

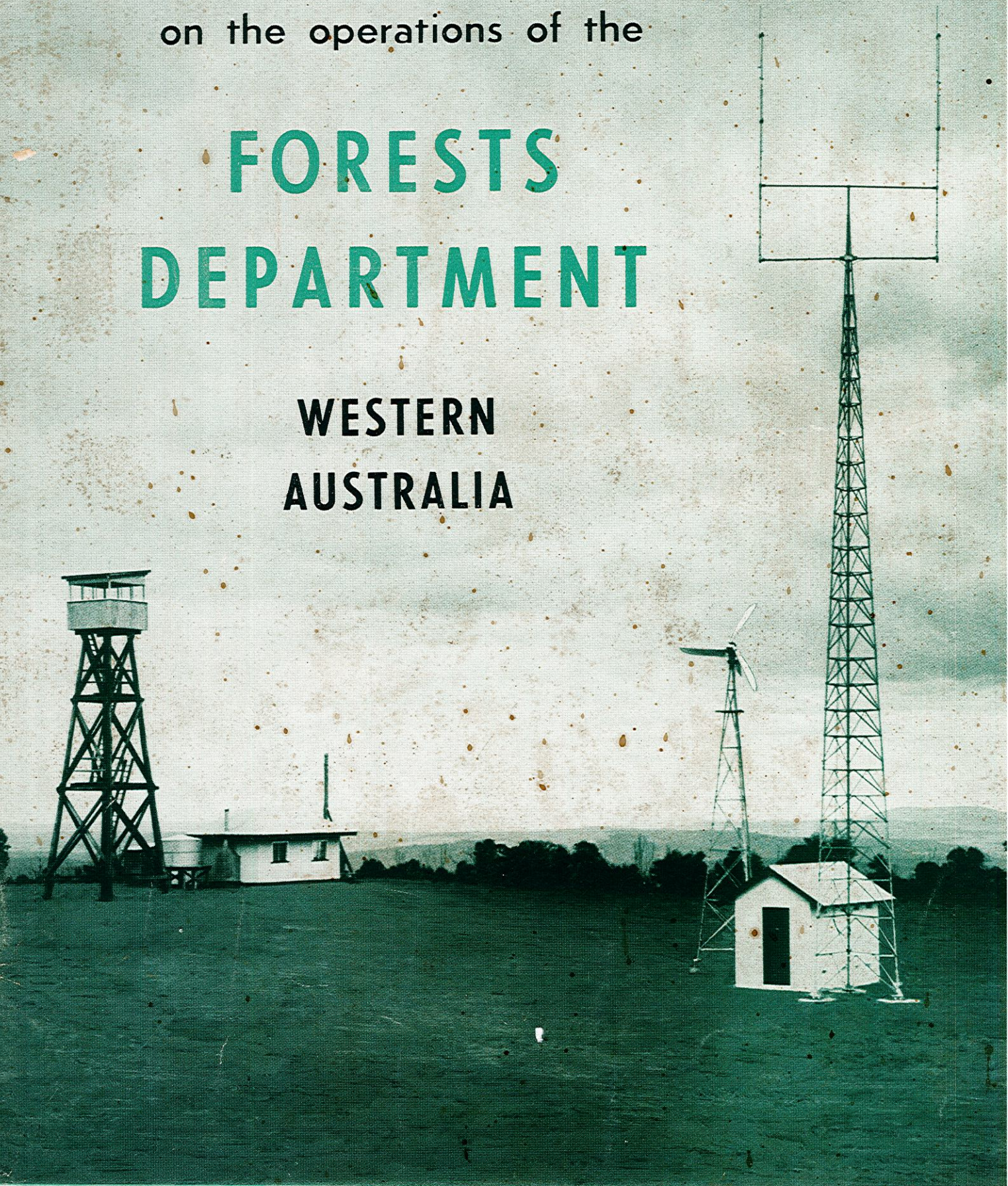
Report

2-3

on the operations of the

FORESTS DEPARTMENT

WESTERN
AUSTRALIA



FOR THE YEAR ENDED 30th JUNE
A radio repeater station installation on
Mount Wells in the Dwellingup Division
showing the windcharger for charging batteries
and the fire lookout tower and towerman's
hut.

A. C. HARRIS, B.Sc. (Ael), A.A.I.M.M. CONSERVATOR OF FORESTS

REPORT

on the operations of the

FORESTS DEPARTMENT

WESTERN AUSTRALIA

for the year ended

30th JUNE, 1963

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, 1963

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, 1963.

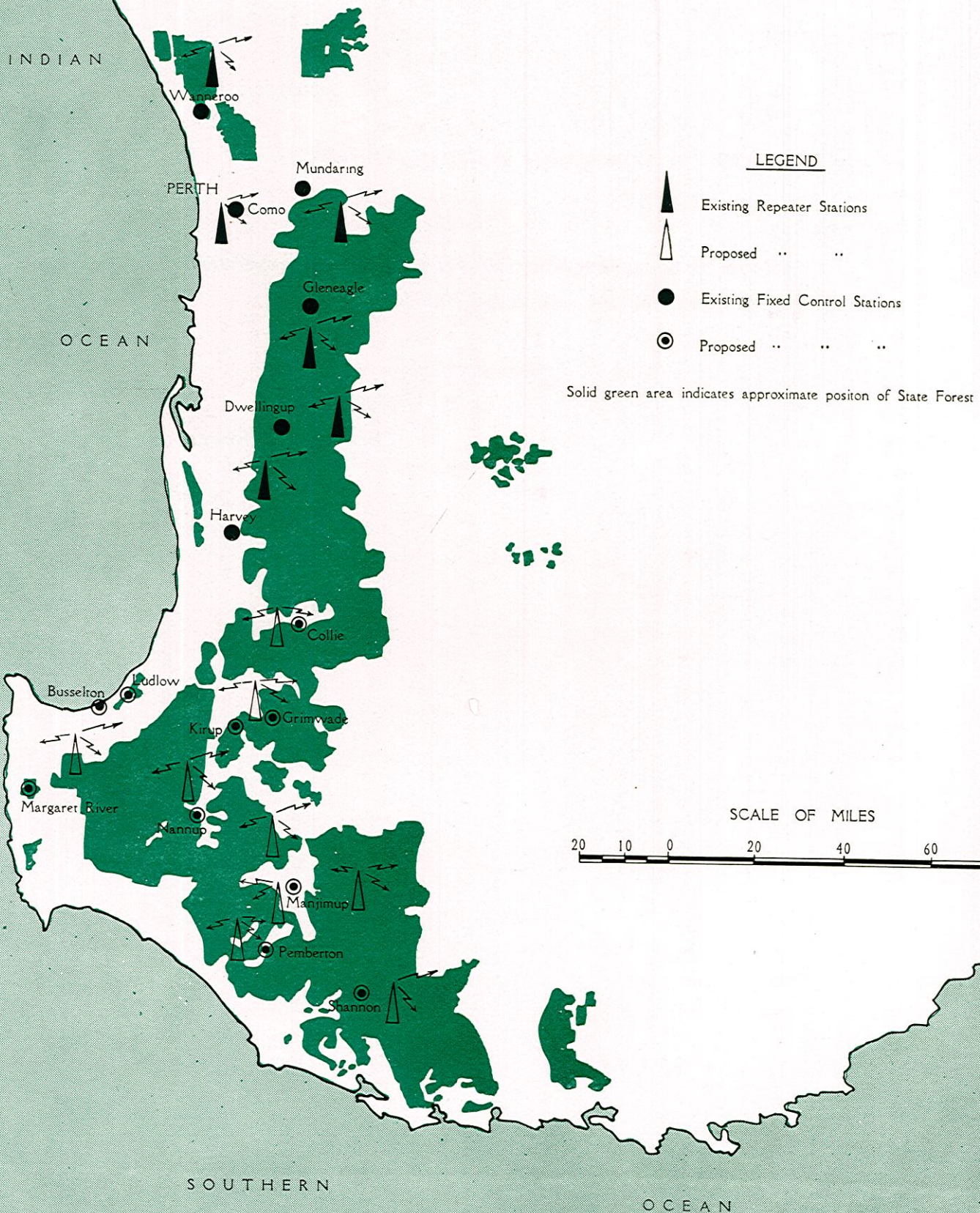
Yours faithfully,

A. C. HARRIS,

Conservator of Forests.

V. H. F. RADIO INSTALLATIONS

EXISTING AND PROPOSED



CONTENTS

SECTIONS	Page
1. Statistical Summary of Major Operations	7
2. Revenue and Expenditure	9
3. The Forest Area—	
State Forests	9
Timber Reserves under Forest Act	9
Land Released	9
4. Sawmilling, Timber Inspection and Forest Produce—	
Timber Production and Distribution	10
Firewood Production and Consumption	11
Other Forest Produce	11
Sandalwood	12
5. Timber Utilisation	12
6. Forest Management—	
Surveys and Map Production	13
Working Plans	13
Forest Engineering	13
Departmental Buildings	14
Communications	14
7. Reforestation	16
8. Afforestation	16
9. Protection—	
Fire Protection	19
Protection from Insects	20
Protection from harmful plants	21
10. Silviculture, Soils and Fire Research—	
Karri Silviculture	22
Jarrah Silviculture	23
Pine Silviculture	24
Soils Research	24
Fire Research	25
11. Library	25
12. Forest Economics	25
13. Education and Publicity	27
14. Timber Industry Regulation Act	27
15. Forest Offences	27
16. Employment in Forestry and Timber Industry	27
17. Staff Matters	28
18. British Commonwealth Forestry Conference	28

APPENDICES

1. Revenue and Expenditure Statements for the year ended 30th June, 1962—	
(a) Consolidated Revenue Fund	29
(b) Forest Improvement and Reforestation Fund	29
(c) Afforestation Expenditure	30
(d) Distribution of Expenditure	30
2. Exports and Imports for the year ended 30th June, 1962—	
(a) Exports of Timber, Tanning Substances, Sandalwood and Essential Oils	31
(b) Imports of Timber, Tanning Substances, Sandalwood and Essential Oils	33
3. Summary of Exports of Forest Produce since 1836	35
4. Summary of Imports of Timber, Tanning Materials and Essential Oils since 1848	36
5. Summary of Log Production	37
6. Extract of the Resolutions of the 8th British Commonwealth Forestry Conference	37

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 (Research Arboriculture and the Interior)						G. E. E. BROCKWAY, B.Sc. (Adel.).
Superintendent (Pine Plantations and Forest Management)						G. W. M. NUNN, B.Sc. (For.), Dip.For. (Canb.), M.I.S. (Aust.).
Superintendent (Development and South-West)	....					D. W. R. STEWART, B.Sc. (For.), Dip.For. (Canb.), Dip.For. (Oxon.).
Fire Control Superintendent	....	....	....	....	....	A. J. MILESI, B.Sc. (Adel.).
Utilisation Officer	....	....	....	....	....	H. C. WICKETT, M.Sc. (Adel.), B.For.Sc. (N.Z.), A.M.I.E. (Aust.), Dip.For. (Canb.).
Regional Inspector	....	....	....	....	....	D. R. MOORE, B.Sc. (Adel.).
Secretary	....	....	....	....	....	E. S. BUDD.
Accountant	....	....	....	....	....	A. B. TENGER, A.A.S.A.
Registrar	....	....	....	....	....	R. K. REID.

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

Brown Mallet	....	....	....	....	....	<i>Eucalyptus astringens.</i>
Canary Island Pine	....	....	....	....	....	<i>Pinus canariensis.</i>
Christmas Tree	....	....	....	....	....	<i>Nuytsia floribunda.</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	....	....	....	....	....	<i>Pinus pinaster.</i>
Monterey 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>
Tuart	....	....	....	....	....	<i>Eucalyptus gomphocephala.</i>
Western Australian Blackbutt (Yarri)	....	....	....	....	....	<i>Eucalyptus patens.</i>
Wandoo	....	....	....	....	....	<i>Eucalyptus redunca var. elata.</i>

FORESTS DEPARTMENT

I. STATISTICAL SUMMARY OF MAJOR OPERATIONS

Timber Production (in cubic feet).

Total Production Sawn Timber	.....	.....	.....	.....	.....	15,593,099
Exports—Interstate	.....	.....	.....	.....	.....	2,807,081 (18 per cent.)
Overseas	.....	.....	.....	.....	.....	2,675,432 (17·2 per cent.)
Local Consumption	.....	.....	.....	.....	.....	10,110,586 (64·8 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

Total Cut

Log Volumes (in cubic feet)	48,503,267	{ Jarrah 35,772,749 Karri 8,030,114 Wandoo 2,553,005 Pine 1,493,015 Other 654,384
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Made up as follows :—

From State Forest and Crown Land	38,671,715 (80 per cent.)
From Private Property	9,831,552 (20 per cent.)

Value Produced

Total Value Sawn Timber (on mill skids)	.....	.....	.....	.....	£10,851,950
Total Value of Other Forest Products	.....	.....	.....	.....	£2,487,750

Source and use of Funds

Source :	1962-63	1961-62
Revenue—		
Royalties on Timber, etc.	988,731	963,602
Departmental Sales of Logs, etc.	486,135	475,682
	<hr/>	<hr/>
General Loan Fund	1,474,866	1,439,284
Federal Aid Road Grant	125,000	125,000
	76,000	76,000
	<hr/>	<hr/>
	1,675,866	1,640,284
	<hr/>	<hr/>
Use :		
Consolidated Revenue Fund	486,113	445,860
Reforestation Fund	941,266	930,203
General Loan Fund	125,000	125,000
Treasury Employment Relief Funds	68,498	100,614
	<hr/>	<hr/>
	1,620,877	1,601,677
	<hr/>	<hr/>

Forest Area

Additions to State Forest	....	....	....	....	....	....	....	....	108,571 acres
Excisions from State Forest	....	....	....	....	....	....	....	....	2,218 „
Land purchased for Pine Planting	....	....	....	....	....	....	....	....	300 „
Total Area of State Forest	....	....	....	....	....	....	....	....	4,454,309 „
Area of National Parks (approx.)	320,900 „

Reforestation

Cut-over area treated for regeneration	60,777 „
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Afforestation

Area planted with pines, 1962	2,335 „
Area cleared for pines	2,314 „
Area soil surveyed for pines—									
Detailed Surveys	....	....	....	....	....	....	....	....	7,240 „
Reconnaissance Surveys	....	....	....	....	....	....	....	....	31,370 „
Total area of pine plantation established	....	....	....	....	....	....	....	....	35,655 „
Total experimental area (additional)	....	....	....	....	....	....	....	....	916 „

Management

Survey :—

Theodolite Surveys	....	....	....	....	....	....	....	....	120 miles
Other Surveys	....	....	....	....	....	....	....	....	110 „
Map Sheet Compilation	1,880 sq. miles

Assessment :—

Air Photo Interpretation	1,084,000 acres
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Engineering, new works :—

Roads and Tracks	437 miles
Telephone Lines	9 „
Houses and Buildings (No.)	7

Protection

Controlled burning	582,336 acres
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Fire Outbreaks :—

Number	231
Area burnt	9,960 acres

Nurseries

Hamel and Dryandra :—

Trees produced for—

Forest Department	....	....	....	....	....	....	....	....	145,947
Private Buyers	84,338

Plantation Nurseries :—

Pine Plantation Stock	2.5 million
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Sandalwood

Quantity exported	469 tons
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Eight

2. REVENUE AND EXPENDITURE

Revenue from all sources was £1,474,866 compared with £1,439,284 the previous year. Of the net revenue, £907,149 (£897,949) was transferred to the Forests Improvement and Reforestation Fund. Expenditure charged against this Fund was £941,266 (£930,203) and the balance in the fund at 30/6/63 was £204,001 (£144,006) which included a Fire Control Reserve of £100,000.

Thinning operations in Departmental pine plantations returned a profit of £80,959 (£60,048) for the year.

3. THE FOREST AREA

State Forests (Forests Act, 1918-1954)

The total area of State Forest at 30/6/1963 was 4,454,309 acres which is an increase of 106,353 acres compared with the total area at 30/6/1962. In the 10 years since 30/6/1953 the area of State Forest dedicated has increased by 994,217 acres.

During the year, additions totalling 108,571 acres were made to State Forest and 2,218 acres were excised and reverted to the Lands Department.

The development of metropolitan and country water supplies and the expansion of electric power throughout the South-West has resulted in the destruction of some 7,300 acres of State Forest during recent years. The productive capacity of this area is therefore forever lost to Forestry and the Timber Industry of this State. Over 5,200 acres have been inundated, while nearly 2,100 acres have been cleared for the construction of power lines.

	June, 1962 Acres	June, 1963 Acres
Jarrah	3,175,237	3,187,853
Karri	170,987	171,047
Jarrah and Karri (mixed)	654,050	654,320
Jarrah and Wandoo (mixed)	81,500	176,815
Tuart	5,995	5,995
Tingle Tingle	10,778	10,726
Karri and Tingle (mixed)	13,885	13,885
Sandalwood	1,930	1,930
Pine Planting	174,555	174,555
Mallet	58,887	57,031
Miscellaneous	152	152
	<u>4,347,956</u>	<u>4,454,309</u>

Timber Reserves (Forests Act, 1918-1954)

The area held under Timber Reserve at 30/6/1963 was 1,839,351 acres, which is an increase of 54,105 acres on the area at 30/6/1962.

	June, 1962 Acres	June, 1963 Acres
Jarrah	74,590	82,020
Wandoo and Jarrah		50,260
Pine Planting	5,908	5,908
Mallet	648	648
Sandalwood	23,100	23,100
Mining Timber, Firewood, etc.	1,681,000	1,677,415
	<u>1,785,246</u>	<u>1,839,351</u>

Land Alienations, etc.

During the year ended 30/6/63, 236 applications for land were received, covering a total of 820,597 acres.

The Department agreed to the release of land 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 12,072	acres 15,630	acres 40,172	acres 2,501	acres 1,182	acres 672,939

4. SAWMILLING, TIMBER INSPECTION AND FOREST PRODUCE

Timber Production and Distribution

The production of 15,593,099 cubic feet of sawn timber was a decrease of 207,968 cubic feet on last year's figure. Of this total production, 3,160,844 cubic feet were obtained from private property, an increase of 6,742 on last year.

During the year ended 31st December, 1962, 221 mills were registered, of which 114 operated on Crown Land and 107 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 (1829-1963) is shown in Appendix 5.

Departmental plantations yielded 1,461,008 cubic feet of pine thinnings which was an increase of 1.8 per cent. on last year's figure.

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

	Cubic feet
Karri	104,423
Pine	79,156
	183,579

Sawn sleepers produced during the year amounted to 3,875,980 cubic feet, of which 1,433,589 cubic feet were from private property. Of the sleepers produced 3,789,325 cubic feet were inspected and a further quantity of 8,850 cubic feet were re-inspected during the year. Other sawn timber inspected during the year totalled 879,027 cubic feet.

Distribution	Sleepers		Other Sawn Timber		Total
	Karri	Jarrah and Other Species	Karri	Jarrah and Other Species	
	cub. ft.	cub. ft.	cub. ft.	cub. ft.	cub. ft.
Interstate	Nil	443,085	880,977	1,483,019	2,807,081
Overseas	Nil	1,870,325	188,540	616,567	2,675,432
Local	Nil	1,562,570	1,647,215	6,900,801	10,110,586
Total	Nil	3,875,980	2,716,732	9,000,387	15,593,099

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		
1961-62	cub. ft. 9,984,947	cub. ft. 2,662,018	cub. ft. 1,674,432	cub. ft. 1,479,670	cub. ft. 15,801,067	£ 10,892,800
1962-63	9,989,864	2,442,391	1,727,255	1,433,589	15,593,099	10,851,950

TIMBER PRODUCTION

PRODUCTION OF TIMBER FOR YEAR ENDED 30th JUNE, 1963 (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	27,835,750	7,578,741	1,257,323	437,117	67,728	8,937	1,461,008	25,111	38,671,715	12,432,255
Private Property	7,936,999	451,373	1,295,682	108,187	4,680	1,816	32,007	808	9,831,552	3,160,844
Total	35,772,749	8,030,114	2,553,005	545,304	72,408	10,753	1,493,015	25,919	48,503,267	15,593,099

In addition to the above, 31,891 tons of wandoo logs were treated for Tannin extract.

Firewood Production and Consumption

The firewood consumption for the State was estimated at 712,847 tons of which 38 per cent. was used for industrial and mining fuel. The quantity of sawdust burnt as fuel was 118,755 tons.

The following table accounts for approximately 53 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 48 per cent. was obtained from Crown land.

	Crown Land Tons	Private Property Tons	Total Tons
<i>Production</i>			
Domestic Firewood—			
Firewood Permits (South-West)	60,316	232	60,548
Mill Waste sold as firewood (estimated 50 per cent. of total)	39,591	16,592	56,183
Domestic use on Goldfields	24,816	.....	24,816
Total Domestic Firewood as shown by returns	124,723	16,824	141,547
Industrial Firewood—			
Supplied under License, Nos. 3 to 8 Pumps	17,949	.....	17,949
Other Pumps	643	.....	643
Factories, etc.	71,982	232	72,214
Mill Waste sold as firewood (estimated 50 per cent. of total)	39,592	16,591	56,183
Mill Waste used as firewood	66,907	1,156	68,063
Total Industrial Firewood as shown by returns	197,073	17,979	215,052
Mining Firewood	24,408	.....	24,408
Total Firewood Produced (as shown by returns)	346,204	34,803	381,007

Consumption

	Tons	
Domestic (estimated)	420,000	(at 2 tons per dwelling)
Industrial	249,847	(ex Govt. Statistician)
Pumping Stations	18,592	(as per F.D. Returns)
Mining	24,408	(as per F.D. Returns)
	<u>712,847</u>	

Other Forest Produce

Piles and Poles obtained from Crown Lands during the year amounted to 709,589 lineal feet compared with 545,392 lineal feet for the year 1961-62. Of this total 39,262 lineal feet were produced from Departmental operations. Returns from private property show a production of 90,702 lineal feet and although this information is not complete the figure is a big reduction on a comparative figure of 341,125 lineal feet for the previous year.

There were approximately 400,700 posts and strainers cut from Crown Lands during the year of which 26,850 were produced by this Department. As few records are received of posts obtained from private property this figure is only a portion of the total production.

Of the total production of 316 tons of Mallet Bark, 98 tons came from thinning on Departmental Mallet plantations, 14 tons from other Crown Land and Reserves and the remaining 204 tons from Private Property.

Eighteen thousand tons of mining timber were used apart from the timber supplied by sawmills. This was nearly all from Crown Lands, 12,420 tons being obtained from inland forests.

The demand for Christmas Trees continues to increase. During the year under review 11,089 trees were produced for a revenue of £1,930.

The following table shows the quantity of minor forest produce obtained during the year. The estimated total value of this forest produce was approximately £2,487,800.

FOREST PRODUCE NOT ELSEWHERE INCLUDED IN PRODUCTION TABLES
OBTAINED DURING YEAR ENDED 30th JUNE, 1963

Description of Forest Produce	South-West Division and Agricultural Areas			Northern, Central and Eastern Goldfields	Totals
	Supplied by Department	Other Crown Lands	Private Property*	Crown Lands	
Mining Timber .....	.....	5,645	3	12,420	18,068
Sleepers for Goldfields Woodline .....	.....	.....	.....	12,503	12,503
Charcoal (includes 38,970 tons ex Wundowie) .....	.....	39,121	.....	.....	39,121
Piles and Poles	39,262	670,327	90,702	.....	800,291
Fence Posts and Rails	25,304	121,790	17,992	246,132	411,218
Strainer Posts	1,553	5,926	.....	.....	7,479
Mallet Bark	98	14	204	.....	316
Wandoo Timber for Tannin Extract .....	.....	8,621	23,270	.....	31,891
Bean Sticks, etc. ....	.....	11,000	.....	5,315	16,315
Boronia Blossom .....	.....	178	347	.....	525
Stone .....	.....	61,483	.....	.....	61,483
Sand .....	.....	263	.....	.....	263
Loam .....	.....	740	.....	.....	740
Scout Staves	144	.....	.....	.....	144
Sawdust consumed as fuel† .....	.....	118,755	.....	.....	118,755

* 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

Stocks of sandalwood at Fremantle remain satisfactory and deliveries from the bush have been sufficient to meet export requirements.

A total of 468 tons was delivered during the year as compared with 729 tons for the year ended 30th June, 1962, and this quantity was made up as follows :—

Crown Lands—	Tons
Logwood (including roots and butts)	449
Pieces	11
Private Property—	
Logwood	8
Total	468

Exports amounted to 469 tons compared with 536 tons for the previous year.

No orders for logwood were placed by the oil distillers, but 80 tons of roots and butts severed from the logwood at Fremantle were delivered to them for distillation purposes.

The quantity of sandalwood oil distilled was 7,127 lb. of which 6,452 lb. was exported interstate and overseas.

5. TIMBER UTILISATION

Timber Industry Conference

In October, 1962, the Australian Timber Industry Stabilisation Conference (Aus.T.I.S.) was held in Western Australia for the first time.

Aus.T.I.S. is a Conference of forestry and timber industry authorities and its actions are based on the concept that permanence and stability are essential in the industries supported by Australian-grown forests.

The 5 day Conference was based at Bunbury and included a 2 day field trip to inspect indigenous and planted forests and associated forest industries in the South-West of the State.

Over 140 delegates and official visitors from all States of the Commonwealth and from New Guinea and New Zealand attended.

The Conference was organised jointly by the Forests Department and the Associated Sawmillers and Timber Merchants of W.A.

Design and Construction

Construction of the Department's new sawmill at Dwellingup is well advanced. This will replace the one destroyed in the 1961 bushfire.

Various items of equipment used in the sawmill have been fully detailed and drawings can be made available to the sawmilling and manufacturing industries if desired.

S.E.C. power was connected to the Grimwade settlement during the year and the pine sawmill at that centre was converted to electric power.

Grading Rules

Two meetings of the Western Australian Joint Timber Committee were held during the year. The draft grading rules for flooring, lining, siding and mouldings were finalised and have since been issued by Standards Association for public review.

Tests of Treated Sleepers

Some 400 marri sleepers were treated, half with creosote at 200 pounds per square inch and half with 3 per cent. pentachlorophenol in fuel oil at 1,000 pounds per square inch. These have been set in the W.A.G.R. lines, one section near Collie and the other near Goomalling.

Durability of Powderback Wandoo

Tests carried out in Canberra by the C.S.I.R.O., Division of Entomology, have shown that Powderbark Wandoo (*Euc. accedens*) is equal to Wandoo (*Euc. redunca var. elata*) in resistance to termite attack. A corresponding test by the Division of Forest Products to determine resistance to fungal attack has not yet been completed.

Equipment in the Sawmilling Industry

It is pleasing to record that modern precision equipment is being introduced into both logging and sawmilling operations, the use of rubber-tyred logging units and the installation of a bandsaw head-rig at one new mill being particularly noteworthy. More general use of bandsaws, giving appreciably higher recovery should help the industry to compete with other materials.

6. FOREST MANAGEMENT

Surveys and Map Production

Higher order surveys carried out during the year amounted to 120 miles of traverse, which in addition to extending the Departmental theodolite control surveys, also provides "control" for air photo mapping.

One hundred and ten miles of compass and chain traverse covered less important roads and tracks not generally defined on current air photos.

Compilation of base sheets for use in mapping of surveys and air photos amounted to 1,880 square miles.

Fair drawing was commenced for the reproduction of a new series of multi-coloured one mile to an inch lithographs covering the South-Western State Forest areas and adjoining property.

In addition to information shown on earlier issues, the new series will incorporate topographical and general details obtained from interpretation of air photos. Two extra printing colours are being introduced to improve clarity and facilitate map reading.

New "temporary" maps—Denmark 80, Dale 80 and Peel Estate 40—were compiled.

The net total area of standard 20 chains to 1 inch maps, including the Goldfields and Eastern Wandoo regions, now amounts to 10,638,000 acres.

Air Photo Interpretation

Over 1,800 photos were received from the State Mapping Committee and resulted in the interpretation of 1,084,000 acres.

Working Plans

Among the projects completed by the Working Plans Offices in the field were:—

- (1) Class I assessment of Crown timber on private property blocks in the Kirup, Manjimup, Pemberton, Shannon River Divisions and the Mount Barker district.
- (2) The pulpwood resources for the area within 50 miles of Pemberton.
- (3) The firewood potential within 50 miles of Augusta.
- (4) The marketable volume available under improvement cutting on certain type areas.

Forest Engineering

Engineering projects during the year included the construction (437 miles) and maintenance (4,535 miles) of forest roads, tracks and firelines. Nine miles of telephone line were erected.

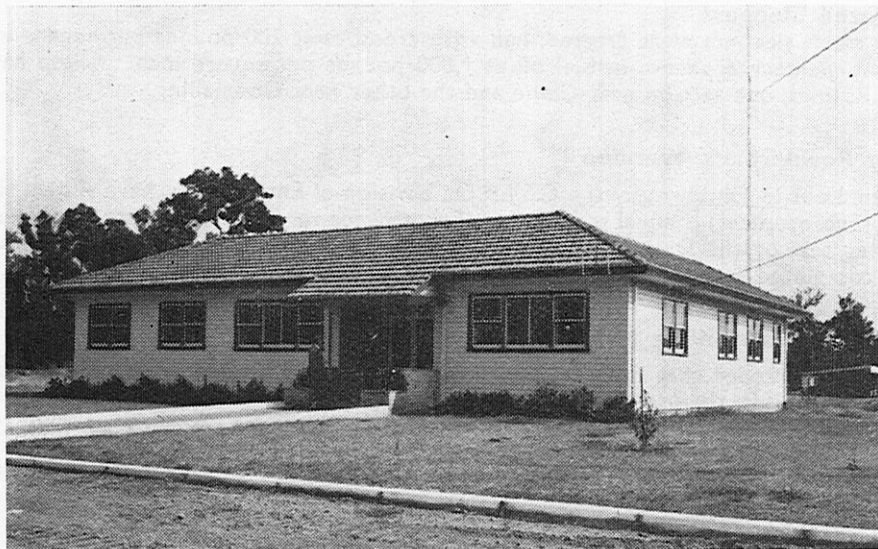
Plant and Equipment

The performance of the Department's plant and equipment was maintained at a high standard and the fabrication of equipment for use by the Department was accelerated during the year.

Following the successful construction and testing of an experimental "fireline plough" last year, additional units were fabricated for field use. Sawmilling equipment, tanks and hose reels, front mounted blades for wheel tractors, a pine seedling lifter and jib cranes were also constructed.

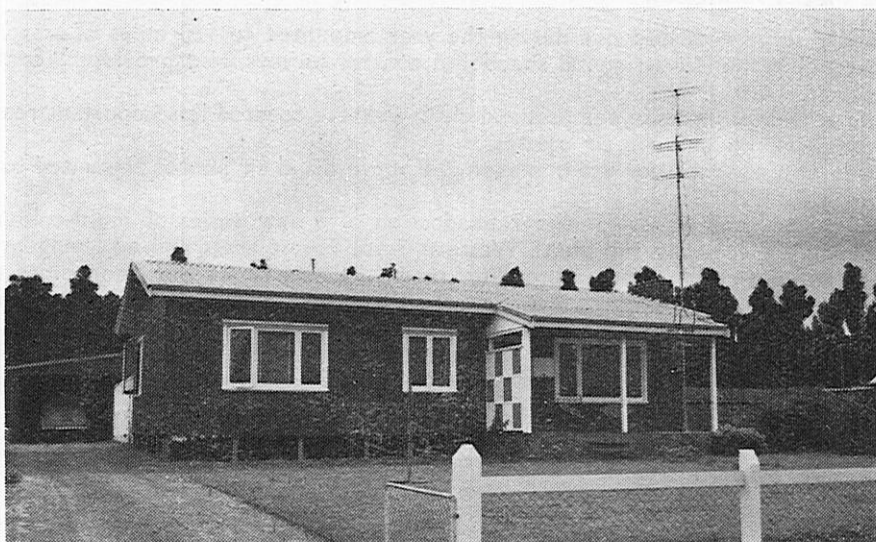
Departmental Buildings

Two new Divisional offices erected at Dwellingup and Busselton were officially opened by the Hon. Minister for Forests during the year.



The new Divisional Office at Dwellingup.

A further 6 houses were built and one purchased to bring the total number of Departmental houses to 457.



An employee's house of modern design at Dwellingup Divisional Headquarters.

A modern radio workshop to house the Communications Branch at Como Headquarters was completed.

Communications

RADIO.—The installation of V.H.F. repeater stations at Gnangara, Mount Solus, Mount Wells, Mount Dale and Mount William was completed and the station put into service.

A further 16 V.H.F. transceiver sets were installed and the Mundaring Office equipped for mobile control purposes.

TELEPHONES.—Seven new telephone switchboards were completed as well as a new underground telephone system at Dwellingup, and extensions made at the Grimwade settlement.

ELECTRICAL.—Twenty-three vehicles were wired for radio including those of 2 Fire Control Foresters.

GENERAL.—A brief history of telecommunications of the Forests Department is of interest.

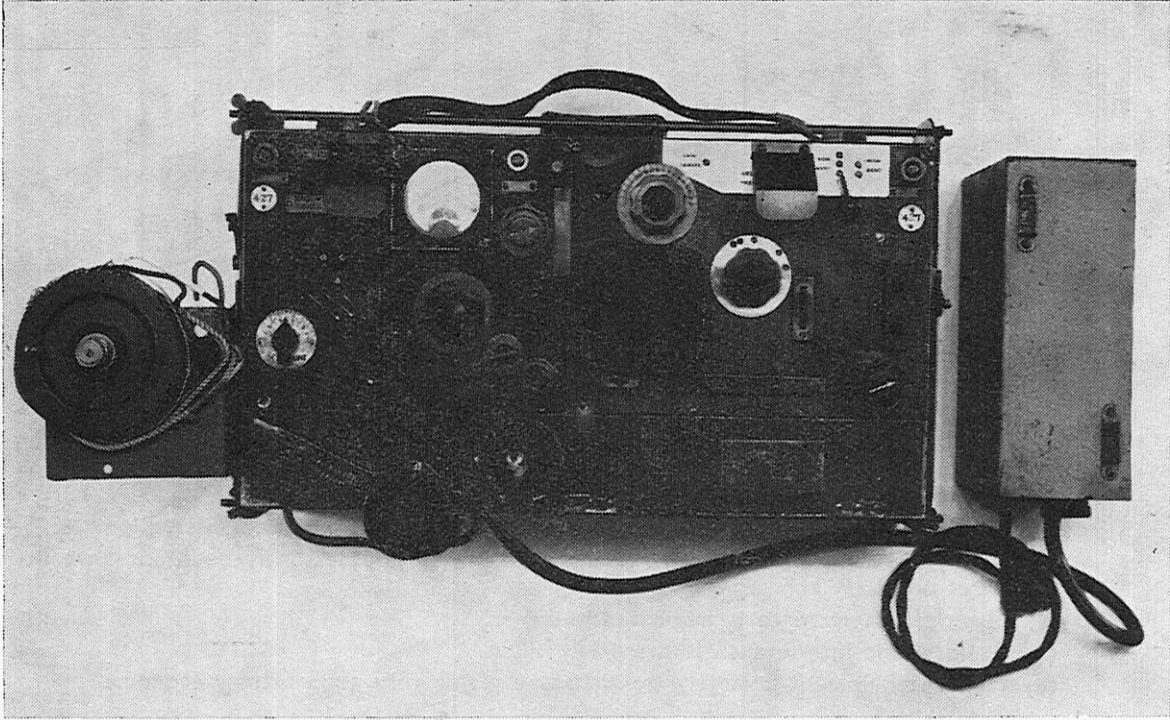
Telephones.—As early as 1924 a start was made in erecting telephone lines between forest headquarters and the few lookout towers then in existence. Heliograph was also used to keep in touch with working parties and survey teams. By 1929 a serviceable single wire earth return system had been developed and it is upon this system that the present network is largely based. Telephones were obtained originally from P.M.G. disposals and one of these inspected after many years of useful service, was recorded as having been serviced by a P.M.G. technician as far back as 1896.

Telephone is still the principal medium of communication in our forests and apart from the P.M.G. system, we have a network of some 2,000 miles of line servicing 480 telephones.

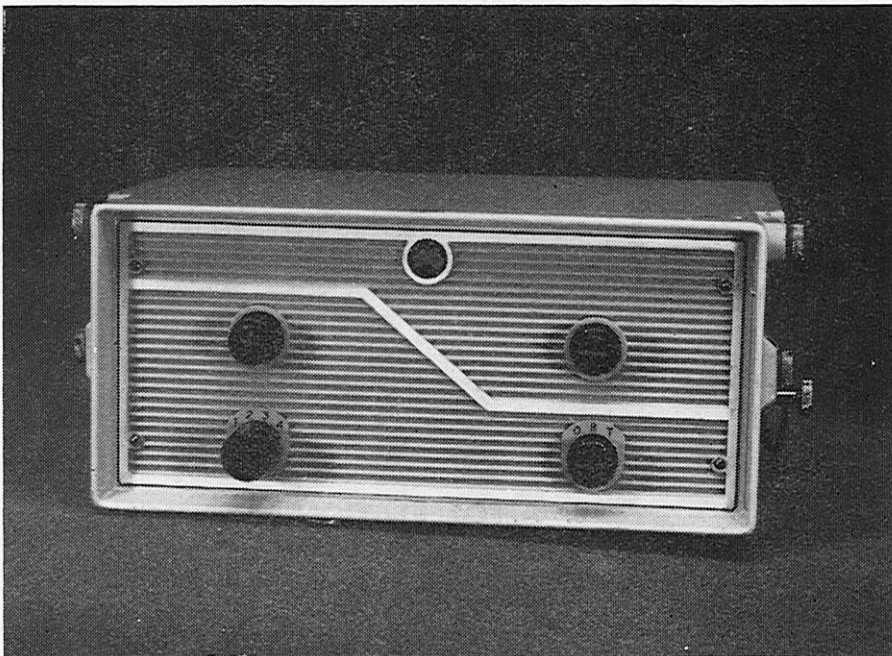
High Frequency Radio.—Radio as a means of communication was first tested by the Department in 1929-30, but owing to lack of reliable equipment and technical knowledge, results were not considered sufficiently reliable for its adoption as a supplementary means of communication.

In 1946 it was again tested with more encouraging results and with the most suitable "disposals" equipment offering, a start was made to develop radio communications as an aid to fire control. A workable high frequency system was eventually achieved at a very small capital outlay and with modification of the Army disposals sets available, radio rapidly became a valuable and indispensable medium of field communication, in spite of the well known shortcomings of the high frequency band.

The network was prone to interference from electrical storms and, at times, almost unworkable. The 1961 fire at Dwellingup adequately demonstrated this shortcoming. For the first 48 hours of this fire a severe local electrical storm was experienced and at this most critical period communication by radio was extremely difficult.



A mobile H.F. transceiver—Type FS6 modified—showing the power pack at the right, the transmitter left foreground and the aerial reel on the left.



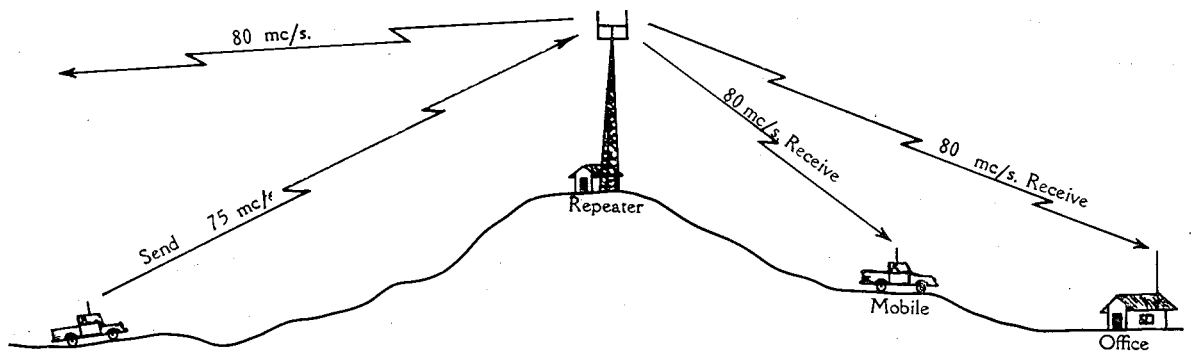
A modern mobile V.H.F. transceiver—Type I675A/25. This unit is approximately one-third of the weight of the previous type, takes up one-fifth of the space and has double the power.

Very High Frequency Radio.—In order to overcome these deficiencies other systems were investigated and field tests of new transistorised V.H.F. units were carried out.

These tests proved that V.H.F. radio communication in the band 75-85 mc/s could be successfully employed in Western Australia's jarrah forests, and by March, 1962 temporary installations had been made in the Dwellingup and Wanneroo Divisions.

In the ensuing 12 months the network has been consolidated and expanded and, at the present time, 6 repeater stations are in operation together with 32 mobile units. Plans have now been made to extend the V.H.F. system to cover the whole of the forest area.

Stated very briefly the system works as follows. Repeater stations are established on suitable high points and mobile radio units in the forest transmit on 75 mc/s to one or more of these stations. On receipt of the signal the repeater station transmitter automatically switches on and re-broadcasts the mobile units signal at increased power on a different frequency (80 mc/s.).



Diagrammatic Representation of the V. H. F. Radio Communication System

The advantages of V.H.F. are :—

- (1) Simple aerial, needing little maintenance.
- (2) No tuning controls—any person can operate a set after a minute's instruction.
- (3) Steady signals day and night. Changes in diurnal and seasonal conditions have little effect on the V.H.F. signal.
- (4) Electrical interference is minimised.
- (5) Atmospheric interference is extremely slight.
- (6) Modern equipment is largely transistorised giving very good battery economy.

The value of a reliable system of radio communication during periods of extreme fire danger cannot be over estimated.

7. REFORESTATION

The silvicultural control of felling under the West Australian system of tree marking ensures that trees are removed in such a way as to protect existing immature growth and encourage regeneration. Over all permits in State Forest, an authorised officer of the Department selects and brands trees to be felled. After felling, a top disposal operation with burning of tops, assists in protecting the young trees and also provides a good seed bed for future crops.

During the year 60,777 acres of virgin State Forest were cut over and treated for regeneration. This area consisted of 46,792 acres of jarrah, 4,708 acres of karri and 9,277 acres of wandoo forests.

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

	Acres
Jarrah	2,214,740
Karri	102,263

8. AFFORESTATION

Establishment

During the year a further 2,335 acres of pine plantations were established. Clear felling of 113 acres brings the net area of plantation at 30/9/62 to 36,571 acres, including experimental areas of 916 acres.

In the 32 years prior to 1953, 17,690 acres of pine plantation were established. In the 10 years since 1953 a further 18,881 acres have been planted.

The total area of pine plantation established by the Department to 30th June, 1963, is as follows :—

Plantation	<i>P. radiata</i>	<i>P. pinaster</i>	Other Species	Total
	acres	acres	acres	acres
Wanneroo	7	11,477	43	11,527
Metropolitan	10	2,606	12	2,628
Mundaring	2,050	1,148	161	3,359
Gleneagle	80	786	25	890
Harvey	1,234	3,032	55	4,321
Collie	1,715	242	4	1,961
Ludlow	267	2,028	23	2,318
Willcock	68	595	5	668
Keenan	803	402	17	1,222
Grimwade	3,225	178	17	3,420
Nannup	2,967	.....	3	2,970
Pemberton	267	62	41	370
Total established Plantations	12,693	22,556	406	35,655
Experimental Areas	199	631	86	916
Grand Total	12,892	23,187	492	36,571

The 1962 pine planting was distributed over the following plantations :—

	Acres	
	<i>Pinus radiata</i>	<i>Pinus pinaster</i>
Wanneroo—		
Yanchep	4	183
Pinjar		274
Neaves		98
Gnangara		208
Mundaring	68	93
Gleneagle		23
Harvey—		
McLarty		50
Myalup		168
Brunswick	90	.....
Collie	413	2
Grimwade	251	.....
Blackwood	350	.....
Pemberton	.....	60
	<u>1,176</u>	<u>1,159</u>

The preparation of ground for future planting is a continuing operation and the position is well in hand.

Soil Surveys

The need to establish, wherever possible, greater areas of the faster growing *Pinus radiata* on the better class soils, leads to continuous soil investigations.

Details of work carried out during the year are :—

	Acres
Detailed Surveys	7,240
Reconnaissance Surveys	31,370

Since 1954, when this standard of survey was initiated, the following areas have been covered :—

	Areas
Detailed Surveys	73,786
Reconnaissance Surveys—Hills	167,026
Reconnaissance Surveys—Coastal Plain	136,160

Production of Pine Timber

The total production of timber for the year from pine plantations, mainly in the form of thinnings, again increased and amounted to 1,461,008 cubic feet.

Production figures over the last few years emphasizes the increasing importance of pine in the economy of this State. This is evidenced by the following figures :—

	Cubic feet
1950	397,347
1955	947,793
1960	1,336,825
1961	1,395,701
1962	1,435,085
1963	1,461,008

The amount of pine used for peeling and slicing increased from 76,906 cubic feet in 1962 to 79,156 cubic feet this year.

The woodwool industry obtained 3,850 cubic feet of the smaller sized logs.
 The pine intake of Departmental sawmills for the year amounted to 236,321 cubic feet (16 per cent. of all pine logged).
 The pearl culture industry in the North-West used 2,980 cubic feet of pine poles for the construction of rafts for culture pots.
 The Education Department continued to use large quantities of pine in their manual training centres.

Log Production

Logs produced by the various plantations were as follows :—

	Cubic feet
Metropolitan—	
Gnangara	162,325
Somerville	153,521
Collier	61,967
Mundaring	421,110
Gleneagle	3,162
Harvey—	
Harvey Weir	244,167
Myalup	87,150
Grimwade	183,157
Busselton—	
Boranup	1,950
Keenan	34,722
Ludlow	78,975
Pimelia	25,412
Miscellaneous Forest Produce Licenses	2,390
	1,461,008

Mallet Plantations

Spot sowing of Brown Mallet was confined to the filling of blank areas and the total area of mallet plantation remains at 19,111 acres.

No mining timber was supplied during the year but the Department produced 98 tons of chipped bark.

Inland Arboreta

Five new arboreta were established in the agricultural areas during the year, bringing the total to 45.

Planting

All new plots were thoroughly cultivated in advance of planting. Treatments included the severance of coiling roots by vertical cuts $\frac{1}{2}$ inch deep and the use of 2 per cent. dieldrin powder as a deterrent to white ants.

The trees were protected from attack by rabbits and cockatoos by tubular guards of wire netting 3 feet high and 11 inches in diameter.

Survival

A survival of 85 per cent. was recorded as against 64 per cent. the previous year. This improvement was brought about by a more favourable growing season, better protection against rabbits and cockatoos and by greater attention to late winter cultivation.

Maintenance

This was carried out by farmers, Shire authorities and staffs of Agricultural Research Stations associated with the work. It is desired to place on record our appreciation of the co-operation received.

It is expected that suitable plant and equipment will be provided next year for a mobile gang to carry out all such maintenance work.

Investigation

Moisture investigations in wheat belt soils under different forms of ground cover continue.

Some modification to maintenance cultivation of very light soils, subject to wind erosion, are proposed.

Seed Supplies

Sales of seed to Australian and overseas buyers were valued at £2,889, compared with £2,134 last year. The increase was largely due to further orders from Morocco.

Seed of 186 species, valued at £19,000 are held in the Departmental Seed Store.

A further 1,103 pounds of conifer seed were taken into stock during the year.

Tree Nurseries

The number of trees supplied to private buyers on farms and in country towns increased by nearly 11,000 to 84,338.

By far the most popular species was River Gum with 18,849 plants distributed, followed by Sugar Gum (6,413), Dwarf Sugar Gum (4,301) and Coral-flowered Gum (3,618).

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	22,806	1,708	16,663	137,432	5,488	94
Dryandra	37,561	5,600	....	469	2,558	101

9. PROTECTION

FIRE PROTECTION

State Forest under Protection

Indigenous Forest	....	....	....	....	4,054,250 acres
Pine Plantations	....	....	....	....	36,571 "
Mallet Plantations	....	....	....	....	19,111 "

The Fire Season

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

	Jarrah	Karri
Rainfall	.... All months except December and March above average.	.... All months except February and March above average.
Temperature	.... Above average every month except November. 23 days above 90°. Highest 101° in January.	.... Generally mild.
Relative Humidity	.... 24 days below 25 per cent.	.... 9 days above 90°.
Fire Hazard	.... 9 dangerous days. 15 Severe Summer.	.... 10 days below 25 per cent. 1 dangerous day. 9 Severe Summer.
Mean	.... 5.3	.... 4.8
Mean of all Seasons	.... 5.5	.... 4.3

Controlled Burning

Late spring rains and a prolonged dry autumn seriously curtailed controlled burning operations this year and in an endeavour to cover as much ground as possible, considerable night burning was undertaken.

Although the total area of prescribed burning carried out was considerably below that of 1961-62 it was about the average of previous years.

Prescribed Burning—

	Acres
General	522,848
Advance and top disposal	57,478
Fire breaks	2,010
Total	582,336

It is with great regret we report the death of two Departmental employees, Arthur Clive Cleveland and Alfred Thaddaus Jaschke, who while controlled burning with others on a very mild day, lost their way in the forest, wandered into a potentially dangerous area, and were overcome in a sudden flare up of the fire. The deep sympathy of all of the staff is extended to the relatives of the deceased.

Detection

One new tower at Milward in the Nannup Plantation area was manned for the first time.

Manning of Towers—

	Jarrah	Karri
First watch	13/10/62	23/11/62
Last watch	30/4/63	22/4/63

Fires and Fire Damage

The total number of fires attended by Departmental gangs was 231, which is the lowest since 1950-51 when there were only 217. The overall average is 360 fires.

The following table sets out the principal causes :—

Escape from Settlers' burning	56
Escape from prescribed burning	36
Hunters and travellers	36
Deliberately lit	20
Bush workers	15
Children	12
Lightning	9
Mill locos	8
W.A.G.R. locos	3
Householders	5
Mill surroundings	3
Tractors	3
Other	4
Unknown	21
	231

Again escapes from settlers' burning heads the list with 24.2 per cent. ; last year 24.4 per cent. Total area burnt was a low 9,960 acres, of which just over half was scorched above 30 feet.

<i>Summary of Damage—</i>		Acres
Slight	2,855	
Medium	1,959	
Severe	5,457	
Total	9,960	
<i>Points of Origin—</i>		
State Forest	107	
Crown lands	30	
Private Property	94	
	231	

Public Relations

All Divisions report continually improving co-operation with bush fire brigades and local organisations generally.

Many brigades are availing themselves of the offer to train with Departmental gangs and much co-operative burning has been done, notably in burning along the Darling Scarp.

On many occasions Departmental gangs have assisted bush fire brigades to put through settlers' burns, and, on several occasions, bush fire brigades have attended to small fires in State Forest without calling on Departmental gangs for assistance.

PROTECTION FROM INSECTS

Sirex Wasp

A careful examination for this pest was made in private and Departmental plantings of pine over most of the South-West. Recent fellings were investigated and suspect trees were felled and closely examined but failed to reveal any evidence of the Sirex wasp.

There has been liaison with the Entomology Branch of the Department of Agriculture and with the Plant Quarantine Branch, particularly the inspecting staff at Fremantle.

Slides showing the effect of Sirex attack on pines in Victoria and Tasmania have been shown to the public, and Shire Councils have co-operated in displaying posters and distributing literature supplied to them. Departmental staff have been advised of the symptoms of attack and the method of identifying the insect.

So far, an Australia wide investigation has shown that Sirex is found only in Tasmania and Victoria. In the latter State vigorous counter measures are being taken, and all States are supporting the campaign against Sirex. Basic entomological research is being carried out aiming at introducing known predators to give some biological control as well.

PROTECTION FROM HARMFUL PLANTS

Attack by Christmas Tree on Coaxial Cable

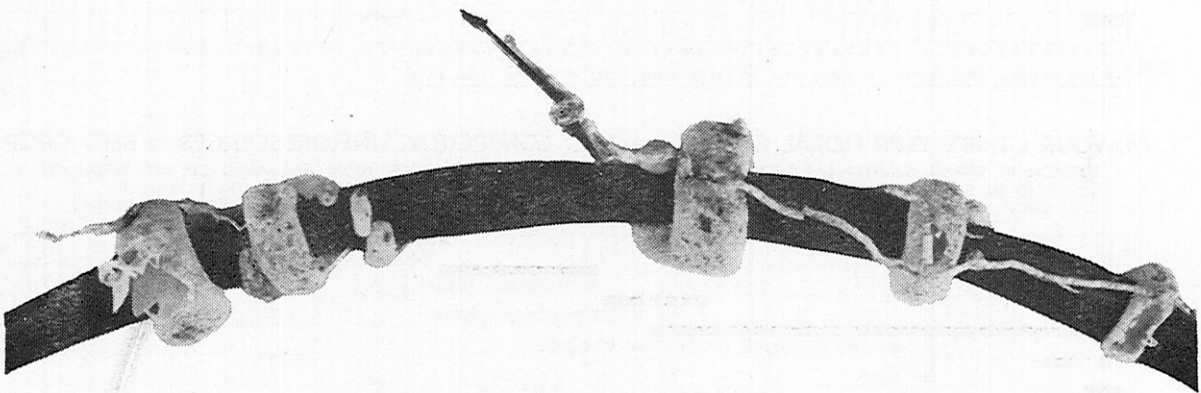
In October, 1962, a Stanford Research Institute project was established in the Gngara plantation area to study the propagation of long wave radio waves. Coaxial cables about 3/4 inch diameter were laid about a foot underground between the aerals and recording instruments.

In March, 1963, the cables short-circuited and an examination revealed attacks by the feeding roots of the Christmas Tree (*Nuytsia floribanda*) at several points. Attack was found up to 2½ chains from the nearest Christmas Tree and zones of concentrated attack occurred wherever large roots had been cut when laying the cable.

The form of attack appears to be as follows :—

Where a small root comes into contact with a cable, a circular membranous pad develops and attaches itself to the surface. The pad elongates around the circumference, becomes fleshy and thickens thus forming a collar which is firmly attached to the cable. The membrane on the inside of the collar appears to be the site of the breakdown of the insulating polymer.

A variety of materials have been buried near the cables to test their susceptibility to attack by the roots of the Christmas Tree.



Part of the co-axial cable showing five "collars."



A cross-section of the cable and the "collar" surrounding it.

10. SILVICULTURE, SOILS AND FIRE RESEARCH

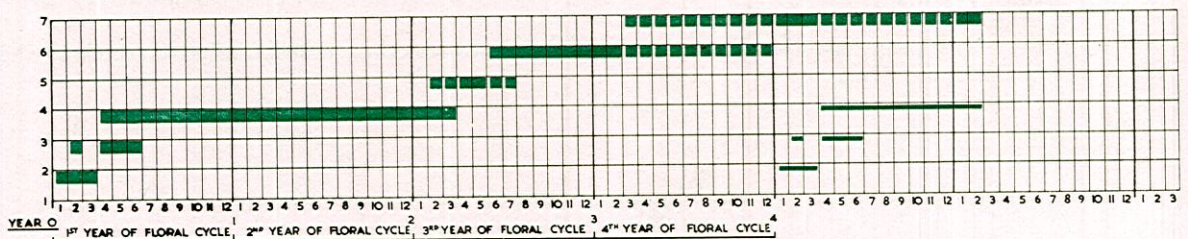
KARRI SILVICULTURE

Flowering and Seed Production

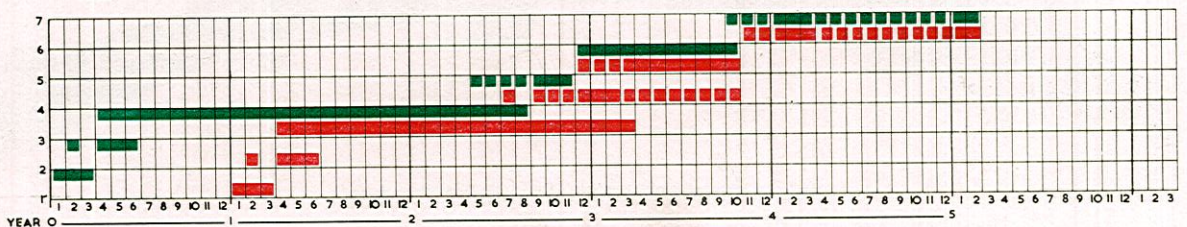
The variability in Karri flowering for honey and seed production is summarised in the accompanying diagram. Calendar months from January (1) to December (12) are recorded along the horizontal axis. Floral stages are recorded on the vertical axis as follows:—

- Between lines 1-2 Formation of the inflorescence
- 2-3 Formation of the bud initials
- 3-4 Development of the flower bud
- 4-5 Blossom
- 5-6 Development of the ripening capsules
- 6-7 Dissemination of the seed

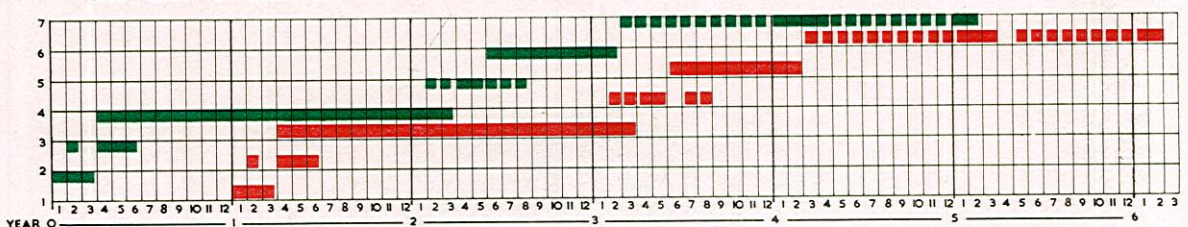
(a) **KARRI FLORAL CYCLE — FOUR YEARS FROM INFLORESCENCE TO SEED CROP**
 BLOSSOM IN AUTUMN AT 2¼ YEARS FROM BEGINNING OF FORMATION OF INFLORESCENCE.
 SEED CROP BEGINS IN LATE SUMMER—AUTUMN, NINE MONTHS AFTER BLOSSOM



(b) **FOUR & THREE YEAR FLORAL CYCLES FROM TWO CONSECUTIVE INFLORESCENCES TO SEED CROP**
 BLOSSOM IN SPRING, SUMMER & AUTUMN, DELAYED IN FIRST CROP TO 2¼ YEARS FROM BEGINNING OF INFLORESCENCE & ADVANCED IN SECOND CROP ONE YEAR TO SPRING. CONTINUES TO FLOWER OVER SUMMER & AUTUMN.
 SEED CROP OPTIMUM IN SPRING AFTER RIPENING OVER A PERIOD OF ONE FULL WINTER FOLLOWING FLOWERING



(c) **TWO CONSECUTIVE FOUR YEAR FLORAL CYCLES**
 BLOSSOM IN TWO CONSECUTIVE AUTUMNS 2¼ YEARS FROM BEGINNING OF FORMATION OF INFLORESCENCE.
 SEED CROP OPTIMUM BEGINS IN LATE SUMMER—AUTUMN, NINE MONTHS AFTER SECOND FLOWERING



Fluctuations in the amount of flowering and fruiting are associated with the development pattern of single (shown in green) or successive (shown in red) crops.

Fig. (a) shows the normal development pattern of a single crop.

Fig. (b) illustrates the combination of two crops in successive years in which the development of the second crop is accelerated and eventually comes into phase with the first. This pattern produces heavy blossom and seed crops at relatively long intervals providing an abundance of nectar and seed.

Fig. (c) illustrates the combination of two crops in successive years in which the twelve months difference in development is maintained throughout the complete cycle.

Seed Supply and Prescribed Burning for Natural Regeneration

Prescribed burning to produce a clean seed bed at the time of natural seeding is the cheapest and most successful method of regenerating karri.

Following prescribed burning, assessments have been made of seed dispersal, germination and survival. Results show where enrichment plantings are needed to supplement the natural regeneration. Tests show that surplus one year old naturally established seedlings (referred to as wildlings) may be successfully transplanted from ashbed and provide abundant, reliable planting stock at low cost.

Seven years have elapsed since the last heavy seeding in 1956 and during that period there was insufficient natural seed in most of the logged stands to warrant treatment for regeneration. The current heavy seeding, however, has permitted prescribed burning to be carried out in the majority of these stands and the remainder will receive attention in 1963-64.

It may be possible, however, to shorten the regeneration interval in individual stands by commencing trade cutting, where practicable, when the stands are flowering.

Reforestation after Uncontrolled Fire

During the period of waiting for the development of adequate seed in cut over stands, the tops of felled trees must be protected from fire. However, accidental fires have occurred in these stands, resulting in insufficient natural regeneration and damage to the floral parts in the crown. It may be 1½ to 2 years after burning before the effect of fire on the floral cycle can be assessed. This delay enables vigorous weed growth to develop and this prevents the satisfactory subsequent establishment of karri either by seeding or by the use of transplants.

Experimental Techniques

Chemical spray trials using 2.4.5.T. butyl ester at different concentrations are being carried out in an endeavour to reduce this weed competition both for seeding and transplant experiments.

Direct seeding trials continue using a number of treatments. These include time of sowing, the use of pelleted seed and the application of insecticides and fertilisers.

Karri wildling transplants, 17 months old, lifted from ashbeds have been successfully established. The plants were either lifted by spade and the surplus soil lightly shaken off; lifted by spade and the roots balled; or pulled up by hand from the ashbed. There was no significant difference in survival between the three methods of lifting. The limiting factor in survival appears to be adequate protection of the plants from desiccation at the time of lifting and during the period of transporting and planting.

In the nursery, seedlings have been raised in 3 inch peat jiffy pots for transplanting in the field. Results to date indicate that plants 8 inches high, developed from seed sown in mid-February, give the best survival.

Plantings of wildlings and nursery raised stock have been made in old and new ashbeds and cultivated soil at various spacings. Treatments include applications of N. and P. fertilisers, dieldrin with lime, and rock phosphate at various levels.

JARRAH SILVICULTURE

Silvicultural research work in the jarrah forest continued with thinning trials and the treatment of the stumps of felled trees with 2.4.5.T. ester to prevent coppice development. Plots for the measurements of results have been established.

In the experimental plot shown in the accompanying photographs the prevention of coppice growth was completely successful and a marked increase in the density of the crowns of the remaining trees is noticeable. This is reflected in an increase in increment.



A jarrah pole stand 9 months after thinning and poisoning of the stumps of the removed trees.



The same stand 26 months later. Note the recovery of the crown of the tree in the centre of the photograph.

PINE SILVICULTURE

Tree Breeding

(a) *Pinus pinaster*—Leiria Race

A total of 2,100 spring grafts were attempted and 70 per cent. survived, the survival percentage for any one clone ranging from 12.5 to 91. The degree to which the age of the tree from which the scions are taken affects survival is shown by the following figures :—

Age of tree—	Survival
Scions from grafts 4 years old	83
Scions from trees 21 years old	67
Scions from trees 31 years old	52

An attempt was made to graft this species in the autumn in the hope that grafting work might be spread over two periods instead of being confined to one as at present. Results were only moderately successful.

(b) *Pinus brutia*

Grafting of this species was carried out at the beginning and end of October. Cleft grafts gave better results when made at the end of the month. The best results came from bottle approach grafts which were made only at the end of October.

(c) *Pinus canariensis*

Grafting of this species, attempted for the first time using scions from "plus" trees, failed completely. Both cleft and bottle approach grafts were tried. It is proposed to try again next year using scions from coppice shoots.

Controlled Pollinations

A total of 280 controlled pollinations with *Pinus pinaster* (Leiria race) were completed in September, 1962. The stored pollen used was mainly from two "plus" trees which were destroyed by fire in February, 1962. These pollinations were carried out mainly to check techniques, the viability of pollen stored for a year at 6°F. and its effectiveness in producing fertile seed.

Systematic progeny testing of the clones in the first seed orchard will commence in spring, 1963.

The first pedigree seed should ripen in August-September, 1963, the result of a small pollination programme in 1961.

Pollen shed in September, 1962, from four plus trees has been collected and placed in storage.

Seed Orchards

The Joondalup seed orchard is ready for the first planting in July, 1963, and it is expected to be fully stocked the following year.

The grafts of *Pinus brutia* planted last year in the Rottneest Island seed orchard are thriving. The major part of this orchard will be planted in July, 1964, and completed in 1965.

Pinus radiata

A search for plus trees within plantations of this species has been initiated and several trees have been located.

Grafts have been obtained from some of the best phenotypes established in South Australia, Victoria and New Zealand. The co-operation of the Forest Services concerned is gratefully acknowledged.

It is planned to establish a clonal seed orchard of this species as soon as sufficient material is available to provide scions for grafting.

Tree Breeding Station

To cope with the expansion and development of tree breeding work a second glass house will be erected.

A second shade house of woven tea tree has been constructed to accommodate the increased number of grafts.

SOILS AND PLANT NUTRITION

Close co-operation was maintained with the Council for Scientific and Industrial Research Organisation Regional Laboratory throughout the year.

Co-operative Lines of Research with C.S.I.R.O.

(a) Soil Phosphorus Studies

The soil phosphorus study at Margaret River and Grimwade was completed during the year. In addition to hydrochloric acid soluble phosphorus, the soil phosphorus was fractionated by William's method. The additional data gained by this technique did not materially assist in the interpretation of pine growth. The topographic situation which reflects soil type, was closely related to the distribution of soil phosphorus.

(b) *Effect of Site Factors on Co-dominant Height*

A series of regression equations showed that at Margaret River, stand co-dominant height could be largely accounted for in terms of topography and soil phosphorus level. However, at Grimwade this relationship did not hold and topographic situation was the most important factor controlling co-dominant height.

(c) *Soil Moisture Studies*

Instrument faults with the neutron probe made it impossible to follow the annual cycle of soil water fluctuations during the year. This work will be repeated during the coming year.

(d) *Soil Fertility Experiments*

The field trial at Carinyah was continued. The area was top dressed with superphosphate and the fourth series of plots put down under lupins and clover. The plots will be planted with *pinus radiata* during July, 1963.

(e) *Foliar Analysis*

The analysis of foliar samples from *Pinus radiata* and *Pinus pinaster* was continued and a further series of *Pinus pinaster* needles were collected during the summer. To date it has not been possible to determine any direct relationship between nutrient levels and current height growth, and due to the difficulty in measuring current height growth, attempts are being made to relate foliar composition to girth increment. The study of the chemical composition of live bark as a substitute for needles was concluded. The analysis of this material does not appear to give a good indication of the nutrient status of the tree but it was observed that the level of potassium in *Pinus radiata* bark was significantly related to the level of potassium in the foliage. In *Pinus pinaster* the bark phosphorus level was closely related (P.001) to the foliar level.

Routine soil phosphorus analyses were an important function of the laboratory during the year, with a total of 527 samples being handled. The majority of these samples were from the Manjimup and Pemberton Divisions, where large scale soil reconnaissance is at present being carried out.

FIRE RESEARCH

In order to examine the behaviour of fire under different conditions of weather, fuel quantity and topography, some 150 experimental burns were carried out during the year, 50 in spring and 100 in autumn. Factors affecting the rate of spread of the head fire were measured. These included fuel quantity, fuel moisture content, temperature, relative humidity, wind velocity and slope.

Although the analysis of the data obtained is not complete, preliminary results suggest that reasonably accurate predictions of fire behaviour in the jarrah forest may soon be possible.

Assessments of the degree of damage resulting from burns of different intensity are also being made.

Investigations into the method of controlled burning have led to an overall increase in the daily acreage burnt, and in certain conditions the area covered has been markedly greater.

A simple direction finder for use by gangs has improved the efficiency and safety in prescribed burning operations.

The use of fusee matches as a lighting tool is being examined. It is thought that the use of these matches will increase the acreage covered per day and improve the quality of the burn.

II. LIBRARY

Library services continued to expand throughout the year. The volume of material acquired is approximately the same, but the increase in loans and queries from outside the department as well as from the staff shows a growing awareness of the literature available. Regular exchanges of technical reports are made with sixteen international institutions.

	1962-63	1961-62
Publications received	616	679
Loans and queries	2,760	2,455
Journal loans	6,233	5,614

12. FOREST ECONOMICS

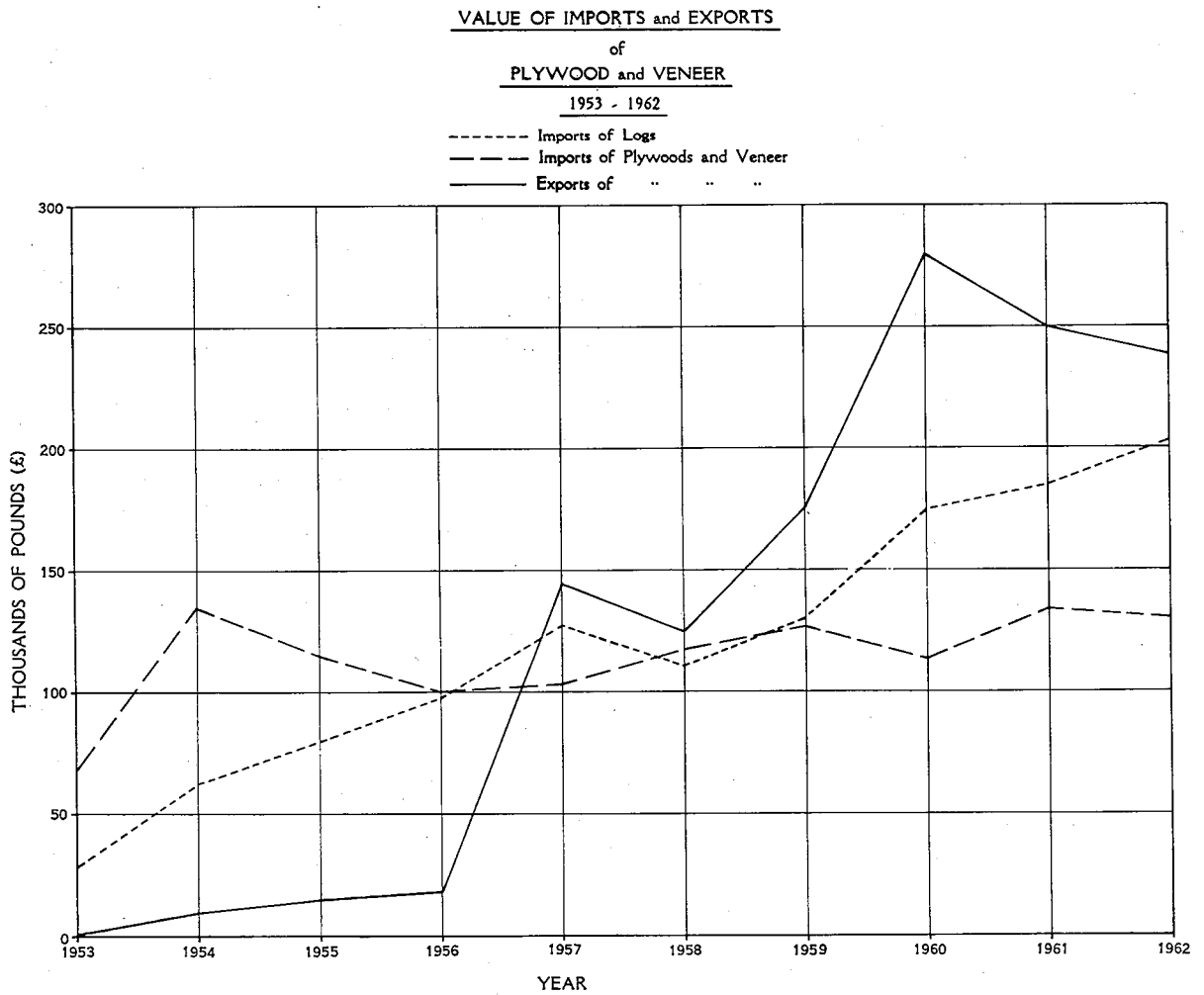
Plywood and Veneer

Value of Imports and Exports

The cost of importing plywood and veneer, and logs to produce these items, represents nearly 50 per cent. of the total value of the State's timber imports (excluding wood manufactures).

The increased activity in the plywood industry has been previously noted. An examination of available figures show that in the last 10 years the value of log imports has increased over seven-fold to £204,000 in the year ended 30th June, 1962. During the same period, imports of plywood and veneer after 1954 decreased somewhat, but later rose to the present value of some £125,000 per annum.

Although plywood has shown an increase, the value of imports of veneer has fallen from a peak of £40,000 in 1955 to £6,000 in 1960 and has remained at that general level since then. The outstanding feature, however, of the plywood trade has been the dramatic increase in the value of exports—nearly all to the Eastern States. From a figure of £748 in 1953 the value of exports jumped to nearly £280,000 in 1960 (See Graph).



Local Use

Figures from the Timber Supply Review showing distribution on a per capita basis (see table) indicates that Western Australia generally uses more plywood per head of population than the average for the Commonwealth. This may perhaps be explained by the low availability in Western Australia of plywood's main competitor, hard fibre-board. Availability in this State of hard fibre-board averages less than 40 per cent. of the Commonwealth average.

The table also shows the reduced demand as a result of the recession in the furniture and building industries.

PLYWOOD DISTRIBUTION

		Per Capita (sq. ft. 3/16 in. basis)						
		1955/56	1956/57	1957/58	1958/59	1959/60*	1960/61*	1961/62*
Western Australia	.....	25.7	28.8	33.1	24.0	11.2	13.3	13.6
Commonwealth	.....	25.0	23.3	25.4	24.9	13.3	11.6	10.9

* Average of 6 monthly figures.

13. EDUCATION AND PUBLICITY

Education

A Staff Training School for recently appointed officers was held during the year at Dwellingup. Five out of six trainees successfully completed a two-year course of instruction and were then appointed to the General Field Staff.

Staff meetings were held at Nannup, Kirup and Manjimup, which were attended by officers of the Southern Region.

An Overseer's school was held during the year at Wheatley.

The lack of suitable applicants for Forestry Scholarships will be reflected over the next three years when only two Western Australian scholarship holders will graduate from the Australian Forestry School, Canberra. The present position is as follows :—

	Commonwealth Scholarship	State Scholarship	Independent
4th Year—Canberra—To graduate, 1963	1	....	....
3rd Year Canberra	....	....	....
2nd Year—University of W.A.	1	....	....
1st Year—University of W.A.	2	2	1 (Part-time)

Publicity

The bulletin "Safety in Controlled Burning" was published during the year.

A school project brochure entitled "Western Australia's Wonderful Hardwoods" was prepared jointly by the Associated Sawmillers and Timber Merchants of W.A., the Timber Development Association (W.A.) and the Forests Department.

In addition, the Timber Industry Regulation Act and Regulations were reprinted.

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

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 221 (114 Crown Land and 107 Private Property).

The average number of persons employed on timber holdings each month throughout the year was 4,725 compared with 4,906 last year.

The District and Workman's Inspector made 1,316 inspections of timber holdings.

There were 1,186 notifiable accidents, two of which were fatal.

The number of accidents per 100 persons employed was 25.1 compared with 24.8 for last year.

The cost to the Forests Department of administering the Timber Industry Regulation Act for the year ending the 30th June, 1963 was as follows :—

Salaries	£
Mileage, Travelling Allowances and Sundries	2,944
	1,951
	<u>£4,895</u>

15. FOREST OFFENCES

Sixty-two forest offences were reported during the year. Legal proceedings were taken in six cases and all resulted in conviction. Fines and costs amounted to £90 and £10 13s., respectively.

Warnings were issued in 37 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 £595 16s.

16. EMPLOYMENT IN FORESTRY AND THE TIMBER INDUSTRY

The number of wage earners directly employed in Forestry and the Timber Industry was estimated at 6,264, made up as follows :—

<i>Forestry—</i>		
Professional Officers	....	45
General Field Staff	....	161
Clerical and Drafting	....	66
Wages employees	....	618
Contractors and employees (estimated)	....	20
		<u>910</u>
<i>Timber Industry—</i>		
Sawmill employees including bush workers at 31st December*	....	4,725
Firewood cutters and pole getters, working under permits	....	348
Goldfields firewood cutters, contractors and woodline employees and carters	....	38
Sandalwood workers	....	45
Apiarists, estimated (593 sites registered)	....	198
Total	....	<u>6,264</u>

* Includes employees of registered sawmills.

17. STAFF MATTERS

Public Service Act

Mr. A. A. McDonald arrived from Tanganyika in April, 1963, and commenced duty as an Assistant Divisional Forest Officer at Manjimup.

Mr. E. R. Hopkins was granted six months' long service leave on half pay and six months' special study leave on half pay to enable him to continue post-graduate research in forestry at the University of Melbourne.

A further twelve month's study leave was granted to Mr. I. S. Ferguson to continue post-graduate studies at Yale University in the United States of America.

Another, Mr. D. Doley, continued his second year of post-graduate studies at the University of Western Australia following a special study grant and eighteen months' study leave on half pay.

Five graduates from the Australian Forestry School were appointed to the permanent staff as Assistant Divisional Forest Officers.

Five Assistant Divisional Forest Officers were reclassified to Divisional Forest Officers, Grade II, during the year and one Draftsman to Senior Draftsman.

A reclassification of the Public Service was carried out to take effect from the 1st January, 1963. The career range for professional Forest Officers was amended to give an increased classification for Assistant Divisional Forest Officers and increases were also granted to all other professional foresters.

Three officers in the Clerical Division were granted increased classifications and an allowance was granted to the Assistant Chief Draftsman.

The Accountant, Mr. A. B. Tenger, was promoted to a position in the Metropolitan Water Supply Department.

All Ministers in the various States met in Melbourne in February, 1963, to consider the promotion of the Australian Forestry Council. The Hon. Minister for Forests, Mr. W. S. Bovell, was accompanied by the Conservator.

Senior Divisional Forest Officer J. C. Meachem accompanied the Hon. Minister for Industrial Development to Melbourne in July, 1962, for discussions in connection with a pulp mill in Western Australia.

Senior Divisional Forest Officer B. J. Beggs was nominated to attend the Australian Administrative Staff College, Mount Eliza, Victoria, and began a ten weeks' course on the 29th June, 1963.

Forests Act

New appointments during the year included 2 Clerical Assistants, 7 Forest Guards (1 from Kenya), 6 Technical Assistants, Grade 2, 1 Forest Assessor, 1 Nurseryman, 1 Assistant Forester.

A recruit from Tanganyika was also appointed as a Forest Officer.

Promotions included 2 officers to Assistant Forester and one to Forester.

One officer was reclassified to District Forester.

Resignations included one Forester and one Technical Assistant, both of whom joined the Commonwealth Forestry and Timber Bureau in the Northern Territory.

Forester F. H. H. Collins retired as did two Senior Foresters, W. A. Ross and J. A. Thomson. These two latter officers joined the Department under the original apprentice scheme inaugurated in 1918, and gave excellent service for more than 45 years.

Following the Reclassification of the Public Service the margins of officers of the Field Staff General Division were adjusted to conform as from the 1st January, 1963, and an agreement with the Civil Service Association was registered at the Court of Arbitration. A reclassification, to date from the 1st January, 1963, has also been carried out.

It is with deep regret that I have to record the death of two valued officers in the persons of District Forester F. P. Mullumby and Utilisation Forester B. J. Ryan.

18. BRITISH COMMONWEALTH FORESTRY CONFERENCE

The Eighth British Commonwealth Forestry Conference was held in East Africa (Kenya, Tanganyika, Uganda) during June-July, 1962, and was attended by 72 representatives of 21 Commonwealth countries.

The Conservator of Forests, A. C. Harris, and the Deputy Conservator, W. R. Wallace, attended, the former presiding over the working committee on Forest Policy, and the latter acting as secretary of the committee on Forest Protection.

An extract of the resolutions which are of general interest appear in Appendix 6.

APPENDIX IA

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

1961/62	Revenue	1962/63	1961/62	Expenditure	1962/63
£	<i>Royalties</i>	£	£		£
847,691	Logs	851,826	164,000	Salaries	176,278
44,515	Sleepers	46,756	50,362	Incidentals	51,562
1,753	Sawn Timber	1,576	2,000	Timber Industry Regulations Act	1,951
32,809	Piles and Poles	49,891	69,153	Hardwood Conversion	75,214
5,487	Mining Timber	4,385	109,319	Pine Conversion	129,583
12,754	Firewood	12,594	41,702	Recoupable Projects	43,235
3,654	Posts	3,720	9,324	Tree Nurseries	8,290
5,626	Sandalwood	4,221		Excess of Revenue Over Expenditure	
4,471	Miscellaneous	8,778		distributed as follows:—	
958,760		983,747	897,949	9/10ths to Reforestation Fund....	907,149
			95,475	1/10th Paid to Treasury	81,604
	<i>Pine Conversion</i>				
127,362	Pine Logs	160,784			
42,005	Sawn Pine	49,758			
169,367		210,542			
	<i>Hardwood Conversion</i>				
13,718	Sawn Hardwood	13,019			
65,951	Logs	79,526			
7,182	Piles and Poles	11,579			
86,851		104,124			
	<i>Other Sales and Fees</i>				
12,115	Seeds and Trees	11,682			
27,035	Inspection Fees	23,420			
15,756	Rents and Leases	15,841			
130,830	Miscellaneous	97,576			
185,736		148,519			
	<i>Recoupable Projects</i>				
33,017	Specific Roads	15,842			
5,553	Other	12,092			
38,570		27,934			
£1,439,284		£1,474,866	£1,439,284		£1,474,866

APPENDIX IB

Forests Improvement and Reforestation Fund Account for the Year ended 30th June, 1963

1961/62		1962/63	1961/62		1962/63
£		£	£		£
50,147	Balance as at 1st July	94,006	1,091,309	Expenditure	1,075,921
897,949	9/10ths Revenue	907,149	192,529	Less Recoups	134,655
18,690	Rents	18,112	898,780		941,266
76,000	Federal Aid Road Grant	76,000	50,000	Reserve Fire Control	100,000
....	Reserve Fire Fighting	50,000	94,006	Balance Working Account	104,001
£1,042,786		£1,145,267	£1,042,786		£1,145,267

DETAILS OF EXPENDITURE

1962	<i>Divisional</i>		1963
£			£
436,424	Divisional Wages and Materials, etc.		418,792
	<i>Head Office</i>		
190,971	50. Salaries and Allowances		210,994
12,990	51. Incidentals		16,066
110,690	52. Purchase of Plant and Vehicles		102,218
215,812	53. Plant Operations		203,545
13,264	54. Purchase of Land		6,805
6,844	55. Fire Equipment		10,385
14,795	56. Como Buildings		5,498
17,324	57. Como Headquarters		8,046
5,354	58. Communications		13,660
4,158	59. Research		8,463
3,960	60. Drafting		2,617
1,873	61. Surveys		2,829
29,363	62. Training of Staff		2,841
17,206	63. Insurances		30,049
....	64. Pay Roll Tax		18,100
10,281	65. Utilisation		10,919
	F.I.C.A., etc.		4,094
654,885			657,129
£1,091,309	Total Reforestation Fund		£1,075,921

APPENDIX IC

Statement of Afforestation Expenditure for the Year ended 30th June, 1963

1961/62	Expenditure	1962/63	1961/62	Source of Funds	1962/63
£		£	£		£
101,117	Plantation Establishment	107,208	125,000	General Loan Fund	125,000
93,015	Plantation Maintenance	92,768	79,003	Reforestation Fund	58,951
19,960	Buildings and Maintenance	18,430	169,367	Sale of Pine Logs and Timber	210,542
10,030	Road Construction and Maintenance	12,068			
13,254	Fire Prevention and Suppression	11,954			
4,396	Research	3,285			
171	Surveys and Plans	230			
7,402	Essential Services and Communications	10,638			
14,706	Administration	8,329			
109,319	Direct Conversion of Pine	129,583			
£373,370		£394,493	£373,370		£394,493

APPENDIX ID

Statement showing Distribution of Forests Department Expenditure

<i>Details</i>		£
Consolidated Revenue Fund		486,113
Reforestation Fund		941,266
General Loan Fund		125,000
Treasury Special Employment Grant		68,498
Total Expenditure All Funds		£1,620,877

<i>Distribution of Expenditure—</i>		£
1. Busselton		88,935
2. Mundaring		104,246
3. Dwellingup		149,956
4. Collie		116,129
5. Kirup		125,908
6. Manjimup		127,182
7. Narrogin		20,176
8. Gleneagle		68,447
9. Metropolitan		53,225
10. Harvey		139,031
11. Pemberton		124,639
12. Nannup		91,214
13. Shannon River		57,449
14. Kalgoorlie-Esperance		10,420
15. Wanneroo		83,958
Head Office		259,962
Total		£1,620,877

APPENDIX 2A

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

Item No.	Item and Destination	Quantity	Value	Item No.	Item and Destination	Quantity	Value
63521	TIMBER <i>Sleepers—</i> Jarrah Sleepers : United Kingdom Hong Kong Mauritius New Zealand Pakistan Japan South Africa, Republic of United Arab Republic United States of America	cub. ft.	£	64300	TIMBER <i>Shooks and Staves, Undressed or Dressed—</i> Australian States : New South Wales Queensland	cub. ft.	£
	Australian States : Victoria South Australia	cub. ft. £ 32,332 17,266 410,753 224,079	1,879,578 1,263,036			15,486	21,012
			443,085 241,345	64410	<i>Flooring—</i> United Kingdom Christmas Island Indonesia United States of America	15,486	21,012
63529	<i>Other Sleepers :</i> United Kingdom Germany, Federal Republic of Netherlands South Africa, Republic of		210 321 469 380 989 747 30,068 17,373		Australian States : Mosaic Flooring : New South Wales Victoria South Australia Northern Territory Australian Capital Territory	14,257 16,400 790 1,262 1,230 1,101 523 980	16,800 19,743
			31,736 18,821		New South Wales 3,900 10,790 Victoria 450 775 South Australia 661 2,927 Northern Territory 244 471 Australian Capital Territory 3,387 5,370	16,800	19,743
64100	<i>Softwoods—Sawn, Undressed—</i> South Africa, Republic of Australian States : Northern Territory	cub. ft. £ 447 912	3,806 2,454 447 912		<i>Other Flooring :</i> New South Wales..... Victoria South Australia Northern Territory Australian Capital Territory	43,339 38,658 33,262 34,531 149,646 119,085 4,185 5,394 4,069 7,035	8,642 20,333
			4,253 3,366			234,501	204,703
64260	<i>Hardwoods—Sawn, Undressed (other than Sleepers)—</i> Jarrah : United Kingdom Christmas Island Ceylon Hong Kong Malaya, Federation of Mauritius New Zealand Pakistan Sarawak Bahrain Islands Belgium-Luxembourg France Germany, Federal Republic of Italy Netherlands South Africa, Republic of United States of America		137,497 111,742 184 160 8,865 6,598 14,013 11,562 6 7 13,884 9,602 45,824 34,330 137,335 107,473 3 4 569 484 3,381 2,568 3,024 2,859 2,910 2,332 1,504 1,105 6,846 5,109 150,187 109,329 8,772 7,000	64490	<i>Other Timber, Dressed or Moulded—</i> United Kingdom Australian States : New South Wales South Australia Northern Territory	590 424 cub. ft. £ 731 839 4,097 3,065 10,971 17,771	15,799 21,675 16,389 22,099
	Australian States : New South Wales Victoria Queensland South Australia Northern Territory	cub. ft. £ 3,043 1,840 167,364 120,553 17 21 1,006,424 564,146 11,175 8,782	534,804 412,264		Veneer (see Item 6479)— Singapore Japan	sq. ft. 500 11 34,150 781	
			1,188,023 695,342	64600		34,650 792	
			1,722,827 1,107,606	64790	<i>Plywood (see Item 6479)—</i> Christmas Island Fiji Sarawak	720 75 1,080 39 1,856 285	3,656 399
64280	<i>Karri :</i> United Kingdom Christmas Island Mauritius New Zealand Belgium-Luxembourg Germany, Federal Republic of Italy Netherlands South Africa, Republic of United States of America		7,009 5,252 125 178 682 556 75,402 57,631 6,603 5,025 7,417 5,691 504 353 21,428 16,388 67,024 52,331 85 72	64799	<i>Plywood and Veneers (see Items 64600, 64790)—</i> Australian States : New South Wales Victoria Queensland South Australia Tasmania Northern Territory	sq. ft. £ 262,954 8,529 3,075,132 152,910 684 48 2,652,942 171,523 145,432 5,951 70,193 6,137	6,207,337 345,098
	Australian States : New South Wales Victoria South Australia Northern Territory	cub. ft. £ 61,764 40,823 41,951 28,913 671,117 373,827 106,145 77,889	880,977 521,452		Total, Timber Exports		3,966,697
			1,067,256 664,929		WOOD MANUFACTURES		
64290	<i>Other Hardwoods :</i> New Zealand Australian States : Blackbutt : South Australia Northern Territory Wandoo : Victoria South Australia Northern Territory Other Hardwood : Northern Territory	cub. ft. £ 1,895 1,153 96 185 1,991 1,338 12,497 13,542 5,055 3,905 135 90 445 871	186,279 143,477 880,977 521,452 1,067,256 664,929	65050	<i>Casks and Vats—</i> United Kingdom	No. £ 527 2,568	
			43,706 33,415	65290	<i>Manufactures of Wood (except Furniture), N.E.I.—</i> United Kingdom India Malaya, Federation of	5 47 20	
					Australian States : New South Wales Victoria Northern Territory	No. £ 2,902 50 2,677	72 5,629 5,701
				90810-90870	<i>Furniture, of any Material—</i> Christmas Island Hong Kong Malaya, Federation of Mauritius Sarawak Singapore Netherlands United States of America		1,326 176 1,964 174 473 1,972 125 28 6,238

APPENDIX 2A—continued

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

Item No.	Item and Destination	Quantity	Value	Item No.	Item and Destination	Quantity	Value
	Australian States : £		£			lb.	£
	New South Wales 45,573				ESSENTIAL OILS		
	Victoria 75,000			87100—	<i>Natural, Non-spirituous—</i>		
	Queensland 45,443			87290	United Kingdom	23	1,979
	South Australia 64,832				Ceylon	9	120
	Tasmania 3,819				Hong Kong	5	3,952
	Northern Territory 5,889				India	1	237
	Australian Capital Territory 127				New Zealand	1	121
			240,683		Singapore	19	1,044
					France	107	25,173
			246,921		Germany, Federated Republic of	218	1,788
	Total, Wood Manufactures		255,190		Japan	11	11
					Mexico	20	163
	TANNING SUBSTANCES				South Africa, Republic of	2	270
16000	<i>Of Natural Origin—</i>	cwt.	£		Switzerland	75	502
	United Kingdom	928	3,600		United States of America	93	1,430
	Canada	1,781	4,187			572	36,790
	India	5	14		Australian States : cwt. £		
	New Zealand	1,368	4,671		New South Wales 99 14,757		
	Pakistan	363	1,202		Victoria 365 15,046		
	Singapore	410	1,639		Queensland 15		
	Jamaica	45	173		South Australia 27 3,794	491	33,612
	Trinidad and Tobago	54	211			1,063	70,402
	Austria	1,603	4,992		Total Value of All Exports on this		
	Burma	100	268		Return		4,547,015
	Denmark	2,393	7,369				
	Germany, Federal Republic of	4,684	8,607				
	Indonesia	1,196	5,342				
	Iran	40	147				
	Iraq	1	2				
	Netherlands	455	1,466				
	South Africa, Republic of	1	2				
	Spain	200	616				
	United States of America	63,982	184,458				
		79,609	228,966				
	Australian States : cwt. £						
	New South Wales 2,570 10,129						
	Victoria 1,836 6,914						
	Queensland 624 2,608						
	South Australia 1,341 5,545						
	Tasmania 200 564						
		6,571	25,760				
		86,180	254,726				

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 30th June, 1963

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.	£	64690	<i>Veneers—</i>	sq. ft.	£
	Hong Kong	.....	5,503		United Kingdom	48,712	808
	India	.....	367		Ghana	36,217	324
	Malaya, Federation of	.....	11,307		Burma	2,100	105
	Singapore	.....	5,019		Germany, Federal Republic of	338,102	2,882
	Burma	.....	61		Netherlands	22,668	203
	China, Republic of (Formosa)	.....	45		Australian States :	417,799	4,322
	China—Republic of (Mainland)	.....	116		New South Wales	20,256	1,555
	Germany, Federal Republic of	.....	23		Victoria	145,438	3,361
	Japan	.....	7,408		Queensland	48,226	1,042
	Australian States :	.....	29,849			213,920	5,958
	New South Wales	.....	1,033			661,719	10,280
	Victoria	.....	838	64791	<i>Plywood—</i>		
	South Australia	.....	23		New Guinea	.....	24,080
		.....	1,894		Japan	.....	1,806
		.....	31,743		Australian States :	25,886	964
63400	<i>Hardwood Logs—</i>				New South Wales	72,499	7,810
	Ghana	211	529		Victoria	18,772	2,023
	Malaya, Federation of	7,917	2,557		Queensland	1,989,593	140,164
	Nigeria	155	47		Tasmania	68,229	2,140
	North Borneo	40,394	16,551			2,149,093	152,137
	Sarawak	595,446	196,408			2,174,979	153,101
	Dominican Republic	53	468		Total, Timber Imports		763,351
	Gabon	532	867				
	Ivory Coast	9,857	10,596				
	South-West Africa	823	1,456				
	Switzerland	1,250	450				
	Thailand	738	2,446				
		657,376	232,375				
64110	<i>Softwoods—Sawn, Undressed—</i>			64795-64796	<i>WOOD MANUFACTURES</i>		
	<i>Redwood and Western Red Cedar :</i>				<i>Reconstituted Wood being Wood Shavings, Wood Chips, Sawdust, Wood Flour or Other Ligneous Waste Agglomerated with Natural or Artificial Resins or Other Organic Binding Substances in Panels, Sheets or Strips (also known as Particle Board, Chip Board, Sliver Board, Shaving Board, Flake Board, Residue Board and Wood Waste Board—</i>		
	(Australian States covered by Item 64190).				Sweden	68,850	689
	Canada	3,152	2,422		United Kingdom	13,280	639
	United States of America	5,851	4,705		Australian States : *		
		9,003	7,127		New South Wales	4,655,900	278,701
64120	<i>Douglas Fir :</i>				Victoria	384,305	79,042
	(Australian States covered by Item 64190).				Queensland	792,174	73,612
	United States of America	47,675	36,925		South Australia	406,656	33,192
64190	<i>Other Softwoods :</i>				Tasmania	676,384	19,953
	Sarawak	1,869	1,013			6,915,419	484,500
	Sweden	757	693			6,997,549	485,828
	United States of America	9,167	9,918				
	Australian States :	11,793	11,624	65050	<i>Casks and Vats, Empty—</i>	No.	
	Queensland	176	214		Australia (Re-imported)	415	2,651
	South Australia	2,893	3,073				
		3,069	3,287				
		14,862	14,911				
64210-64290	<i>Hardwoods—Sawn, Undressed—</i>			92507	<i>Clothes Pegs of any Material—</i>	Gross	
	Ghana	956	1,053		Hong Kong	8,000	1,003
	Malaya, Federation of	113,162	72,934		Czechoslovakia	7,000	755
	North Borneo	6,967	4,278		Denmark	7,000	2,102
	Sarawak	208,072	109,824		Netherlands	760	202
	Singapore	2,032	1,135		Norway	8,000	3,092
	Ecuador	172	142		Poland	1,500	192
	Switzerland	544	384		Sweden	22,325	3,175
	Australian States :	331,905	189,750		Australian States :	54,585	10,521
	Victoria	372	581		New South Wales	2,674	889
	Queensland	479	718		Victoria	2,116	924
	Tasmania	16,419	13,766		Tasmania	10,655	3,466
		17,270	15,065			15,445	5,279
		349,175	204,815			70,030	15,800
64310	<i>Shooks and Staves—</i>			65150	<i>Last Blocks and Lasts (b) —</i>		
	Malaya, Federation of	.....	4,281		United Kingdom	1	12
	Australian States :	cub. ft.	£	65160	<i>Match Splints (b) —</i>		
	New South Wales	350	420		Finland	.....	22,288
	South Australia	5,814	5,269				
		6,164	5,689	65170	<i>Rules and Rulers, Wooden (b) —</i>		
		10,445	7,390		United Kingdom	.....	7,455
					Hong Kong	.....	1,601
64410	<i>Sawn Timber, Dressed or Moulded—</i>				Japan	.....	204
	<i>Overseas :</i>				Netherlands	.....	472
	<i>Flooring—</i>					.....	9,732
	Sweden	11,328	8,842	65010	<i>Bobbins, Cones, Reels, Spools and the like— (b)</i>	No.	
64490	<i>Other—</i>				United Kingdom	6,675	581
	United Kingdom	3	18	65190	<i>Table Mats, Wooden— (b)</i>		
	Austria	6	34		United Kingdom	.....	181
	Germany, Federal Republic of	8	139		Hong Kong	.....	9
	Netherlands	4	42		Germany, Federal Republic of	.....	18
	Sweden	1,996	1,305		Japan	.....	139
	Australian States :	13,345	10,380			.....	347
	New South Wales	(a)	2,205	65210	<i>Wood Flour— (b)</i>	cwt.	
	Victoria	(a)	49,807		Netherlands	3	7
	South Australia	(a)	2,243				
	Tasmania	(a)	49				
		.....	54,304				
		.....	64,684				

(a) Quantity not recorded.

(b) Australian States covered by Item 65290.

* Includes Laminated Plastic Boards.

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
96450	<i>Tool Handles, Unattached, of any Material—</i>	dozen	£			cwt.	£
	United Kingdom	790	1,897	16010	TANNING SUBSTANCES		
	Canada	39	328		<i>Tanning Bark—</i>		
	Germany, Federal Republic of	9	18		Australian States :	cwt.	£
	Sweden	84	140		Victoria	45	439
	United States of America	468	1,259		South Australia	10	52
		1,390	3,642			55	491
	Australian States :			16110	<i>Tanning Extracts of Natural Origin—</i>		
	New South Wales	10,605			<i>Wattle Bark Extract :</i>		
	Victoria	5,524			Rhodesia and Nyasaland	120	376
	Queensland	10,325			South Africa, Republic of	2,275	7,128
	South Australia	17				2,395	7,504
	Tasmania	177					
			26,648	16190	<i>Other :</i>		
			30,290		United Kingdom	40	438
65290	<i>Manufactures of Wood (except Furniture), N.E.I., whether partly or wholly finished—</i>				Norway	318	327
	United Kingdom		921			358	765
	Canada		84		Australian States :	cwt.	£
	Hong Kong		122		New South Wales	40	151
	Malaya, Federation of		5		Victoria	30	202
	Rhodesia and Nyasaland		274	16200	<i>Other Tanning Substances of Natural Origin—</i>		
	Australia (Re-imported)		41		India	788	755
	China—Republic of (Mainland)		3				
	France		14	87010	ESSENTIAL OILS		
	Germany, Eastern		24	87290	<i>Natural, Non-spirituous—</i>	lb.	
	Germany, Federal Republic of		773		United Kingdom	1,214	837
	Hungary		10		India	793	610
	Italy		405		Australia (Re-imported)	326	498
	Japan		4,994		Brazil	7	4
	Netherlands		190		China, Republic of (Formosa)	2,000	1,088
	Norway		292		China, Republic of (Mainland)	4	5
	Philippines		141		France	2,689	1,839
	South Africa, Republic of		43		Indonesia	648	756
	Sweden		860		Italy	576	674
	Thailand		177		Malagasy	2,936	1,221
	United States of America		146		Netherlands	483	408
			9,519		Netherlands	77,703	18,639
	Australian States :	£			South Africa, Republic of	424	284
	New South Wales	13,754			Spain	1,200	1,974
	Victoria	13,021			United States of America	1,200	1,974
	Queensland	3,837				91,003	28,837
	South Australia	1,742			Australian States :	lb.	£
	Tasmania	754			New South Wales	63,617	25,854
			33,108		Victoria	4,102	4,502
			42,627		South Australia	12,908	4,546
90811—	<i>Furniture of any Material—</i>					80,627	34,902
90870	United Kingdom		29,583			171,630	63,739
	Hong Kong		38,079		Total Value of All Imports shown on this Return		2,052,544
	India		197				
	Ireland, Republic of		8				
	Malaya, Federation of		1				
	Singapore		271				
	Austria		5				
	China, Republic of (Mainland)		633				
	Denmark		484				
	Germany, Federal Republic of		923				
	Italy		677				
	Japan		4,900				
	Netherlands		1,497				
	Norway		2,095				
	Poland		2				
	Sweden		221				
	Switzerland		246				
	Thailand		583				
	United States of America		4,694				
			85,099				
	Australian States :	£					
	New South Wales	210,089					
	Victoria	127,207					
	Queensland	1,249					
	South Australia	181,663					
	Tasmania	116					
			520,324				
			605,423				
	Total, Wood Manufactures		1,215,586				

Basis of Value

Oversea—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	Total	444,596,832	80,746,610	2,122,028	4,537,245	2,765,225
1900	5,725,400	458,461						

- (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
				Total	22,117,311	556,164	2,030,549

* 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
				Total ....	....	....	2,575,018,721

* 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.

APPENDIX 6

AN EXTRACT OF THE RESOLUTIONS OF THE 8TH BRITISH COMMONWEALTH FORESTRY CONFERENCE

Forest Policy and Management

1. *The Forest Estate*

Governments dedicate as a permanent forest estate sufficient areas of land to ensure that forest produce is available in adequate quantities to the community at all times, and that the protective functions of their forests are maintained and improved.

2. *Forestry and Land Use*

Reaffirming the principle of multiple land use in relation to forestry, and that forests have indirect values such as water and wild life conservation, protection of soils and local climates, and the provision of recreational facilities, recommends that—

- (a) National policies on land use, land reservation and the financing of forestry recognise these values; and
- (b) when alternative uses of forest land are being compared, and financial returns are being assessed, the stumpage value of timber alone should not constitute the sole basis for evaluating the benefits of forestry, but rather the total value of the products of forest-based industries, the role of these industries in the national economy and the many other benefits of forestry which find no expression in stumpage values.
- (c) Savanna woodlands should be so managed that their capacity can be developed in the interests of communities or industries dependent on them, now and in the future.
- (d) In conformity with the principle of multiple land use, that conservation of wild life be accepted as one of the objects of management of forest land.

3. *Interrelation between Private, Communal and State Forestry*

Where appropriate, private and communal forestry should be given encouragement by Governments, particularly through facilities for advice on management and by taxation measures suitable to long-term forestry investment.

4. *Education and Training of Staff at Professional and Technical Level*

- (a) All forest staff be kept at as highly trained a level as possible.
- (b) To this end, training at technical level be hastened and raised to the highest possible level. At more advanced levels, some of this training could, with advantage, be taken overseas or at regional centres.
- (c) As the training of local officers at professional level is all important, the necessary university entrance qualifications must be secured. Where adequate numbers of men with university entrance qualifications are not available, scholarships be made available at pre-university level where such arrangements are acceptable.
- (d) Refresher courses be given at all levels.

5. Education of the Public in Forestry

Education of the public in forestry be intensified in every possible way (including assistance from interested organisations) the provision of recreational facilities for visitors to forests, the employment of qualified public relations officers, the promotion by the forest authority of forestry extension services and collaboration with Government Information Services, paying particular attention to publicity directed towards schools and young people.

6. Methods of Management

The preparation of (management) plans be continued and accelerated using all modern techniques, with emphasis on simplicity and flexibility.

Silviculture

1. Espacement, Thinning and Pruning of Fast-Growing Plantations

A. Conifers

(a) Espacement and Thinning

- (i) All countries publishing research results or describing thinning practices categorise their thinnings on the criteria of dominant height (100 largest trees per acre) and number of stems per acre, together with basal area per acre, to define particular densities or thinning grades.
- (ii) Information on current or projected thinning research projects be exchanged between countries, and that the Commonwealth Forestry Institute act as a clearing house for this information.
- (iii) Fundamental research to determine the effects on tree and crop development of spacing and release from suppression be carried out, bearing in mind the approaches of O'Connor in South Africa and Crane in Australia.
- (iv) In analysing the results of thinning research, attention be given not only to the usual dependent variable of diameter, basal area and crop volume, but also to timber size assortments and timber quality so that economic assessment of the total volume can be made.

(b) Pruning

- (i) Research organisations should speedily publish (or otherwise make known) details of their results and experimental techniques in the form of interim reports.
- (ii) Research pay special attention to:—
 - (a) The effects of height of pruning and the minimum pruning diameter on increment.
 - (b) The effects of closeness of pruning on the rate of healing; and
 - (c) The economic aspects of pruning.
- (iii) A free exchange of ideas, techniques and actual pruning instruments between countries take place, and a series of illustrated articles on local practices be published.

B. Hardwoods

Studies should be made for each species of the relationship between age, basal area and crown size as affecting volume increment.

2. Tree Breeding and Seed Selection

A. Tree Breeding

Determination of the wood properties of selected trees be given high priority and be introduced at an early stage.

B. Seed Certification

All member countries co-operate in improving standards of seed certification, and that certificates, in addition to specifying the precise locality of collection, indicate the degree of selection exercised (e.g. unselected, final crop trees, certified seed stands, seed orchards).

3. Planting of Trials of Exotics

- (a) Trials of exotic species be expanded in most Commonwealth countries.
- (b) Countries should publish (or otherwise issue) all available information on the performance of provenances, however preliminary, as expeditiously as possible.

Protection

(a) The current research programmes on termite control in the various countries of the Commonwealth be co-ordinated and directed to the determination of the causes of attack, the effect on the environment of the elimination of termites, and the effects on the environment of insecticidal treatment.

(b) The countries of the Commonwealth co-operate in the compilation of an annotated check-list of the pests and diseases of all forest plantation species to be published before the Ninth British Commonwealth Forestry Conference.

(c) The Commonwealth Forestry Institute be asked to initiate and co-ordinate action on (a) and (b) above; and

(d) the attention of Governments be again drawn to the grave danger inherent in allowing the indiscriminate importation of plant materials. Adequate provision should be made in legislation to permit of the imposition of embargoes; enforce the growing of imported material in isolation; require certification or treatment; and establish, where necessary, suitable quarantine stations.