. of the land area, at an average rate of some 67,500 acres per year.

Portugal's own *Pinus pinaster* seed requirements this year are some 500 metric tons\*, compared with the order for 1½ tons placed by Australia in Portugal.

An officer of the Department, Mr. D. H. Perry, left for Portugal in October, 1963, to select plus material from natural stands of *Pinus pinaster*. To date approximately 45 plus trees, estimated to be at least as good as the 14 selected in this State, have been located. Material from these trees will be imported for grafting in Australia in the coming spring.

Half-sib seed has also been collected from the Portuguese trees and the possibility of importing pollen is being investigated.

This expedition, sponsored on an Australasia-wide basis, offers a very promising future for breeding improvement in the species.

**2. A Shoot Disorder in *Pinus Pinaster***

In the winter of 1963 a shoot disorder was observed in vigorous stands of *Pinus pinaster* in Pinjar plantation. The initial outbreak, apparently resulting from an infection in February of that year, was again observed in the spring months of 1963 and the autumn of 1964.

The disorder produces multi-leadering by the drooping and death of the terminal and lateral buds. Successive infections of the same apex results in extremely poor form. This damage has been observed in all coastal plantations in Western Australia, but is only at present considered serious at Pinjar.

The attack appears to be associated with stands which have high vigour in the late summer and autumn months. In such stands damage can occur in all canopy levels.

Assessments to determine the rate of spread of the disorder are being carried out at 2-monthly intervals. Observations from August, 1963, to April, 1964, suggest that the first attack occurs at about age 3 years and reaches its maximum intensity at age 8-9 years. This is illustrated by the following figures :—

	Date Planted			
	1961	1959	1957	1955
Per Cent. of trees infected	0.6	6	32	33
Per cent. of Total Damage occurring in autumn, 1964	100	91	29	9

Certain aspects of the disorder seemed comparable to those reported for *Diplodia* infection elsewhere. However, preliminary isolations of fungi from infected material appear to rule out the possibility of *Diplodia* as the causative agent.

**3. Pine Thinning (*Pinus pinaster*)**

A remeasurement of late thinning studies initiated in 1958 is providing data to check present prescriptions. Basal area increment over the 5 years since treatment was almost trebled by the heaviest thinning intensity. Some evidence is present to indicate that a lower basal area limit of approximately 70 square feet per acre may be desirable for management purposes. This would necessitate a heavier thinning prescription than the present schedule and further trials have been designed to check the data.

\* 1 metric ton .... 0.9842 long tons.

#### 4. Water Relations

A further year's investigation of soil moisture in 22 year old thinned and unthinned stands of *Pinus pinaster* was commenced in October, 1963. Radial increment of the trees over the summer months is directly related to the amount of water retained in the soil profile. This study will be completed in the coming year.

#### JARRAH SILVICULTURE

Thinning investigations, involving the use of hormone 2.4.5-T to kill unwanted trees and to inhibit coppice development, have been extended and the results applied, with progressive reduction of costs to an economic level. The value of this work is now established and considerable expansion is being planned.

Tests were made with Dulux paint tint (red), Waxoline yellows and Waxoline reds for dyeing solutions of 2.4.5-T in dieselene. The Waxoline reds gave the most satisfactory results. The Waxoline yellows were unsatisfactory as frills in a Jarrah stem weather to a colour similar to that of the dyes. The other compounds were excluded on account of cost.

Other investigations initiated during the year, included :—

- (i) A regeneration enumeration in areas of massive *Banksia grandis* understorey. A trial is being established to find the effect of removal of the *Banksia* by various means, on the growth rate of existing advance growth and the recruitment of new seedlings.
- (ii) The use of foliar hormone sprays on Eucalyptus coppice and various species of Acacia scrub.
- (iii) Trials to find the effect of thinning on the growth rates and form of Jarrah coppice.

#### KARRI SILVICULTURE

##### Flowering and Seed Production

The last of the current seed crop will be available for natural dissemination during the coming spring and summer, and will germinate in autumn, 1965. Further general seeding is not expected for about four years. The development of flower buds this year indicates a restricted flowering in 1964, becoming more general in 1966. Seed shed should occur between 1967 and summer 1969, with a peak in 1968. Stands scorched in wildfires in 1961 are expected to blossom this year and cast their seed in 1966.

Commercial seed collection will only be possible during years of abundant seeding which occur at intervals of about four, eight or twelve years. About two hundred pounds of green capsules yield one pound of pure seed containing an average of 300,000 seeds. The number of seeds obtained from each capsule and the viability of the seeds increases with the maturity of the fruit. More than 2.0 seed per capsule is accompanied by reduction in seed size. About 30 strong seedlings can be raised from 100 seeds sown in the nursery.

##### Natural Regeneration

Collection and testing of seed capsules from cut over stands assists in determining the most favourable season for the regeneration burn. The prescribed burning promotes seed shed, removes competition, and stimulates the early development of Karri seedlings. Creation of sunlit ashbeds is an important part of regeneration practice. A better distribution of ashbeds and less damage to growing stock would be achieved by pulling the crowns of felled trees into gaps for burning.

A technique has been developed for the assessment of natural regeneration. One gap is selected in each 10 acres of cut over forest. A circular one thousandth acre plot is selected on the best seedbed within half a chain of the centre of the gap and the seedlings on this area counted. Two further samples are taken between the centre and extremities of the long axis of the gap. Each area is re-assessed when seedlings are about one year old, using plots of four thousandths of an acre in area.

Surveys of the seedling regeneration in 1963 and 1964 showed the following survival values in the germinated spots : 4,200/acre on ashbed ; 1,880 on clean fair seedbed and 740 on poor bed.

Five hundred seedlings per acre has been accepted as the minimum stocking at age one year. The number of germinants required to secure this minimum stocking in various stand types are : Karri—1,000 ; Karri-Marri—2,000 ; other Karri mixtures—3,000/acre. Areas in which 80 per cent. of the gaps contained less than the acceptable number of seedlings per acre, have been delineated to enable their treatment for artificial regeneration.

##### Artificial Regeneration

Studies have been made of methods of artificial regeneration so that areas not satisfactorily stocked with natural regeneration may be restored to full productivity. Broadcasting or spot sowing of seed does not result in successful Karri establishment unless favourable seedbeds are available, such as the ash covered soil free from other plant species. The development of seedlings from artificially sown seeds is slower than that of naturally regenerated plants. Direct seeding is very sensitive to the influences of site, and, because of the large amount of seed required to ensure success, is expensive.

The transplanting of suitably sized natural regeneration gives more certain establishment than does seeding. Transplanted wildlings, however, require sites free of competition for successful establishment as their small root systems at the time of planting retard their early development. The addition of nitrogen and phosphorus fertilizer, and removal of weed species by spraying with 2.4.5-T, both benefit survival and height growth during the first year.



Plants raised in compressed peat pots develop a dense root system which is undamaged at the time of planting. This allows rapid possession of the site, an important factor where conditions are unfavourable. Potted planting stock shows a greater response of height growth to the application of nitrogen and phosphorus fertilizer than to the removal of plant competition by weedicide spraying, or to planting on or off ashbed. The survival percentages of potted stock are considerably higher than for transplanted wildlings, 20 per cent. where fertilizer is used.

The shoots of transplanted wildlings die back for about two thirds of their length after planting, except where the sites are unusually favourable. Bifurcation of the shoot is common and may influence the subsequent value of the growing stock. Potted seedlings branch more freely than natural regeneration, though a distinct leading shoot is retained.

The percentage success of various methods of artificial regeneration are : spot seeding 25, transplanted wildlings 75, and potted stock 95 per cent. Broadcast seeding requires four to eight times as much seed per acre as spot seeding and sixty times as much as for the raising of potted nursery stock.

## SOILS AND PLANT NUTRITION

Pending the construction of a new Research Station, the Departmental laboratory is housed in temporary quarters at Como.

### Pine Studies in Co-operation with C.S.I.R.O.

The following co-operative studies were carried out :—

(a) *Margaret River*

In association with the soil studies previously carried out, a series of foliar samples of *Pinus radiata* were collected and analysed. Results showed no clear relationship between the foliar phosphorus level and the soil phosphorus level.

(b) *Grimwade*

In a further study of the effect of site factors on predominant height in this area, a multiple regression was calculated using the following factors—

- (i) The relative altitude of the plot (linear and quadratic terms).
- (ii) The soil phosphorus level (linear and quadratic terms).
- (iii) The product of the relative plot altitude and the soil phosphorus level.
- (iv) The level of zinc in the foliage.

The equation gave a satisfactory fit and showed that the square of the soil phosphorus level was the most significant factor.

(c) *Soil Moisture Studies*

This work has now been taken over completely by C.S.I.R.O. officers.

(d) *Soil Fertility Experiments*

The field trial at Carinyah was continued and all blanks from the 1963 planting have been refilled. It is still too early to assess the effects of the different treatments.

A further three factorial trials involving zinc, nitrogen and phosphorus were established at Margaret River, Grimwade and Pemberton.

(e) *Foliar Analysis*

The analysis of foliar samples from *Pinus radiata* and *Pinus pinaster* was continued, with the work being concentrated mostly on *Pinus pinaster*.

To investigate the effect of second applications of superphosphate on *Pinus pinaster*, a series of samples were collected from 'free growth' plots at Gngara. The plots were given an initial dressing of 2 cwt. of superphosphate per acre at time of planting and, except for control plots, a subsequent treatment of 4 cwt. per acre in August, 1962.

The second application of fertilizer resulted in increased needle length from an average 4.8 in. in the control plots to an average 7.5 in. in the treated plots. Associated with the increased needle length was a marked increase in the foliar phosphorus level from 0.078 per cent. to 0.236 per cent. The subsequent changes in foliar phosphorus levels and their relationship to growth responses are being studied in these plots.

From an examination of the Gngara foliar data, it is evident that the chemical composition of the needles largely influences the length of the needles on the coastal sands. It has been shown that phosphorus is the most important element and it is probable that needle length can be used to predict the necessity for future fertilizer applications.

(f) *Soil Analysis*

Routine soil phosphorus analyses were an important function of the laboratory, a total of 277 samples being handled during the year.

In addition a series of chemical analyses were carried out on soil profiles collected from experimental pine plots in the Wanneroo Division.

## Fire Research

Research into fire behaviour in the northern Jarrah forest continued. Detailed measurements from a further 200 experimental fires have allowed an analysis of data which will give reasonable predictions of the behaviour of fires in this forest.

A draft controlled burning guide, for use by officers and overseers directly in charge of burning operations has also been produced from this data. This guide, already tested to some extent, will be put to large scale trial during the 1964/65 burning season.

Trial use of direction finders and fusee matches during last season has proved the value of these two aids to controlled burning and the increased acreages being covered are, in part, due to these refinements.

Preliminary trials, on a strictly limited basis, to investigate the possibility of burning under pine plantation canopy, have been initiated. Observation and measurement of the effect of such burning on the pine crop is being carried out concurrently.

A study of the methods and equipment devised in South Australia for the fighting of plantation fires has led to the ordering of similar equipment (viz. fire tanker, rubber lined canvas hose and hermaphrodite couplings) for trial in local plantations.

## II. LIBRARY

A feature of the past year has been the substantial increase in the number of journal loans, the number rising from 6,233 for the year ended June, 1963, to 6,680 for the year ended June, 1964.

Enquiries received in the library ranged from requests for information on forestry topics, such as 'thinnings' and 'fire control', to information on the temperature at Addis Ababa.

The librarian attended the 12th biennial library conference in Tasmania in August, 1963. While in Hobart a visit was made to the Tasmanian Forestry Department Library.

## 12. EDUCATION AND PUBLICITY

### Education

Two Staff Discussion Groups and Conferences were held for Assistant Divisional Forest Officers at Manjimup during the year.

A week's school on controlled burning was held at Tone River for overseers from Southern divisions. A similar but shorter school was held for officers and overseers at Gleneagle.

Several courses on Workers' Safety Methods were held in the various Divisions.

Late in 1963, a further intake of eleven trainees took place; of these, three failed to reach the standard required and were dropped from the Scheme, two additional trainees were recruited. The total under training is now ten.

A further State Forestry Scholarship was awarded for 1964 while three Scholarships were awarded by the Commonwealth. The present position is as follows:—

	Commonwealth Scholarship	State Scholarship	Independent
4th Year—Canberra—To graduate, 1964	.....	.....	.....
3rd Year—Canberra	2	.....	.....
2nd Year—University of W.A.	1	1	.....
1st Year—University of W.A.	2	1	*2

\* Suspended Scholarships.

A cadetship was, for the first time, made available and was awarded in 1964.

### Publicity

New publications during the year were:—

Pine Volume Yield and Log Tables.

Pamphlet No. 8 (revised) entitled "Communications—Telephone", which is part of the Foresters' Manual, Bulletin No. 58.

The following publications, all part of the Foresters' Manual, are in the course of printing:—

Pamphlet No. 5 (revised) ..... Afforestation With Pines (South-West)

Pamphlet No. 6 (revised) ..... Reforestation and Silvicultural Operations—Jarrah and Karri.

Pamphlet No. 7 (revised) ..... Fire Control.

Pamphlet No. 10 (New section) ..... Forest Engineering—Sawmills.

Over 5,000 requests for different publications were received, the school brochure "Western Australia's Wonderful Hardwoods" (1,750 copies issued) being in most demand.

Senior officers of the Department gave lectures and talks to various Societies and Public Bodies during the year.

### 13. FOREST ECONOMICS

#### The Production and Distribution of Railway Sleepers

##### Production

Western Australia ranks a close second to New South Wales in the production of railway sleepers in the Commonwealth. Figures extracted from Forestry and Timber Bureau Annual Reports and the Timber Supply Review, show the total production by States, for the 10-year period 1953-54 to 1962-63 inclusive, to be as follows :—

	Million Superficial Feet
New South Wales	436
Western Australia	431
Queensland	308
Victoria	276
Tasmania	34
South Australia	12
Commonwealth Total*	1,497

\* Figures for the last 2 years are provisional.

In Western Australia railway sleepers (all sawn) form an important part of sawmill production. Since the lifting of export restrictions in July, 1957, they have represented nearly 25 per cent. of the State's total sawn output. (See Fig. 1).

##### Distribution

Following the lifting of restrictions, Western Australia has dominated the export of railway sleepers from the Commonwealth to overseas markets. The trend shown in the accompanying histogram (Fig. 2) suggests that it will continue to do so.

The part that sleepers play in exports from Western Australia is shown in Fig. 1. In the last 8 years they have averaged well over 40 per cent. of the total volume of all exports. Overseas buyers absorb over 3 times the volume of sleepers marketed in the other States of the Commonwealth.

Figures from the Forestry and Timber Bureau Annual Reports, although available for only 3 years, show also that Western Australia leads in the interstate trade of sleepers. South Australia—which includes the whole of the requirements of the Commonwealth Railways—accounts for nearly all of our interstate sleeper exports. Movements of sleepers were as follows :—

Interstate	1959/60	1960/61	1961/62
	Millions of Super Feet		
From Western Australia	6.7	9.0	8.0
From New South Wales	5.6	4.1	4.5
From Victoria	3.6	6.2	3.3

### 14. TIMBER INDUSTRY REGULATION ACT, 1926-1950

The number of mills registered under the provisions of the Act at the close of the year totalled 214 (116 Crown land and 98 private property).

Average numbers of persons employed in timber mills each month throughout the year was 3,448. This figure is for employees at mills cutting timber from the log only. Employees of associated yards in the metropolitan area are no longer included.

The District and Workman's Inspectors made 1,296 inspections of timber holdings.

There were 874 notifiable accidents, 3 of which were fatal. The number of accidents per 100 persons employed was 25.3 compared with 25.1 for last year.

The cost to the Forests Department of administering the Timber Industry Regulation Act for the year ending 30th June, 1964, was as follows :—

Salaries	£2,793
Mileage, Travelling Allowances and Sundries	£2,426
	£5,219

### 15. FOREST OFFENCES

Eighty forest offences were reported during the year. Legal proceedings were taken in three cases and all resulted in conviction. Fines and costs amounted to £55 and £17 12s. 4d. respectively.

Warnings were issued in 48 instances and the remainder were dealt with by charging royalty, forfeiture of deposits, collection of damages or confiscation and sale of timber illegally cut. The amount received by the Department in this way totalled £1,725 8s. 11d.

Twenty-six

PRODUCTION AND DISTRIBUTION OF RAILWAY SLEEPERS IN W.A.  
 RELATIONSHIPS TO TOTAL SAWN PRODUCTION AND TOTAL VOLUME OF EXPORTS

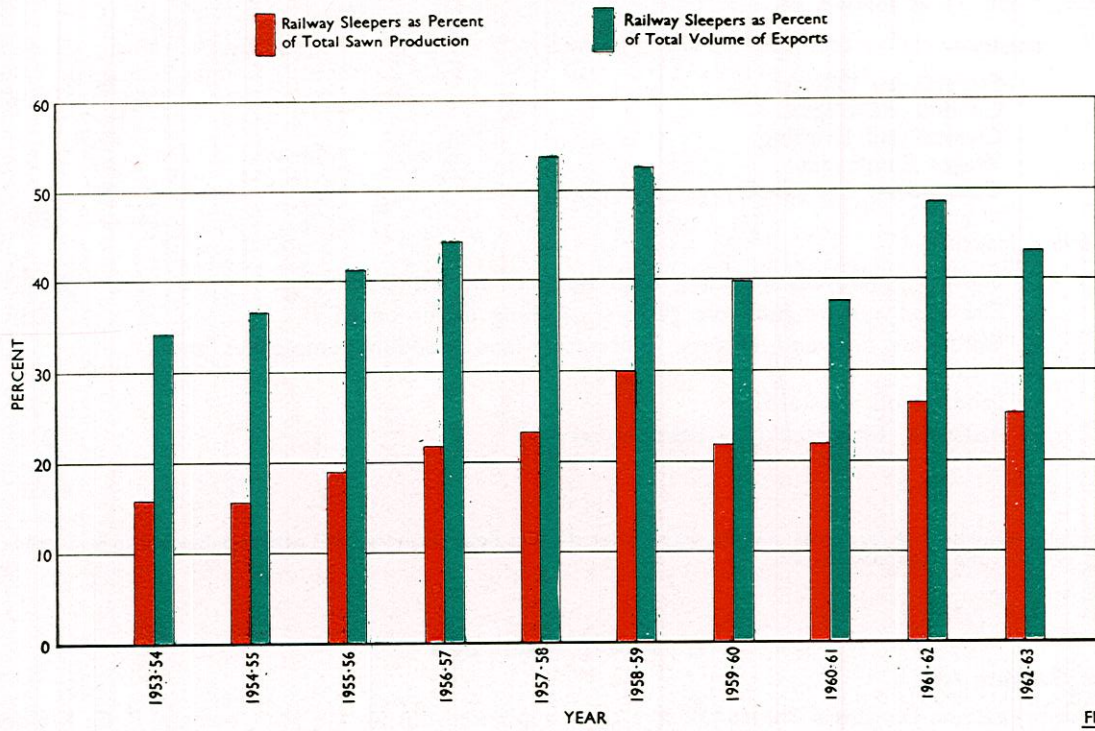


FIG. 1

SAWN AND HEWN RAILWAY SLEEPERS

EXPORTS TO OVERSEAS FROM AUSTRALIA

1953-54 — 1962-63

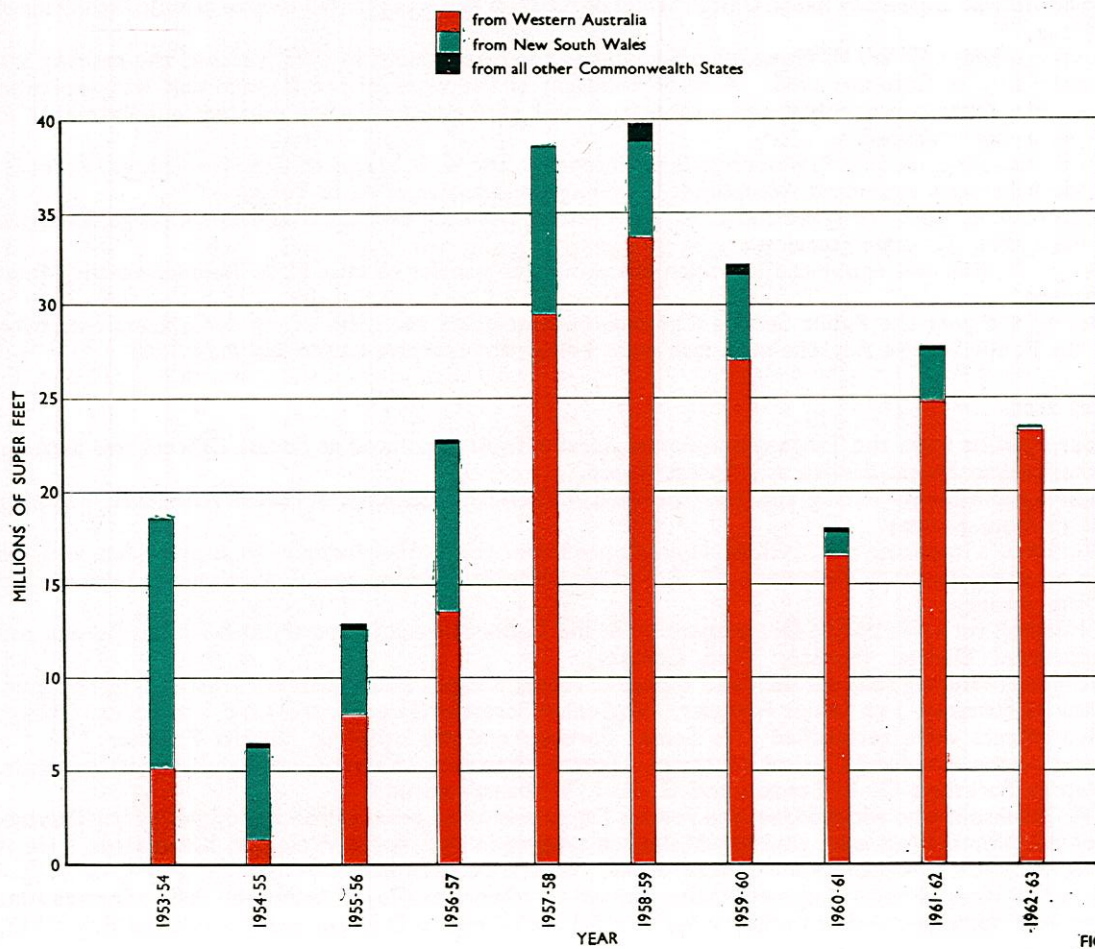


FIG. 2

## 16. EMPLOYMENT IN FORESTRY AND THE TIMBER INDUSTRY

The number of wage earners directly employed in Forestry and the Timber Industry was estimated at 4,959, made up as follows:—

<i>Forestry—</i>		
Professional Officers	.....	46
General Field Staff	.....	183
Clerical and Drafting	.....	76
Wages Employees	.....	569
Contractors and employees (estimated)	.....	20
		894
<i>Timber Industry—</i>		
Sawmill employees including bush workers at 31st December *	.....	3,448*
Firewood cutters and pole getters, working under permits	.....	323
Goldfields firewood cutters, contractors and woodline employees and carters	.....	39
Sandalwood workers	.....	24
Apiarists, estimated (593 sites registered)	.....	231
		4,959

\* Includes employees of registered sawmills only and for the first time, excludes 1,088 persons employed in associated yards in the metropolitan area.

## 17. STAFF MATTERS

### Public Service Act

Three Assistant Divisional Forest Officers were appointed during the year, namely, P. C. Kimber from the Tanganyikan Forest Service, A. D. Mather from the Kenyan Forest Service and P. N. Shedley, who resumed with the Department after service in private enterprise.

E. R. Hopkins resumed duty after post-graduate study in forestry at the University of Melbourne and D. Doley commenced duty after completing his post-graduate studies at the University of Western Australia.

I. S. Ferguson, who had been on twelve months' study leave without pay, continued his post-graduate studies at the Yale University in the United States of America and was granted twelve months' study leave on half pay.

Superintendent G. W. M. Nunn, who first joined the Department in 1925, reached the retiring age and ceased duty in October, 1963. A re-organisation of the work of the Department was approved following Mr. Nunn's retirement and although several new positions were created, appointments to these were not finalised.

Promotions included D. R. Moore to Superintendent and K. B. Hayes to Clerk-in-Charge, Records.

E. G. Baker was appointed Accountant following the transfer of A. B. Tenger.

A. D. F. O. K. Kelers resigned and C. A. Crew retired from the position of Clerk-in-Charge, Records, after more than 39 years' service.

Miss J. M. Bull was appointed Librarian following the transfer of Miss M. E. Redman to the Mines Department.

During the year the Public Service Commissioner adjusted the rates of pay for officers employed under the Public Service Act, the increased rates being retrospective to the 3rd May, 1963.

### Forests Act

Four recruits from the Tanganyikan Forest Service were appointed as Forest Officers and another from the Kenyan Forest Service as a Forest Guard.

New appointments during the year included 4 Clerical Assistants, 3 Forest Assistants, 7 Forest Guards (1 from Kenya).

Workmen's Inspector F. A. McDonald employed under the Timber Industry Regulation Act resigned to take an appointment as Secretary, W. A. Timber Workers' Union, and G. C. Kennedy was elected to fill the vacancy.

J. Marshall returned to the Department from the Commonwealth Forestry and Timber Bureau and was appointed District Forester (Fire Control).

Promotions during the year include 1 officer to Forest Ranger, 3 to Assistant Forester, 2 to Forester, 1 to District Forester, 1 to Senior Forester, 1 to Senior Forester (Fire Control) and 1 to Forest Officer.

Two officers were reclassified 1 to Senior Forester and the other to District Forester.

Resignations included 2 Clerical Assistants, 3 Forest Assistants, 2 Forest Guards and 1 Forest Assessor. District Foresters O. R. Loxton and C. H. J. Williams retired.

J. A. Thomson, who retired from the Forests Department last year, has been engaged by the Department of the North-West on a tree establishment project in the North-West and Kimberleys. He is receiving technical direction from officers of the Forests Department.

Increased rates of pay in line with those granted to officers employed under the Public Service Act, were granted retrospectively to officers of the Field Staff General Division as from the 3rd May, 1963.

**APPENDIX IA**

*Statement of Revenue and Expenditure of the Consolidated Revenue Fund for the Year ended 30th June, 1963*

1962/63	Revenue	1963/64	1962/63	Expenditure	1963/64
£	<i>Royalties</i>	£	£		£
851,826	Logs .....	924,698	176,278	Salaries .....	188,983
46,756	Sleepers .....	51,491	51,562	Incidentals .....	62,276
1,576	Sawn Timber .....	1,780	1,951	Timber Industry Regulations Act .....	2,426
49,891	Piles and Poles .....	61,437	75,214	Hardwood Conversion .....	73,695
4,385	Mining Timber .....	6,600	129,583	Pine Conversion .....	158,091
12,594	Firewood .....	11,361	43,235	Recoupable Projects .....	46,138
3,720	Posts .....	6,265	8,290	Tree Nurseries .....	13,478
4,221	Sandalwood .....	3,252		Excess of Revenue over Expenditure distributed as follows:—	
8,778	Miscellaneous .....	3,426		9/10 to Reforestation Fund .....	972,899
983,747		1,070,310	907,149	Transferred to Treasury .....	107,595
	<i>Pine Conversion</i>		81,604		
160,784	Pine Logs .....	153,933			
49,758	Sawn Pine .....	77,717			
210,542		231,650			
	<i>Hardwood Conversion</i>				
13,019	Sawn Hardwood .....	14,297			
79,526	Logs .....	88,793			
11,579	Piles and Poles .....	7,950			
104,124		111,040			
	<i>Other Sales and Fees</i>				
11,682	Seeds and Trees .....	14,863			
23,420	Inspection Fees .....	26,272			
15,841	Rent and Leases .....	16,812			
97,576	Miscellaneous .....	104,750			
148,519		162,697			
	<i>Recoupable Projects</i>				
15,842	Specific Roads .....	7,296			
12,092	Other .....	42,588			
27,934		49,884			
1,474,866		1,625,581	1,474,866		1,625,581

**APPENDIX IB**

*Forests Improvement and Reforestation Fund Account for the Year ended 30th June, 1964*

1962/63		1963/64	1962/63		1963/64
£		£	£		£
94,006	Balance as at 1st July .....	104,001	1,075,921	Expenditure .....	1,275,636
907,149	9/10 Revenue .....	972,899	134,655	Less Recoups .....	147,235
18,112	Rents .....	20,922			
76,000	Federal Aid Road Grant .....	76,000	941,266		1,128,401
50,000	Reserve Fire Fighting .....	100,000	100,000	Reserve Fire Control .....	100,000
....	Research Building Grant .....	40,000	104,001	Balance Working Account .....	85,421
1,145,267		1,313,822	1,145,267		1,313,822

**DETAILS OF EXPENDITURE**

1962/63	Divisional	1963/64
£		£
418,792	Divisional Wages, Materials, etc. ....	490,882
	<i>Head Office</i>	
210,994	50. Salaries and Allowances .....	255,063
16,066	51. Incidentals .....	19,085
102,218	52. Purchase of Plant and Vehicles .....	121,944
203,545	53. Plant Operations .....	215,555
6,805	54. Purchase of Land .....	12,051
10,385	55. Fire Equipment .....	5,967
5,498	56. Como Buildings .....	2,182
8,046	57. Como Headquarters .....	8,052
13,660	58. Communications .....	36,945
8,463	59. Research .....	11,719
2,617	60. Drafting .....	2,829
2,829	61. Surveys .....	3,270
2,841	62. Training of Staff .....	6,154
30,049	63. Insurances .....	32,337
18,100	64. Pay Roll Tax .....	20,415
10,919	65. Utilisation .....	31,186
4,094	F.I.C.A., etc. ....	....
657,129		784,754
1,075,921	Total Reforestation Fund .....	1,275,636

**APPENDIX IC**

*Statement of Afforestation Expenditure for Year ended 30th June, 1964*

1962/63	Expenditure	1963/64	1962/63	Source of Funds	1963/64
£		£	£		£
107,208	Plantation Establishment .....	102,290	125,000	General Loan Fund .....	175,000
92,768	Plantation Maintenance .....	90,287	58,951	Reforestation Fund .....	58,566
18,430	Houses and Buildings* .....	63,376	210,542	Sale of Pine Logs and Timber .....	231,650
12,068	Road Construction and Maintenance .....	8,609			
11,954	Fire Prevention and Suppression .....	12,970			
3,285	Research .....	2,663			
230	Surveys and Plans .....	143			
10,638	Essential Services and Communications .....	12,569			
8,329	Administration .....	14,218			
129,583	Direct Conversion of Pine .....	158,091			
394,493		465,216	394,493		465,216

\* Includes £40,000 for the new Research Station at Como.

**APPENDIX ID**

*Statement Showing Distribution of Forests Department Expenditure*

<i>Details</i>					£
Consolidated Revenue Fund .....	.....	.....	.....	.....	545,087
Reforestation Fund .....	.....	.....	.....	.....	1,128,401
General Loan Fund .....	.....	.....	.....	.....	175,000
Treasury Special Employment Grant .....	.....	.....	.....	.....	10,017
					<u>1,858,505</u>
Distribution of Expenditure—					£
1. Busselton .....	.....	.....	.....	.....	135,939
2. Mundaring .....	.....	.....	.....	.....	97,574
3. Dwellingup .....	.....	.....	.....	.....	168,128
4. Collie .....	.....	.....	.....	.....	106,237
5. Kirup .....	.....	.....	.....	.....	108,958
6. Manjimup .....	.....	.....	.....	.....	166,078
7. Narrogin .....	.....	.....	.....	.....	28,740
8. Gleneagle .....	.....	.....	.....	.....	66,428
9. Metropolitan .....	.....	.....	.....	.....	77,628
10. Harvey .....	.....	.....	.....	.....	195,158
11. Pemberton .....	.....	.....	.....	.....	124,104
12. Nannup .....	.....	.....	.....	.....	124,739
13. Shannon River .....	.....	.....	.....	.....	74,111
14. Kalgoorlie-Esperance .....	.....	.....	.....	.....	10,094
15. Wanneroo .....	.....	.....	.....	.....	90,641
Head Office .....	.....	.....	.....	.....	283,948
					<u>£1,858,505</u>

APPENDIX 2A

Exports from Western Australia of Timber, Tanning Substances and Essential Oils for Year ended 30th June, 1964

Item No.	Item and Destination	Quantity	Value	Item No.	Item and Destination	Quantity	Value
63490	<b>TIMBER</b> Hardwood Logs— Australian States : South Australia	cub. ft. 11,957	£ 6,824	64410	Timber, Dressed or Moulded— Flooring : United Kingdom Christmas Island Cocos Islands Hong Kong Greece United States of America	cub. ft. 5,437 1,004 2,418 126 316 1,236	£ 4,961 1,222 500 133 475 2,588
63521- 63529	Sleepers— United Kingdom New Zealand Pakistan Greece Netherlands South Africa, Republic of	43,597 322,249 390,226 176 1,498 1,000,543	46,408 185,099 276,328 204 1,271 593,469		Australian States : Mosaic Flooring : New South Wales Victoria South Australia Northern Territory	cub. ft. 8,218 146 2,834 25	£ 20,695 216 5,665 90
	Australian States : New South Wales Victoria South Australia	cub. ft. 1,224 1,957 584,451	£ 679 1,061 318,932		Other Flooring : New South Wales Victoria South Australia Northern Territory	71,411 39,483 104,341 8,886	65,847 40,642 92,627 12,934
	Total	1,758,289	1,102,779		Total	11,223	26,666
64100	Softwoods, Sawn, Undressed— Cocos Islands Australian States : Northern Territory	2 1,066	7 1,370	64490	Other Timber : United Kingdom Christmas Island United States of America	506 571 5,822	416 689 6,000
	Total	1,068	1,377		Australian States : New South Wales Queensland South Australia Northern Territory	cub. ft. 24,755 836 6,905 9,957	£ 30,127 1,002 5,150 17,149
64260	Hardwoods, Sawn, Undressed (other than sleepers)— Jarrah : United Kingdom Christmas Island Cocos Islands Canada Ceylon Hong Kong Malta Mauritius New Zealand Pakistan Belgium-Luxembourg France Germany, Federal Republic of Greece Iran Italy Netherlands South Africa, Republic of United States of America	51,099 139 1 2,352 4,571 6,175 406 563 6,244 63,819 104,892 4,378 350 51 451 5,700 3,434 8,803 207,074 2,020	46,263 193 3 1,762 3,406 4,061 474 4,704 44,173 83,012 3,207 251 41 319 5,266 2,661 6,468 155,398 1,563	64799	Plywood and Veneer— Cocos Islands Sarawak Japan Portugal United States of America	Sq. ft. 1,008 776 56,323 500 1,800	49 110 1,188 10 40
	Australian States : New South Wales Victoria South Australia Northern Territory	cub. ft. 2,720 144,151 855,190 7,944	£ 2,196 100,061 485,211 7,320		Australian States : New South Wales Victoria Queensland South Australia Tasmania Northern Territory	sq. ft. 147,376 2,187,080 6,174 2,622,009 207,378 65,470	£ 5,660 109,426 155 148,101 9,460 6,279
	Total	1 010 005	594 788		Total	5,235,487	279,081
64280	Karri : United Kingdom Christmas Island Ireland Republic of New Zealand Belgium-Luxembourg France Germany, Federal Republic of Greece Netherlands South Africa, Republic of United States of America	4 380 278 61 100 201 5,847 349 10,518 151 32,853 62,960 2,541	4 098 178 60 74,963 4,458 250 8,197 105 25,925 51,862 3,040		Total	5,295,894	280,478
	Australian States : New South Wales Victoria South Australia Northern Territory	cub. ft. 14,314 21,407 782,695 74,126	£ 9,260 13,834 438,932 56,255		<b>Total, Timber Exports</b>		<b>3,686,732</b>
	Total	1 482 131	958 013	65050	<b>WOOD MANUFACTURERS</b> Casks and Vats (a)— United Kingdom	487	2,418
64290	Other Hardwoods : Cocos Islands Australian States : Blackbutt : South Australia Northern Territory	150 2,528 63	50 1,208 102	65130- 65290	Manufactures of Wood (except Furniture) N.E.I.— Christmas Island Cocos Islands Mauritius Singapore Germany, Federal Republic Of Japan Netherlands	250 1,400 180 163 5 35 80	2,113
	Wandoo : New South Wales Victoria South Australia Northern Territory	42 11,172 2,939 116	52 12,304 1,696 127		Australian States : New South Wales Victoria Northern Territory	£ 700 531 5,847	7,078
	Other Hardwoods : Victoria Northern Territory	55 273	50 455		Total		9,191
	Total	17,338	16,044	90814- 90880	Furniture of any Material— United Kingdom Christmas Island Cocos Islands Malaya, Federation of Mauritius North Borneo Sarawak Singapore Indonesia Thailand	5 572 80 1,423 132 73 143 4,354 402 710	7,894



APPENDIX 2A—continued

Exports from Western Australia of Timber, Tanning Substances and Essential Oils for Year ended 30th June, 1964

Item No.	Item and Destination	Quantity	Value	Item No.	Item and Destination	Quantity	Value
	Australian States : £		£	87100-87290	Essential Oils, Natural, Non-spirituous—		
	New South Wales .... 69,268				United Kingdom .... lb. £		
	Victoria .... 84,468				Hong Kong .... 7,465 17,755		
	Queensland .... 33,272				India .... 1,232 7,191		
	South Australia .... 63,411				Singapore .... 1,317 558		
	Tasmania .... 2,852				New Zealand .... 114 128		
	Northern Territory .... 1,780				Singapore .... 840 513		
			255,051		France .... 280 1,263		
	Total ....		262,945		Germany, Federal Republic of .... 27,322 6,632		
	<b>Total, Wood Manufactures</b> ....		<b>272,157</b>		Japan .... 7 1,048		
16000	<b>Tanning Substances of Natural Origin—</b>				South Africa, Republic of .... 4 24		
	United Kingdom .... cwt. £				Switzerland .... 11,623 605		
	Ceylon .... 10 30				United States of America .... 5,960 487		
	Hong Kong .... 546 2,248					56,164	36,204
	India .... 13 45				Australian States : lb. £		
	New Zealand .... 2,498 8,899				New South Wales .... 39,658 24,945		
	Pakistan .... 2,380 8,229				Victoria .... 40,176 21,427		
	Singapore .... 424 1,704				Queensland .... 326 704		
	Trinidad and Tobago .... 54 211				South Australia .... 2,582 5,386		
	Austria .... 1,247 3,960			96450	<b>Tool Handles, Unattached, of any material (c)—</b>		
	Burma .... 200 662				Christmas Island .... Doz. £		
	Denmark .... 2,437 7,770					4	51
	Germany, Federal Republic of .... 2,168 5,068				<b>Total Value of all Exports on this Return</b> ....		<b>4,370,501</b>
	Indonesia .... 1,136 3,880						
	Italy .... 564 2,245						
	Netherlands .... 2,149 6,728						
	Norway .... 6 24						
	Mozambique .... 1 1						
	Sweden .... 6 24						
	Thailand .... 907 3,159						
	United States of America .... 78,623 236,499						
		96,450	295,649				
	Australian States (b) : cwt. £						
	New South Wales .... 2,665 10,506						
	Victoria .... 2,483 5,541						
	Queensland .... 1,210 5,626						
	South Australia .... 1,138 4,689						
	Tasmania .... 300 905						
		7,796	27,267				
	<b>Total</b> ....	<b>104,246</b>	<b>322,916</b>				

- (a) Interstate Exports included in Item 65130-65290.  
 (b) Includes Synthetic Tanning Materials and Tanning Oils.  
 (c) Interstate Exports not recorded separately.

Basis of Value—F.O.B. Port of Shipment

**APPENDIX 2B**

*Imports into Western Australia of Timber, Tanning Substances and Essential Oils for Year ended June, 1964*

Item No.	Item and Origin	Quantity	Value	Item No.	Item and Origin	Quantity	Value
63010-63090	<i>Wicker, Bamboo and Cane and Manufactures thereof, except furniture—</i>	cub. ft.	£	64490	<i>Other—</i>	cub. ft.	£
	United Kingdom	28	82		United Kingdom	74	58
	Hong Kong	6,629	141		Sarawak	21	157
	India	78	157		Germany, Federal Republic of	95	356
	Malaya, Federation of	12,032	356		Australian States :		
	Singapore	2,477	4,478		New South Wales	4,478	34,865
	Burma	417	34,865		Victoria	34,865	2,530
	China—Republic of Formosa	1	2,530		Queensland	2,530	4,951
	China—Republic of Mainland	296	4,951		Tasmania	4,951	46,824
	Japan	6,489	46,824		Total	47,180	
	Philippines	3	47,180				
	Switzerland	296	47,180				
	Australian States :		28,746	64610	<i>Plywood and Veneer—</i>	sq. ft.	£
	New South Wales	82	28,746		United Kingdom	83,979	2,463
	Victoria	135	2,463		New Guinea	63,325	2,410
	Queensland	272	2,410		Ghana	93,329	820
	South Australia	2	820		Gabon	28,357	688
	Total	491	688		Japan	2,970	204
			29,237		Australian States :	271,960	6,585
63400	<i>Hardwood Logs—</i>				New South Wales	173,792	15,231
	Ghana	2,121	4,390		Victoria	76,893	5,386
	Malaya, Federation of	9,139	2,623		Queensland	2,687,542	190,084
	Nigeria	401	333		Tasmania	35,809	1,393
	North Borneo	32,374	12,145		Total	3,245,996	218,679
	Fiji	3,163	1,048		Total, Timber Imports	917,965	
	Solomon Islands	3,190	773				
	Sarawak	617,496	216,862	64795-64796	<i>WOOD MANUFACTURES</i>		
	Singapore	1,853	547		<i>Reconstituted Wood, also known as Particle Board, Chip Board, Sliver Board, etc.—</i>		
	Tanganyika	268	311		United Kingdom	188,387	8,233
	Western Samoa	608	75		Portugal	1,680	94
	Gabon	1,261	1,424		United States of America	128	16
	Indonesia	3,250	11,412		Australian States :	190,195	8,343
	Ivory Coast	4,027	3,853		New South Wales	282,399	33,780
	South West Africa	129	87		Queensland	41,040	4,047
	Thailand	3,852	8,369		South Australia	412,686	38,448
	Total	683,132	264,252		Total	736,125	76,275
64110	<i>Softwoods, Sawn, Undressed—</i>			65050	<i>Casks and Vats, empty (c)—</i>	No.	
	<i>Redwood and Western Red Cedar (a) :</i>				Australia (Re-imported)	140	1,743
	Canada	1,904	1,121	65150	<i>Last Blocks and Lasts (c)—</i>	dozen	
	United States of America	2,670	1,809		United Kingdom	93	315
	Total	4,574	2,930	65160	<i>Match Splints (c)—</i>		
64120	<i>Douglas Fir (a) :</i>				Finland		23,022
	New Zealand	876	535	65170	<i>Rules and Rulers, Wooden (c)—</i>		
	United States of America	51,278	44,010		United Kingdom		4,419
	Total	52,154	44,545		Hong Kong		343
64170	<i>Radiata Pine (a) — :</i>				Japan		13
	New Zealand	2,234	709		Total		4,775
64190	<i>Other Softwoods :</i>			65190	<i>Table Mats, Wooden (c)—</i>		
	Sweden	737	663		United Kingdom		265
	United States of America	4,524	5,226		Germany, Federal Republic of		30
	Yugoslavia	695	651		Italy		6
	Australian States :	5,956	6,540		Japan		61
	New South Wales	298	471		Sweden		16
	Queensland	232	348		Total		378
	Tasmania	1,043	1,325				
	Total	7,529	8,684	65210	<i>Wood Flour (c)—</i>	cwt.	
64290	<i>Hardwoods, Sawn, Undressed—</i>				Netherlands	3	7
	Ghana	1,036	888		United States of America	464	2,928
	Kenya	195	125		Total	467	2,935
	Malaya, Federation of	211,104	142,679	65290	<i>Manufactures of Wood (except Furniture) N.E.I.</i>		
	North Borneo	15,369	9,178		<i>Whether wholly or partly finished—</i>		
	Fiji	1,672	1,352		United Kingdom		1,595
	Pakistan	1,554	880		Canada		82
	Sarawak	210,302	122,932		Hong Kong		245
	Singapore	3,962	2,311		India		59
	Uganda	1,527	1,701		Malaya, Federation of		32
	Thailand	929	2,880		New Zealand		552
	Australian States :	447,650	284,926		Denmark		194
	Victoria	906	781		France		48
	Queensland	100	177		Germany, Federal Republic of		1,422
	Tasmania	12,762	11,094		Hungary		37
	Total	13,768	12,052		Italy		374
		461,418	296,978		Japan		5,718
64310	<i>Shooks and Staves—</i>				Netherlands		11
	Malaya, Federation of	2,270	1,005		Norway		82
	Australian States :	92	180		Philippines		20
	South Australia	92	180		Spain		14
	Total	2,362	1,185		Sweden		1,094
64410	<i>Sawn Timber, Dressed or Moulded—</i>				Switzerland		28
	<i>Overseas (b)—</i>				Thailand		598
	<i>Flooring (b)—</i>				Yugoslavia		14
	Sweden	4,385	3,182		United States of America		903
	Yugoslavia	567	404				
	Total	4,952	3,586				13,122

(a) Interstate Imports included in Item 64190.

(b) Interstate Imports of Flooring included in Item 64490.

(c) Interstate Imports included in Item 65290.

APPENDIX 2B—continued

Imports into Western Australia of Timber, Tanning Substances and Essential Oils for Year ended 30th June, 1963

Item No.	Item and Origin	Quantity	Value	Item No.	Item and Origin	Quantity	Value
	Australian States : New South Wales ..... £ 15,894 Victoria ..... 24,730 Queensland ..... 5,581 South Australia ..... 8,036 Tasmania ..... 51	sq. ft.	£	16010	Tanning Substances— Bark : Australian States : South Australia ..... cwt. 9 £ 42	cwt.	£
	Total ..... 54,292				Extracts of Natural Origin— Overseas : Wattle Bark Extract— South Africa, Republic of ..... 3,743 11,638 Other— United Kingdom ..... 20 185 Norway ..... 200 225		
90814	Furniture of any Material—			16110	Australian States : Victoria ..... cwt. 25 £ 180		
90899	United Kingdom ..... 33,380 Canada ..... 3 Hong Kong ..... 29,584 India ..... 29 Malaya, Federation of ..... 1 New Zealand ..... 37 Singapore ..... 957 Australia (Re-imported) ..... 18 China, Republic of Formosa ..... 1 China, Republic of Mainland ..... 139 Denmark ..... 1,243 France ..... 6 Germany, Federal Republic of ..... 804 Italy ..... 684 Japan ..... 5,069 Netherlands ..... 2,443 Norway ..... 4,380 Poland ..... 2 South Africa, Republic of ..... 181 Sweden ..... 372 Switzerland ..... 23 Thailand ..... 5 United States of America ..... 4,778			16190	Total ..... 3,988 12,228		
	Total ..... 67,414			16200	Other Tanning Substances of Natural Origin Peru ..... 98 288		
	Australian States : New South Wales ..... £ 223,599 Victoria ..... 191,926 Queensland ..... 2,597 South Australia ..... 236,456 Tasmania ..... 78				Australian States : New South Wales ..... cwt. 608 £ 2,090 Victoria ..... 248 1,601 South Australia ..... 401 3,163		
	Total ..... 84,139				Total ..... 1,257 6,854		
	Australian States : New South Wales ..... £ 223,599 Victoria ..... 191,926 Queensland ..... 2,597 South Australia ..... 236,456 Tasmania ..... 78			87010	Essential Oils Natural Non-spirituous—	lb.	
	Total ..... 738,795			87290	United Kingdom ..... 13 40 India ..... 397 279 Malaya Federation of ..... 505 1,108 Seychelles ..... 977 431 China, Republic of Formosa ..... 3,600 1,795 China, Republic of Mainland ..... 5,871 3,617 France ..... 248 632 Italy ..... 27 83 Japan ..... 15 8 Malagasy ..... 4,399 1,800 Netherlands ..... 112 65 South Africa, Republic of ..... 85,051 13,133 United States of America ..... 1,713 3,508		
	Australian States : New South Wales ..... £ 7,514 Victoria ..... 4,962 Tasmania ..... 56,160				Australian States : New South Wales ..... lb. 2,719 £ 647 Victoria ..... 3,594 5,172 South Australia ..... 14,183 5,176		
92508	Clothes Pegs of any Material—	Gross			Total ..... 102,928 26,499		
	Hong Kong ..... 2,000 237				Australian States : New South Wales ..... lb. 2,719 £ 647 Victoria ..... 3,594 5,172 South Australia ..... 14,183 5,176		
	Czechoslovakia ..... 3,000 320				Total ..... 20,496 10,995		
	Denmark ..... 1,000 273				Total ..... 123,424 37,494		
	Netherlands ..... 2,860 689				<b>Total Value of all Imports shown on this Return</b> ..... 1,960,678		
	Norway ..... 8,100 2,991						
	Sweden ..... 7,826 1,188						
	Australian States : New South Wales ..... Gross £ 7,514 Victoria ..... 4,962 Tasmania ..... 56,160	24,786	5,678				
	Total ..... 68,636 26,755						
	Total ..... 93,422 32,433						
96450	Tool Handles, Unattached, of any Material—	Dozen					
	United Kingdom ..... 1,390 3,214						
	Canada ..... 24 216						
	Sweden ..... 108 27						
	United States of America ..... 645 1,623						
	Australian States : New South Wales ..... dozen £ 8,952 Victoria ..... 3,415 Queensland ..... 11,851 South Australia ..... 18 Tasmania ..... 63	2,167	5,080				
	Total ..... 24,299						
	Total ..... 29,379						
	<b>Total, Wood Manufactures</b> ..... 985,807						

Basis of Value

Overseas—F.O.B. Port of Shipment  
Interstate—Landed cost in Western Australia

APPENDIX 3

Summary of Exports of Forest Produce since 1836

Year	Timber		Year	Timber		Wood Manu-	Tanning	Essential
	Cub. ft.	Value		Cub. ft.	Value	factures	Materials	Oils
		£			£	£	£	£
1836 (a)....	10,000	2,500	1901 ....	7,150,600	572,354	£	£	£
1837 ....	....	....	1902 ....	6,256,750	500,533	....	....	....
1838 ....	....	....	1903 ....	7,748,450	619,705	....	859	....
1839 ....	....	....	1904 ....	8,072,300	654,949	....	32,876	....
1840 ....	....	....	1905 ....	8,709,500	689,943	....	154,087	....
1841 ....	....	....	1906 ....	(c) 8,830,700	708,993	....	140,720	....
1842 ....	....	....	1907 ....	(c) 6,409,550	511,923	....	98,773	....
1843 ....	....	....	1908 ....	(c) 9,869,509	813,591	....	79,934	....
1844 ....	(b)	163	1909 ....	(c) 10,830,450	867,419	....	59,633	....
1845 ....	....	....	1910 ....	(c) 12,074,100	972,698	....	93,733	....
1846 ....	2,550	255	1911 ....	(c) 12,449,500	986,341	....	83,470	....
1847 ....	12,200	1,120	1912 ....	(c) 11,297,100	903,396	....	49,004	....
1848 ....	3,350	333	1913 ....	(c) 13,619,850	1,089,481	....	47,377	....
1849 ....	....	....	1914 (d) ....	(c) 6,279,750	502,153	....	18,197	777
1850 ....	10,500	1,048	1915 (e) ....	(c) 9,968,500	808,392	....	6,127	381
1851 ....	1,250	268	1916 (e) ....	5,432,100	441,991	....	10,208	1,102
1852 ....	7,050	806	1917 (e) ....	3,890,650	310,893	....	18,959	2,060
1853 ....	52,200	5,220	1918 (e) ....	3,436,250	274,141	....	16,886	3,995
1854 ....	58,500	7,023	1919 (e) ....	4,135,750	332,584	11,535	18,875	3,987
1855 ....	76,900	12,076	1920 (e) ....	5,065,300	465,731	21,935	22,121	3,704
1856 ....	70,500	9,671	1921 (e) ....	9,816,250	1,137,819	24,916	23,073	10,107
1857 ....	69,200	9,449	1922 (e) ....	8,309,750	1,041,047	22,248	13,328	6,878
1858 ....	29,250	2,340	1923 (e) ....	7,911,310	997,454	12,377	21,161	20,075
1859 ....	67,250	6,051	1924 (e) ....	11,126,861	1,367,517	11,505	29,606	39,877
1860 ....	54,800	4,932	1925 (e) ....	11,844,303	1,477,997	13,298	40,136	42,057
1861 ....	27,750	2,497	1926 (e) ....	12,001,384	1,522,958	10,072	15,056	47,819
1862 ....	68,800	7,151	1927 (e) ....	12,580,262	1,651,149	8,727	15,818	26,544
1863 ....	32,900	2,963	1928 (e) ....	10,384,784	1,265,383	7,783	27,662	39,131
1864 ....	58,300	5,508	1929 (e) ....	7,635,237	960,435	6,603	35,850	63,307
1865 ....	183,950	15,693	1930 (e) ....	6,579,743	807,425	4,687	40,628	77,510
1866 ....	85,650	6,849	1931 (e) ....	4,127,856	507,382	26,615	35,333	56,170
1867 ....	56,750	4,541	1932 (e) ....	3,062,673	361,700	85,488	42,016	59,301
1868 ....	8,000	638	1933 (e) ....	2,235,540	262,617	80,332	33,352	26,331
1869 ....	179,900	14,273	1934 (e) ....	4,060,830	487,248	76,107	20,904	26,720
1870 ....	157,200	17,551	1935 (e) ....	5,326,117	636,466	65,494	15,284	35,363
1871 ....	218,500	15,304	1936 (e) ....	5,598,180	697,522	50,665	12,237	27,526
1872 ....	37,000	2,590	1937 (e) ....	5,673,903	699,684	52,338	14,491	38,185
1873 ....	68,150	4,771	1938 (e) ....	7,545,744	932,420	47,934	13,865	35,128
1874 ....	345,600	24,192	1939 (e) ....	5,704,250	722,310	43,518	17,842	25,550
1875 ....	342,350	23,965	1940 (e) ....	5,049,585	634,859	62,796	19,485	47,736
1876 ....	219,050	23,743	1941 (e) ....	6,091,187	790,876	74,935	13,686	59,867
1877 ....	336,150	26,979	1942 (e) ....	5,244,634	700,474	64,454	6,896	74,904
1878 ....	580,900	63,902	1943 (e) ....	3,516,566	605,327	32,426	1,598	70,523
1879 ....	627,250	69,742	1944 (e) ....	3,645,354	613,994	25,324	1,294	72,704
1880 ....	662,550	66,252	1945 (e) ....	2,851,475	570,028	27,307	2,795	103,055
1881 ....	792,750	79,277	1946 (e) ....	3,373,025	722,061	(f) 2,618	4,872	128,050
1882 ....	936,500	93,650	1947 (e) ....	3,458,628	865,255	(f) 13,118	12,056	151,768
1883 ....	997,000	79,760	1948 (e) ....	3,584,405	1,099,073	(f) 6,572	9,556	116,465
1884 ....	861,700	68,936	1949 (e) ....	3,198,212	993,152	(f) 6,639	5,112	75,395
1885 ....	848,150	67,850	1950 (e) ....	2,857,946	974,493	(f) 13,525	8,243	78,550
1886 ....	626,150	50,902	1951 (e) ....	2,342,492	(g) 918,485	(f) 25,101	16,581	125,833
1887 ....	354,800	28,384	1952 (e) ....	2,373,553	(g) 1,032,909	(f) 47,689	19,120	119,109
1888 ....	525,570	42,060	1953 (e) ....	3,965,188	(g) 2,074,421	(f) 120,095	34,136	70,852
1889 ....	788,500	63,080	1954 (e) ....	3,858,956	(g) 2,248,320	(f) 59,360	80,248	55,273
1890 ....	1,172,200	82,052	1955 (e) ....	3,477,249	(g) 1,935,019	(f) 79,893	37,338	80,822
1891 ....	1,273,950	89,179	1956 (e) ....	4,568,034	(g) 2,818,716	(f) 119,459	554,760	90,928
1892 ....	1,082,650	78,419	1957 (e) ....	4,684,017	(g) 3,256,719	(f) 78,934	588,544	58,993
1893 ....	512,950	33,888	1958 (e) ....	5,572,681	(g) 3,875,705	(f) 39,762	337,655	101,814
1894 ....	1,063,700	74,804	1959 (e) ....	6,461,535	(g) 4,373,218	(f) 41,612	259,046	52,843
1895 ....	1,255,250	88,146	1960 (e) ....	6,133,240	(g) 4,160,354	(f) 20,549	366,606	63,905
1896 ....	1,545,600	116,420	1961 (e) ....	5,533,847	(g) 3,838,387	(f) 25,305	201,957	95,475
1897 ....	2,393,300	192,451	1962 (e) ....	5,660,937	(g) 3,993,663	(f) 194,380	281,364	81,506
1898 ....	4,086,150	326,195	1963 (e) ....	5,484,259	(g) 3,966,697	(f) 255,190	254,726	70,402
1899 ....	6,913,550	553,198	1964 (e) ....	5,266,329	(g) 3,686,732	(f) 272,187	322,916	88,666
1900 ....	5,725,400	458,461	Total ....	449,863,161	84,433,342	2,394,215	4,860,161	2,853,891

(a) The exports up to the year 1834 consisted only of supplies to shipping, of which no record is kept.

(b) Not available.

(c) Approximate figures only.

(d) Six months ended 30th June.

(e) Year ended 30th June.

(f) Excludes Casks (principally empty returns) previously included in this item.

(g) Includes items for which the quantity in cub. ft. is not available.

APPENDIX 4

Summary of Imports of Timber, Tanning Materials and Essential Oils, since 1848

Year	Timber, Woodware, etc.	Tanning Materials	Essential Oils	Year	Timber, Woodware, etc.	Tanning Materials	Essential Oils
	£	£	£		£	£	£
1848	464			1900	56,266	1,416	1,105
1849				1901	80,134	1,740	1,546
1850	189			1902	97,810	3,418	1,751
1851	3,216			1903	102,383	3,556	1,348
1852	2,479			1904	157,856	1,322	2,122
1853	790			1905	98,494	582	1,592
1854	831			1906	95,229	1,412	1,915
1855	1,464			1907	122,016	2,767	1,549
1856	1,124			1908	93,205	2,392	4,584
1857	744			1909	90,502	4,129	4,033
1858	1,528			1910	171,280	3,531	3,686
1859	690			1911	152,133	2,912	4,938
1860	2,005			1912	167,244	3,089	4,598
1861	1,459			1913	202,640	2,651	5,392
1862	1,920			1914	78,736	629	2,823
1863	1,568			1914-15	107,763	2,082	4,988
1864	894			1915-16	76,849	3,313	4,788
1865	548			1916-17	75,681	2,848	3,848
1866	1,442			1917-18	58,305	2,020	4,358
1867	1,727			1918-19	62,824	1,181	4,168
1868	1,451			1919-20	100,083	3,748	10,043
1869	1,408			1920-21	171,654	*4,899	6,106
1870	1,518			1921-22	92,448	5,865	6,577
1871	736			1922-23	109,428	6,991	4,033
1872	1,660			1923-24	133,983	2,790	3,301
1873	1,008			1924-25	161,893	2,670	4,429
1874	1,774			1925-26	144,989	5,826	4,449
1875	2,707			1926-27	162,193	8,971	4,254
1876	3,098			1927-28	183,196	9,648	6,955
1877	2,036			1928-29	241,601	6,894	4,413
1878	2,947			1929-30	197,532	10,825	3,980
1879	2,340			1930-31	76,533	4,145	3,160
1880	3,061			1931-32	164,496	4,705	3,505
1881	3,639			1932-33	197,916	4,903	3,421
1882	3,692			1933-34	183,944	4,310	3,888
1883	6,667			1934-35	211,056	4,076	5,040
1884	2,930			1935-36	228,451	5,401	3,921
1885	11,479			1936-37	257,164	5,267	4,810
1886	17,888			1937-38	270,126	4,777	6,560
1887	8,136			1938-39	254,315	3,974	7,014
1888	4,461			1939-40	259,399	6,802	23,027
1889	7,686			1940-41	249,111	3,798	32,399
1890	14,979			1941-42	283,611	15,846	33,828
1891	18,406			1942-43	163,480	6,250	47,718
1892	26,713			1943-44	149,928	7,883	68,871
1893	14,493			1944-45	148,838	9,264	75,449
1894	17,964			1945-46	†219,466	19,573	56,295
1895	47,128			1946-47	386,465	12,395	78,091
1896	5,381			1947-48	345,508	8,019	96,769
1897	164,552			1948-49	470,755	8,662	42,926
1898	55,566			1949-50	521,815	24,923	51,197
1899	45,689			1950-51	640,059	21,147	161,358
				1951-52	1,037,499	18,494	167,697
				1952-53	509,667	21,493	69,804
				1953-54	923,367	45,202	58,019
				1954-55	816,052	27,395	76,464
				1955-56	839,581	27,315	131,758
				1956-57	830,700	35,403	99,863
				1957-58	873,520	28,310	101,680
				1958-59	815,300	9,365	62,983
				1959-60	895,845	14,608	74,199
				1960-61	1,203,641	12,621	60,942
				1961-62	1,236,106	13,853	130,876
				1962-63	1,978,937	9,868	63,739
				1963-64	1,903,772	19,412	37,494
				Total	24,021,083	575,576	2,068,043

\* This and subsequent years include tanning extracts, not previously recorded.

† This and subsequent years include values for furniture, bamboo, cane, etc., not previously included.

APPENDIX 5

SUMMARY OF LOG VOLUMES PRODUCED IN WESTERN AUSTRALIA SINCE 1829

Year	*Crown Land	Private Property	Total	Year	*Crown Land	Private Property	Total
1829-1916†	Cubic feet	Cubic feet	Cubic feet		Cubic feet	Cubic feet	Cubic feet
1917 (a) ....	19,333,100	2,144,500	21,477,600	1939 (c) ....	29,247,650	11,086,000	40,333,650
1918 (b) ....	7,665,550	504,950	8,170,500	1940 (c) ....	27,660,100	9,139,550	36,799,650
1919 (c) ....	19,987,050	3,390,450	23,377,500	1941 (c) ....	28,089,200	10,289,000	38,378,200
1920 (c) ....	28,292,200	5,762,900	34,055,100	1942 (c) ....	26,636,650	5,633,400	32,270,050
1921 (c) ....	29,308,950	7,018,450	36,327,400	1943 (c) ....	23,604,900	4,322,950	27,927,850
1922 (c) ....	36,122,400	15,640,150	51,762,550	1944 (c) ....	22,252,500	4,456,200	26,708,700
1923 (c) ....	26,807,300	9,867,050	36,674,350	1945 (c) ....	21,970,000	4,309,550	26,279,550
1924 (c) ....	42,004,450	9,342,800	51,347,250	1946 (c) ....	21,126,500	5,482,350	26,608,850
1925 (c) ....	43,832,900	18,142,250	61,975,150	1947 (c) ....	21,948,550	7,831,950	29,780,500
1926 (c) ....	48,823,750	25,037,600	73,861,350	1948 (c) ....	22,251,350	8,871,900	31,123,250
1927 (c) ....	46,887,600	31,356,100	78,243,700	1949 (c) ....	20,261,800	9,814,300	30,076,100
1928 (c) ....	42,781,250	23,334,450	66,115,700	1950 (c) ....	21,081,150	9,932,650	31,013,800
1929 (c) ....	32,289,750	11,098,950	43,388,700	1951 (c) ....	25,391,450	10,713,050	36,104,500
1930 (c) ....	31,654,150	11,653,600	43,307,750	1952 (c) ....	28,942,550	11,938,300	40,880,850
1931 (c) ....	18,822,600	12,148,500	30,971,100	1953 (c) ....	34,223,400	13,021,400	47,244,800
1932 (c) ....	11,742,850	4,115,950	15,858,800	1954 (c) ....	37,485,950	13,562,000	51,047,950
1933 (c) ....	13,165,650	2,456,650	15,622,300	1955 (c) ....	37,467,650	15,195,450	52,663,100
1934 (c) ....	21,263,100	6,330,400	27,593,500	1956 (c) ....	39,811,350	13,773,350	53,584,700
1935 (c) ....	27,458,250	11,451,750	38,910,000	1957 (c) ....	39,426,100	11,585,350	51,011,450
1936 (c) ....	31,400,600	13,436,150	44,836,750	1958 (c) ....	39,069,500	12,397,450	51,466,950
1937 (c) ....	31,703,850	15,902,200	47,606,050	1959 (c) ....	40,533,471	13,756,198	54,289,669
1938 (c) ....	31,737,450	15,928,950	47,666,400	1960 (c) ....	38,882,048	12,017,553	50,899,601
				1961 (c) ....	37,752,774	10,818,790	48,571,564
				1962 (c) ....	39,243,552	9,789,268	49,032,820
				1963 (c) ....	38,671,715	9,831,552	48,503,267
				1964 (c) ....	39,431,089	10,220,000	49,651,089
				Total ....	....	....	2,624,669,810

\* Includes State Forest Timber Reserves, Crown Land and Private Property (Timber Reserved).

† Estimated.

(a) Year ended 31st December.

(b) Six months ended 30th June.

(c) Year ended 30th June.