1929.

WESTERN AUSTRALIA

FIRST DECENNIAL REVIEW

OF THE OPERATIONS OF

THE FORESTS DEPARTMENT

TOGETHER WITH THE

ANNUAL REPORT

OF THE

CONSERVATOR OF FORESTS

FOR THE

Year ended 30th June, 1929.

PERTH:
By Authority: JOHN LEE, Acting Government Printer.

1929.

w 3229/29.

Forests Department,

Perth, 12th August, 1929.

The Honourable Minister for Forests.

Sir,

I have the honour to transmit, herewith, a review of the operations of the Forests Department since its inauguration under the provisions of the "Forests Act, 1918," together with my Annual Report for the year ended 30th June, 1929.

I have the honour to be,

Sir,

Your obedient servant,

S. L. KESSELL,

Conservator of Forests.

LIST OF BOTANICAL NAMES OF LOCAL SPECIES REFERRED TO IN THIS REPORT.

Jarrah (*Eucalyptus marginata*).

Karri (*Eucalyptus diversicolor*).

Wandoo (*Eucalyptus redunca,* var. *elata*).

Tuart (*Eucalyptus gomphocephala*).

Tingle Tingle (*Eucalyptus Jacksoni*).

Sandalwood (*Santalum spicatum*).

North-West Sandalwood (*Santalum lanceolatum*).

Brown Mallet (*Eucalyptus astringens*).

Blackboy (*Xanthorrhoea Preissii*).

GRAPHICAL SUMMARY OF OPERATIONS

	1919	1924	1929
Area classified and assessed.	1,388,000 acs.	4,001,832 acs.	4,781,682 acs.
Area topographical survey.	Nil.	200,000 acs	1,501,450 acs.
Area under Local Working Plan.	Nil.	168,930 acs.	818,215 acs.
Roads and Tracks opened up.	Nil.	21 miles.	1,093 miles.
JARRAH (a) Treated for regeneration.	Nil.	6,003 acs.	45,278 acs.
(b) Thinning & improvement of regrowth.	Nil.	Nil.	9,175 acs.
KARRI Treated for regeneration. (5,000 acs. of regrowth fire protected)	Nil.	Nil.	4,673 acs.
MALLET Area sown. (40,000 acs. fire protected)	Nil.	Nil.	760 acs.
SANDALWOOD Area sown. (270,000 acs. assessed and demarcated)	Nil.	430 acs.	3,590 acs.
PINE PLANTATIONS Established (15,000 acs. subdivided & soil types mapped)	400 acs.	1,040 acs.	4000 acs
EMPLOYEES Permanent & Casual. (Including Staff)	42	125	450
PERMANENT BUILDINGS Houses for Field Staff	2	8	96
Huts " " "	Nil.	1	47
Country Offices	3	4	12

CONTENTS.

FIRST DECENNIAL REVIEW OF THE OPERATIONS OF THE FORESTS DEPARTMENT.

ANNUAL REPORT FOR THE YEAR ENDED 30TH JUNE, 1929.

First Decennial Review of the operations of the Forests Department, 1919-1929.

I.—FOREST POLICY.

The serious leeway to be made up before the cut-over forests of the State are brought again into full bearing is indicated by the publication of the first Decennial Review of the operations of the Forests Department, during the Centenary year of the State. Although timber was probably the first export commodity of the Colony, it was not until 1919 that a Forests Act was placed on the Statute-book. By this time it had become abundantly evident that the valuable hardwood forests of the South-West were not inexhaustible, and the neglect of silvicultural treatment and fire control measures were rapidly tending to convert high quality forests into waste land. The power of the Eucalypt species to maintain vigorous coppice growth following long years of maltreatment has hidden much of the damage from the casual observer, but the forest crop has suffered severely owing to lack of forest management in past years. Much has been accomplished during the last ten years, and the foundation of a sound forest policy established, but the most serious problem facing the Department is the question of funds to rehabitate the heavily cut-over forests which have supplied the big export trade in timber and other forest produce during the past 70 years.

The importance of this trade is shown by the following table:—

Summary of Exports of Forest Produce since 1836.

Year.	Timber.		Sandalwood.		Year.	Timber.		Sandalwood.		Tanning Bark.	Essential Oils.*
	cub. ft.	Value.	Tons.	Value.		cub. ft.	Value.	Tons.	Value.	Value.	Value.
		£		£			£		£	£	£
1836*a*...	10,000	2,500	...	...	1884 ...	861,700	68,936	2,620	20,960	...	...
1837 ...	...	...	...	...	1885 ...	848,150	67,850	4,527	36,216	...	...
1838 ...	...	...	...	...	1886 ...	626,150	50,092	3,431	27,450	...	...
1839 ...	...	...	...	...	1887 ...	354,800	28,384	4,317	34,533	...	...
1840 ...	...	...	...	...	1888 ...	525,750	42,060	4,470	33,525	...	...
		...			1889 ...	788,500	63,080	6,385	57,465	...	...
1841 ...	...	...	...	...	1890 ...	1,172,200	82,052	5,136	51,355	...	...
1842 ...	...	...	...	...							
1843 ...	...	...	...	...	1891 ...	1,273,950	89,179	3,760	37,600	...	...
1844 ...	*b*	163	...	...	1892 ...	1,082,650	78,419	5,716	42,870	...	...
1845 ...	...	...	4	40	1893 ...	512,950	33,888	3,893	32,160	...	...
1846 ...	2,550	255	32	320	1894 ...	1,063,700	74,804	2,784	23,430	...	...
1847 ...	12,200	1,120	370	4,444	1895 ...	1,255,250	88,146	3,851	30,863	...	...
1848 ...	3,350	333	1,335	13,353	1896 ...	1,545,600	116,420	6,848	65,800	...	...
1849 ...	...	...	...	...	1897 ...	2,393,300	192,451	5,852	49,480	...	...
1850 ...	10,500	1,048	...	...	1898 ...	4,086,150	326,195	4,349	31,812	...	...
					1899 ...	6,913,550	553,198	4,084	29,719	...	...
1851 ...	1,250	268	219	1,593	1900 ...	5,725,400	458,461	5,095	39,038	...	...
1852 ...	7,050	806	...	...							
1853 ...	52,200	5,220	...	...	1901 ...	7,150,600	572,354	8,864	73,931	...	...
1854 ...	58,500	7,023	...	...	1902 ...	6,256,750	500,533	7,995	61,771	...	...
1855 ...	76,900	12,076	...	...	1903 ...	7,748,450	619,705	4,406	37,913	859	...
1856 ...	70,500	9,671	...	...	1904 ...	8,072,300	654,949	4,510	25,417	32,876	...
1857 ...	69,200	9,449	280	2,524	1905 ...	8,709,500	689,943	5,521	38,817	154,087	...
1858 ...	29,250	2,340	745	7,455	1906 ...	8,830,700*c*	708,993	8,848	70,958	140,720	...
1859 ...	67,250	6,051	1,278	17,259	1907 ...	6,409,550*c*	511,923	9,212	65,999	98,773	...
1860 ...	54,800	4,932	1,687	16,360	1908 ...	9,869,500*c*	813,591	9,564	76,668	79,934	...
					1909 ...	10,830,450*c*	867,419	4,805	37,456	59,633	...
1861 ...	27,750	2,497	2,558	24,945	1910 ...	12,074,100*c*	972,698	8,228	70,775	93,733	...
1862 ...	68,800	7,151	2,393	21,541							
1863 ...	32,300	2,963	2,807	25,265	1911 ...	12,449,500*c*	986,341	6,907	65,506	83,470	...
1864 ...	58,300	5,508	2,724	24,520	1912 ...	11,297,100*c*	903,396	3,154	27,533	49,094	...
1865 ...	183,950	15,693	1,686	13,490	1913 ...	13,619,850*c*	1,089,481	6,260	47,589	47,377	...
1866 ...	85,650	3,849	2,965	23,722	1914*d*...	6,279,750*c*	502,153	4,702	39,800	18,197	5
1867 ...	56,750	4,541	2,305	18,442	1915*e* ...	9,968,500*c*	808,392	8,375	78,926	6,127	381
1868 ...	8,000	638	3,256	26,045	1916*e* ...	5,432,100	441,991	6,271	61,381	10,208	1,102
1869 ...	179,900	14,273	4,124	32,998	1917*e* ...	3,890,650	310,893	7,230	72,669	18,959	2,060
1870 ...	157,200	17,551	6,112	48,890	1918*e* ...	3,436,250	274,141	6,504	81,834	16,886	3,995
					1919*e* ...	4,135,750	344,119	8,998	117,072	18,875	3,937
1871 ...	218,500	15,304	3,366	26,926	1920*e* ...	5,065,300	487,666	14,355	240,579	22,121	3,704
1872 ...	37,000	2,590	3,942	31,536							
1873 ...	68,150	4,771	6,292	62,916	1921*e* ...	9,816,250	1,162,735	10,839	181,801	23,073	10,107
1874 ...	345,600	24,192	7,057	70,572	1922*e* ...	8,309,750	1,063,475	3,990	54,769	13,328	6,878
1875 ...	342,350	23,965	6,646	66,465	1923*e* ...	7,911,310	1,009,831	7,623	102,912	21,161	20,075
1876 ...	219,050	23,743	6,577	65,772	1924*e* ...	11,126,861	1,379,022	14,081	348,713	29,606	39,877
1877 ...	336,150	36,979	4,247	31,851	1925*e* ...	11,844,303	1,491,925	6,243	186,775	40,136	42,057
1878 ...	580,900	63,902	4,675	35,064	1926*e* ...	12,001,384	1,533,030	7,771	238,203	15,056	47,819
1879 ...	627,250	69,742	4,667	35,001	1927*e* ...	12,580,262	1,659,876	6,821	199,754	15,818	26,454
1880 ...	662,350	66,252	5,197	51,970	1928*e* ...	10,384,784	1,274,482	4,829	147,426	27,662	39,131
					1929*e* ...	7,635,237	967,038	7,582	225,208	35,850	63,307
1881 ...	792,750	79,277	7,716	77,165							
1882 ...	936,500	93,650	9,605	96,050	TOTAL	291,714,991	27,740,756	405,504	4,753,175	1,173,619	310,939
1883 ...	997,000	79,760	7,031	56,250							

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. * Principally Sandalwood Oil.

Until 1919 no steps were taken to devote any portion of the revenue from timber to the maintenance of the forest crop and the time has arrived when the allocation of the whole of the net revenue from timber for the management, improvement, and protection of our valuable forest asset is a matter deserving of the earnest consideration of the Government. With the expiration of the last of the long term timber leases and concessions during the next few years, we have the opportunity of bringing the

management of our forests on to thoroughly sound lines, but the rate at which reforestation operations can be extended and permanent communities of forest workers can be established in homes in the forest will depend on funds available.

The following tabular statements of revenue and expenditure show that the expansion of reforestation operations has not proved a drain on the Treasury, and that the net revenue of the State has increased considerably since the passing of the "Forests Act, 1918." The figures for 1913 are quoted for comparison, as in that year the total volume of timber cut on Crown lands reached a maximum which has not been exceeded since.

Year.	Gross Revenue.	Revenue Appropriations for Administration and Reforestation Work.				Net Balance paid into Consolidated Revenue.
		Administration, etc. Interest and Sinking Fund on Loan Money.	Credited to Reforestation Fund.	Credited to Sandalwood Reforestation Fund.	Total Allocations.	
	£	£	£	£	£	£
1913	48,237	11,463	...	...	11,463	36,774
1919	42,051	11,733	...	...	11,733	30,318
1920	59,220	16,494	29,706	...	46,200	13,020
1921	75,469	18,787	33,824	...	52,611	22,858
1922	88,530	19,907	42,880	...	62,787	25,743
1923	87,658	18,033	42,303	...	60,337	27,322
1924	127,253	18,889	65,323	...	84,212	43,041
1925	182,764	20,784	76,867	5,000	102,651	80,113
1926	227,061	26,346	89,562	5,000	120,908	106,153
1927	222,507	26,616	87,078	5,000	118,694	103,813
1928	228,614	28,346	88,950	5,000	122,296	106,318
1929	191,023	27,523	72,377	5,000	104,900	86,123
Totals, 1919–29 ...	1,532,150	233,458	*628,870	*25,000	884,837	644,822

*These figures do not include miscellaneous refunds which totalled £11,188 to Reforestation Fund and £16 to Sandalwood Fund.

From the above figures it will be seen that, despite the setting aside of three-fifths of the net revenue for reforestation, the Treasury has benefited to the extent of £644,822 since the passing of the "Forests Act, 1918."

The actual expenditure of the Department from various sources during the same period is set out hereunder:—

Year.	Consolidated Revenue.	Reforestation Fund.	Sandalwood Reforestation Fund.	Loan Money.	Total Expenditure from all Sources.
	£	£	£	£	£
1913	11,463	...	...	3,842	15,305
1919	10,873	...	...	594	11,467
1920	12,962	7,241	...	*Nil*	20,203
1921	16,128	50,470	...	11,742	78,340
1922	16,439	29,123	...	2,324	47,886
1923	15,246	22,193	...	1,779	39,218
1924	15,835	31,625	...	873	48,333
1925	17,816	66,275	1,648	1,000	86,739
1926	23,191	72,512	3,269	2,349	101,321
1927	23,192	73,698	3,353	2,958	103,201
1928	24,081	87,080	4,613	9,972	125,746
1929	23,081	121,921	2,826	9,997	157,825
Total, 1919–29	198,844	562,138	15,709	43,588	820,279

The Reforestation Fund at 30th June, 1929, showed a credit balance of £77,920. When compared with the expenditure of £121,921 from this fund last year, it is evident that this balance is inadequate to meet the current developmental programme. In an endeavour to meet the more urgent needs, the scheme of expenditure submitted to Parliament during the current session is based on the balance in the fund at 1st July, 1929, plus the estimated appropriations from revenue collected to 1st January, 1930, amounting in all to £110,000, which is still considerably below last year's expenditure.

As a result of this proposal, the reserve in the fund will be reduced to six months' appropriations and, in view of the dependence of the amount credited to the fund each month on collections of revenue from timber royalties, and the necessity for continuation of essential services, such as fire control, during any period of depression or hold-up of the timber industry, this procedure will reduce the balance in the fund at any time to the minimum consistent with reasonable security.

The "Forests Act, 1918," made provision for the immediate establishment of a Forests Department, under the direction of the Minister for Forests, having control and management of all matters of forest policy. In 1919 the Forests Department consisted of an administrative staff of one, an office staff of 10, and a field staff of 27, and employed little or no casual labour. In 1929 the administrative staff consists of 13 professionally-trained forest officers, practically the whole of whom are employed full time in the field. The office staff consists of 35, including seven on drafting and preparation of lithographs. The field staff of locally-trained officers consists of 59, and the number of forest workers, including resident overseers, is 343, the majority of whom are full-time employees.

The first big work undertaken by the newly constituted Department was the classification of the timber lands of the State. By arrangement with the Lands Department the timber classification carried out by experienced bush workers was closely associated with a soil classification carried out by qualified officers of the Lands Department. The classification of all the more accessible timber country was completed by 1921, but it remained for the present Government during 1928 and 1929 to give effect to the dedication of State Forests.

The position at 30th June, 1929 is shown in the following table:—

Species.	Area Classified.	State Forests.	Timber Reserves.
	acres.	acres.	acres.
Jarrah	3,900,000	2,423,660	36,349
Karri	400,000	152,130	...
Jarrah and Karri (Mixed)	359,750	372,190	...
Tuart	5,932	5,932	...
Tingle Tingle	16,000	13,667	...
Mallet	100,000	...	*61,721
Sandalwood	330,440	1,930	232,634
Mining Timber, Firewood, Fencing Timber, etc.	...	...	1,333,202
Pine Planting	...	4,835	†116,375
Totals	5,112,122	2,974,344	1,780,281

* In addition, approximately 8,000 acres temporary reserves. † Including 107,000 acres of country temporarily reserved pending the result of experimental pine planting operations now being carried out.

The only area of forest country of any considerable extent awaiting classification lies to the south of Lake Muir between the Deep and the Frankland Rivers, and is difficult of access at the present time, although it is proposed to complete this important work as soon as funds permit.

II.—REFORESTATION.

1. FOREST MANAGEMENT.

The classification of forest country not only served to locate the areas of merchantable forest, but provided the basis for a reasonably close estimate of the volume of timber remaining. Owing to lack of forest management in the past the sawmilling industry in Western Australia has been migratory. Towns have been built in the forest, flourished for a decade or more, and then disappeared. The idea of the sawmill as a permanent business, cutting only the increment of the growing forest is only now developing, but owing to heavy over-cutting in the more accessible districts in the past, it will be many years before this state of affairs can be brought about in each forest area. As a first step to bring the timber industry as a whole on to a permanent basis, a General Working Plan for Jarrah was approved by the Governor-in-Council in March, 1929. The volume of mature standing Jarrah timber suitable for sawmilling is estimated to be 1,033,000,000 cubic feet, and at the present rate of exploitation, with all mills working at full capacity, this represents only 28 years' cutting. Data concerning the growing stock represented by younger age classes are limited, and no satisfactory increment figures or yield tables for Jarrah exist. It is evident, therefore, that any calculation of permissible annual cut must be approximate and to some extent arbitrary. Ninety years was accepted as the rotation, and it was considered that, if the cutting of the present mature crop can be extended over the first half of the rotation, with an active policy of silvicultural treatment and protection, the immature growing stock should develop sufficiently to maintain this rate during the second half of the rotation. This gives a permissible annual cut of 23,300,000 cubic feet of log timber measured in the round, and the General Working Plan for Jarrah aims to reduce the cut to 25,000,000 cubic feet during the next five years, and to 23,300,000 cubic feet within 10 years. In the Working Plan the whole of the Jarrah forests of the Crown are divided into natural logging sections, and cutting proposals for each one for the next 10 years laid down. As local Working Plans covering all operations including regeneration, protection, and utilisation measures on each of these forests is prepared, those portions of the Working Plan dealing with utilisation will conform with the requirements of the General Working Plan.

Despite extensive tramway construction by sawmilling companies, very little reliable survey had been carried out in the Jarrah forests prior to 1920. Before reforestation work could be started it was necessary to make topographical surveys. On more accessible forest country closer to Government railways and centres of population, sufficient ties were available to render survey by prismatic compass reasonably accurate, but as survey camps have worked into more distant forest regions a skeleton survey by theodolite has been found necessary, the details being subsequently filled in by compass. This work, necessitating 10,000 miles of traverse, has been carried out over 1,331,690 acres, and as a result 31 lithographs have been published and others are in course of preparation.

With the development of silvicultural work and fire control it became apparent that a resident staff of forest workers distributed throughout the area under management was necessary, and that such a system would yield far more satisfactory results than any attempt to concentrate extensive operations to comparatively few centres where large gangs of men might be employed. A "Block" of 5,000 to 15,000 acres, depending on quality classes, has been adopted as an administrative unit and each Block is placed under the control of a resident working overseer who himself carries out silvicultural and fire-control work on his own Block, with the aid of one or more casual employees.

A number of Blocks may be united under the one Working Plan and the same central fire-control organisation, but the overseer is encouraged to regard the care and protection of the whole forest on his Block as his particular responsibility. The number of Blocks on which work has been started in the Jarrah forests is 48, and 58 houses have been erected for the accommodation of overseers and workmen.

As a first measure, when it is proposed to commence operations on any Block or group of Blocks, roads of access are opened up. Old tracks or tramway formations cleared by timber getters are made use of as far as possible. The length of bush tracks cleared and maintained for vehicular traffic exceeds 1,000 miles. Steps are also taken at an early stage to connect overseers with fire lookout towers and district offices by bush telephone lines. One hundred and eighty-seven miles of telephone line have been constructed and the system will be considerably extended during the coming year. An economical type of tree-line construction with earth circuit adapted to local conditions has been standardised and is giving excellent service.

While adhering as far as possible to the principle that the overseer shall be provided with a comfortable house, small cultivation paddock and orchard on his own Block, it has been found necessary to group the buildings to an extent so that school facilities for his children shall be available within reasonable distance, and opportunities for social intercourse provided. Four of these forest settlements have been established to date.

The following statement shows the rate of progress of the work briefly outlined above. Included in this tabulation are certain permanent works in connection with other species such as Karri, Tuart, and Mallet (not Sandalwood) where the same principles have been adopted, but where the extent of work is much less than in the case of Jarrah.

	Assessment Survey.	Topographical Survey.		Area under Local Working Plans.	Accommodation for Staff.		Roads and Tracks opened up.	Telephone Lines erected.
		Acres.	Miles		Houses.	Huts.		
	acres.			acres.			miles.	miles.
1916–18	1,388,000	...	...	...	2	...	...	...
1919	912,000	...	...	...	...	...	...	...
1920	950,000	...	...	...	...	...	20½	...
1921	504,192	...	...	...	...	...	...	...
1922	...	150,000	...	168,930	...	...	...	25
1923	247,740	...	...	...	2	...	½	...
1924	...	50,000	450	...	4	1	...	...
1925	...	296,390	2,766	92,410	11	5	284½	...
1926	...	297,650	2,780	69,865	15	...	205	20
1927	40,750	273,950	2,834	116,123	15	20	80	42
1928	440,000	203,000	371	126,432	15	11	195	32½
1929	299,000	230,460	439	*244,455	32	10	307½	67½
Totals	4,781,682	1,501,450	9,640	*818,215	96	47	1,093	187

* Includes 201,355 acres for which Working Plans have been drawn up but not yet submitted to Executive Council.

2. SILVICULTURE.

(a) *Jarrah.*

Jarrah is a Eucalypt occurring in practically pure forest, which has the power of vigorous coppice growth, and, given sufficient time, natural regeneration in heavily cut-over forest is prolific. Owing to repeated fires practically the whole of the natural regrowth of Jarrah to be found in our forests to-day is coppice growth from seedlings which have been burnt back a number of times. Seed

A stand of young Jarrah after thinning and improvement work, Dwellingup District.

Divisional Office and Quarters, Dwellingup

years are irregular and occur sporadically throughout the habitat of the species. The seed is heavy and in consequence dispersal is poor. The development of the seedling is disappointingly slow in the early stages. In consequence the presence of plentiful advance growth throughout practically the whole of the cut-over forest is of particular value and the work of the forester is directed to providing conditions that this advance growth may come away in the form of seedling-coppice arising from ground level. In the case of the smaller root stock from which the major portion of the future crop will be secured, only one main stem gets away, so that the appearance of the treated and protected forest at the end of five or six years is that of a seedling crop. Even the most heavily cut-over forest is found to be carrying a surprising volume of marketable timber and the removal of the over-mature trees constitutes the first silvicultural problem. The conception of the extraction of the mature and over-mature trees as the first operation in the regeneration of the forest is steadily gaining ground among timber workers, and the marking of trees to be taken out for sawmilling or hewing according to silvicultural rules is being substituted for control by minimum girth restrictions as rapidly as the training of staff and pressure of other work allow. Tree marking for sawmilling is now being carried out in 21 centres. As a first measure for the protection of immature timber in all centres where utilisation is proceeding under minimum girth restrictions "top disposal" operations are carried out by Departmental employees who clear debris resulting from falling operations from around the base of standing poles and piles and subsequently burn the lop and top by a controlled fire at seasons when the intensity of the fire will not cause excessive damage to the crop remaining. The area which has been treated this way amounts to 245,000 acres

Regeneration operations are carried on according to a system of Selection by Groups, following trade cutting under tree-marking control. In the blanks useless species are either cut down or ringbarked, faulty advance growth is cut back to ground level and the whole burnt by a fire, the intensity of which depends on the condition of the surrounding forest. The area treated to date is 45,000 acres, and the organisation necessary for the treatment of 20,000 acres per annum has now been established.

More intensive management has resulted in the location of extensive belts of sapling regrowth which has reached that stage of development without serious damage. An examination of this regrowth has shown that over many tens of thousands of acres there exists a full stocking of sufficient sound saplings and young poles for a final crop, but in many cases the best tree is not the dominant, and in consequence, apart from consideration of increased increment, thinning together with improvement work in the direction of the destruction of useless remnants of the original crop is urgently necessary. Regrowth of this type is being located by special assessment and during the past two years 9,100 acres have been thinned and improved, and at least 10,000 acres should receive treatment during the coming year.

The development of these silvicultural operations in the Jarrah forest is shown in the following statement:

	Top Disposal.	Treated for Regeneration.	Thinning and improvement existing regrowth.
	acres.	acres.	acres.
1919	...	...	...
1920	...	...	...
1921	...	...	...
1922	...	2,747	...
1923	...	680	...
1924	29,917	2,576	...
1925	33,730	8,880	...
1926	29,970	4,719	...
1927	44,230	7,230	...
1928	59,795	4,431	2,058
1929	47,649	14,015	7,117
Totals	245,291	45,278	9,175

(b) *Karri.*

Karri occupies a much more restricted habitat than Jarrah and generally speaking the soil of the Karri region is of much better type than Jarrah. In consequence a large proportion of the cut-over Karri forests has been alienated for closer settlement. Silviculturally Karri is dissimilar to Jarrah in many respects and after the great volumes per acre, running into 10,000 cubic feet of log timber and more, have been removed, it is a matter of regeneration from seed followed by the destruction by ringbarking of the useless over-mature trees which have been reserved for seed. On the Big Brook Working Plan area 4,673 acres have been treated in this way, which practically amounts to clear felling, and a fine crop of seedlings obtained. On the Boranup Working Plan area the problem of protecting and improving the regrowth resulting from the operations of the Karridale Mill is now being undertaken. This regrowth at the end of 25 years has reached such a size that it is unsatisfactory to consider destroying poles to be removed as thinnings which are 60 feet and more in height. The

area of 5,000 acres is not sufficient to warrant the establishment of a paper pulp mill, even if the improvement work is associated with pine planting work in the same locality, but if some market cannot be foreseen in the immediate future, thinning will have to be undertaken.

A General Working Plan for Karri has been approved by the Governor in Executive Council. The present output exceeds the permissible annual cut, and it is proposed to take steps to regulate the output as soon as the existing sawmills finish cutting on their present permits. No further cutting rights may be granted during this period. The total volume of mature merchantable timber on Crown lands when the Working Plan was gazetted in 1927 was estimated to be 301,650,000 cubic feet.

(c) *Tuart.*

Tuart is a species which received early attention owing to the small extent of prime forest and the special value of the timber for Government requirements in the Railway Workshops. There has been little or no natural regeneration for several decades, and it is difficult to say how far frequent burning and over-grazing have been responsible for some change in the factors of the locality. Under present conditions, even with restriction of grazing and fire control, there appears no prospect of securing a satisfactory stocking of regrowth by natural or artificial means at reasonable cost. The Department has operated a sawmill for the economic utilisation of over-mature Tuart taken out in the course of silvicultural treatment and during the past few years this has been run at a small profit, supplying timber to the Railway Department, but the results of the silvicultural work on the 1,990 acres treated are decidedly disappointing. While studying the result of this work consideration is being given to the introduction of a rotation of *Pinus pinaster* on the balance of the area cut-over. If it is finally decided to proceed on these lines, any vigorously growing immature Tuarts, whether singly or in groups, will be retained as standards.

(d) *Mallet.*

The Mallets of the better rainfall areas along the Great Southern Railway were ruthlessly exploited some 20 years ago, and only the facts that the species seed freely at all ages and are largely confined to stony outcrops surrounded by poison plant country has saved them from extinction. Assessment of Crown lands remaining in these districts, which is all very poor country, has shown that these scattered colonies of Mallet in the aggregate amount to a considerable area. The species is fast growing and of particular value, as even the early thinnings yield saleable bark. The extension of colonies by spot sowing on cleared and partly cultivated land has given excellent results. In consequence 69,500 acres of land have been reserved and five overseers established to look after groups of reserves. The first work on each group of reserves is to reduce fire hazards by the establishment of a system of firebreaks. Existing groups of Mallet are then thinned and when this work is well in hand on each reserve, planting operations will be undertaken. Forty thousand acres have been afforded fire protection, and 760 acres sown to date. Two mobile gangs are working on reserves not yet brought under the control of resident overseers.

(e) *Sandalwood.*

A large proportion of the Sandalwood exported during the past 80 years has been obtained from agricultural land which is now under wheat. Its habit of root parasitism limits the possibility of reforestation to areas where host plants are plentiful. The young Sandalwood is succulent and readily eaten by stock and rabbits. Consideration of these facts shows that the only region where extensive areas of natural scrub, free from agricultural and pastoral interests, are available is in the Eastern Goldfields, in the Kalgoorlie and Coolgardie districts and along the Trans-Australian Railway. A classification of Sandalwood-bearing country in these districts showed that natural regeneration was more plentiful than anticipated, and reasonably compact areas were available for reservation.

Following the classification of 330,000 acres, 278,442 acres, carrying a good stocking of host plants and sufficient natural regrowth of Sandalwood to justify reservation and demarcation without further artificial regeneration, have been gazetted as Timber Reserves. 7,744 acres have been fenced against cattle and 2,659 acres have been rabbit netted for experimental sowing. During the past seven years 3,590 acres have been sown with Sandalwood nuts but the results of this experimental work have been delayed by a succession of dry seasons. Good rains in three successive months are required for satisfactory germination and survival until the seedling can parasitise. It has been satisfactory to find that the nuts, if properly buried, will survive a succession of light rains without deterioration. The one factor which has changed during recent years is the introduction of the rabbit, and it remains to be seen how far this pest will affect the possibility of Sandalwood sowing on a large scale.

III.—AFFORESTATION.

Softwood Plantations.

Indigenous forests are deficient in softwood species and, despite the use of hardwoods in Western Australia for many purposes for which softwoods are used in other countries, over £200,000 is sent overseas annually for the purchase of low grade softwood timber. With the object of producing this timber locally and building up a reserve to meet increasing requirements with the growth of population and industries, plantations of conifers have been established. Selection of both species and land has presented difficulties owing to the low summer rainfall and the accepted economic principle in Australia that only the poorest land should be devoted to this purpose. Experience derived from small scale operations commenced some twenty years ago has shown that *Pinus radiata* is not suited to planting on coastal sandplain, but gives rapid growth on better class loamy soils. *Pinus pinaster* on the other hand has given promising results on well drained coastal sandplain. Pending the results of experimental planting of some 21 other species these two have been used for all large scale work. The only land available for the planting of *P. radiata* has been in the richer gullies in the ranges where the land is withheld from selection on catchment areas. Considerable areas of coastal plain are available and have been reserved for pine planting purposes. Exceptionally dry summer conditions and the possibility of dry spells during even the mid-winter planting season have made a careful study of planting technique necessary. Difficulty in the early stages was also experienced in raising satisfactory nursery stock, and it was only after considerable investigation that the trouble was traced to the absence of a soil organism, probably a mycorrhizal fungus. This trouble has been eliminated by the infection of new nursery beds by dressing with infected soil from a well established plantation, or by lining out infected seedling stock from an older nursery.

The area of effective plantation in 1920 was 400 acres, and by 1929 it had been increased to approximately 4,000 acres and the organisation necessary for the planting of 1,000 acres in future established. Pine planting is now proceeding as the main operation on 11 Blocks in charge of resident overseers, and experimental planting is being carried out in four other centres. Of the eleven planting areas five are on coastal sandplain and six on heavier soils in the Darling Ranges; five of these six are in the Mundaring district. Approximately 2,500 acres of the total area of effective plantation are planted with *P. pinaster* and 1,500 acres with *P. radiata.*

IV.—FOREST PROTECTION.

(a) *Fire Control.*

In 1920 steps were taken to test the possibilities of fire control work in the Jarrah forests and to establish the most economical and desirable local practice. The efficacy of fire towers at intervals of 12 to 15 miles in early detection of outbreaks was proved and experience gained in fire-fighting work. The value of controlled burning early in the season, to establish safety zones, was shown, but the cost of carrying out early burning on systematic lines over the whole forest was found prohibitive, even if the practice were considered desirable.

Five hundred acres was fixed as the average size for compartments in the Jarrah bush and firebreak belts five chains wide around each compartment are excluded from treatment and held for periodical burning until such time as the young crop on the treated country is safely above the "fire line." The external boundaries of these firebreak belts are marked by scraper tracks made by a triangular implement of local design drawn by a single horse.

When operations are started on a group of adjoining blocks it is not necessary to erect fire towers and set up an organisation for the central control of fire fighting until the area of regrowth at stake on each Block is greater than the overseer can reasonably look after without such assistance. In consequence only four permanent fire lookout towers have been erected to date, but additional sites have been selected and the system will be extended as the work accomplished in respective districts justifies the extension. The practice of building overseers' houses in elevated positions, with extensive views over country under treatment, has also been adopted. The efficiency of these fire control measures and the dependability of the field staff is shown by the fact that, during the past 10 years, no serious fire losses have occurred.

(b) *Animals.*

Reference has already been made to the damage caused by rabbits in sandalwood reforestation work. Fortunately, these pests are not common in areas where pine planting is proceeding. Smaller marsupials have, however, shown a strong liking for young conifers and have caused considerable damage, particularly in plantations on catchment areas where shooting and hunting have been prohibited for some years. Biting off the top by brush kangaroo seldom causes death to the pine, which sends up a new leader, but barking at the base, from the second to the fifth year, by quokka and tamar, is much more serious, and frequently causes the death of the pine by complete ringbarking.

V.—FOREST UTILISATION.

The reserves of merchantable timber of Jarrah and Karri were shown by the classification of forest lands to be inadequate to maintain the timber industry at the peak of production reached immediately prior to the war in 1913. Reference has already been made to the steps taken to reduce the log consumption from the forest to a basis of sustained yield. The forester can prescribe the permissible cut of log timber, but it remains for the timber trade to see that such restricted output is worked up to the best advantage. The first and most important move in this direction was made by a provision in the "Forests Act, 1918," restricting the operation of sleeper hewers on Crown lands, and the wisdom of this restriction has been abundantly illustrated by great waste of timber which has occurred during hewing operations on private property during the past 10 years. The sleeper hewer may serve a useful purpose in working up faulty logs in advance of reforestation measures, where the volume of timber remaining and the class of log to be worked do not justify sawmilling, but the marking and removal of these logs is a silvicultural operation and the number of hewers available with registrations entitling them to operate on Crown lands is more than sufficient to meet the demand for many years to come.

Many of the old mills designed and erected to cut a large tally, principally of sleepers, have in the past shown a recovery of sawn timber not very much better than a good sleeper hewer, but there is a definite move to improve the type of mill and adapt them to cut the best out of the log. A reduction in log intake in the future is inevitable, but the effect of this on the industry can be met by increasing the quality and value of the sawn product. Reforms in this direction are long overdue and, although there is tangible evidence of the general appreciation of these facts by the sawmilling industry, the progress being made is slower than the State, with its diminishing forest asset, can afford.

The following statement shows the production of timber in the square from Crown lands and private property during the past 10 years, compared with the production during the peak year—1913.

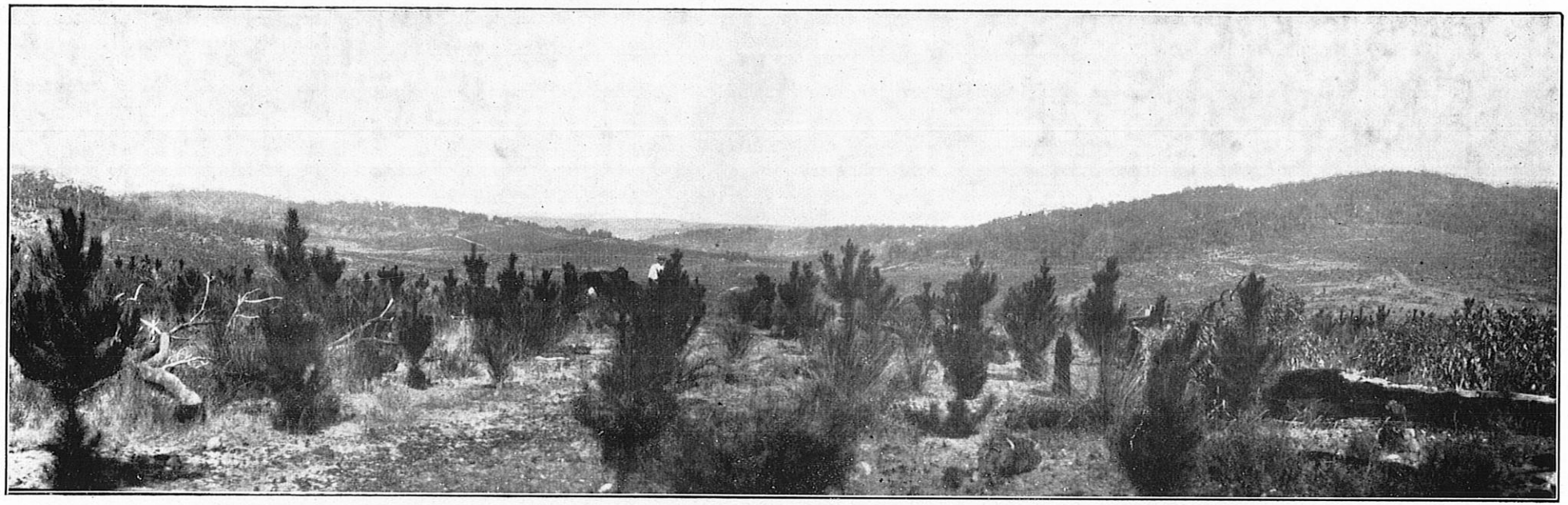
Year.	Hewn Sleepers.			Sawn Timber.			From Private Property including sawn sleepers.	Value of Timber exported.
	From Crown Lands.	From Private Property.	Total.	From Crown Lands.				
				Sawn sleepers.	Other sawn timber.	Total.		
	cub. ft.	cub. ft.	cub. ft.	cub. ft.	cub. ft.	cub. ft.	cub. ft.	£
1913 ...	4,254,740	*	4,254,740	‡	‡	13,987,632	*	1,089,481
1919 ...	‡	‡	979,150	‡	‡	6,180,600	112,900	344,119
1920 ...	‡	‡	1,594,700	‡	‡	8,721,000	137,950	487,666
1921 ...	‡	‡	1,662,550	‡	‡	9,510,150	241,050	1,162,735
1922 ...	‡	‡	3,503,500	‡	‡	11,245,800	298,400	1,063,475
1923 ...	‡	‡	2,497,800	‡	‡	9,771,350	426,700	1,009,831
1924 ...	‡	‡	2,431,150	‡	‡	12,980,204	265,482	1,379,022
1925 ...	† 1,569,605	2,712,787	4,282,392	2,623,903	9,662,461	12,286,364	1,462,653	1,491,925
1926 ...	† 1,533,173	4,744,779	6,277,952	2,472,932	11,600,153	14,073,085	449,648	1,533,030
1927 ...	† 1,764,216	5,758,846	7,523,062	1,583,368	11,420,193	13,003,561	850,694	1,659,876
1928 ...	† 1,067,099	4,152,214	5,219,313	1,047,564	11,756,387	12,803,951	804,851	1,274,482
1929 ...	296,718	1,744,674	2,041,392	561,889	10,020,714	10,582,603	666,408	967,038

* No figures available. In 1913 practically the whole of the output came from Crown Lands. † Includes timber from land in course of alienation including Group Settlement holdings. ‡Separate returns not available.

The supply of poles, piles, firewood and mining timber are local problems which have received attention in the districts where the industries requiring supplies are situated.

The export of mallet bark, owing to uncontrolled exploitation, has, as far as Crown lands are concerned, become an industry of small importance.

Considerable attention has been devoted to the export trade in Sandalwood, and the revenue from this source raised from about £12,000 per annum to £50,000 per annum, while at the same time the price paid to the cutter has been fixed at practically double the average rate previously ruling (viz., £16 per ton f.o.r., Fremantle). The basis of this control has been the limitation of production to the estimated requirements of the Chinese market, which were considered to be a little in excess of 6,000 tons per annum. While prices have been maintained for six years, the restriction of production has not been effective, owing to the supply obtained first from freehold land in Western Australia, and subsequently from Crown lands and private property in South Australia. The South Australian sandalwood is a substitute which is acceptable to the Chinese, and unless some arrangements between the two States concerned, for the control of production including operations on freehold land, can be reached in the immediate future, the value and demand for this commodity must slump very considerably.



Pinus radiata 21 months after planting, Helena Block, Mundaring.

Pinus radiata immediately after first thinning, 7 years after planting, Greystone's Block, Mundaring.

VI.—RESEARCH.

(*a*) *Seasoning of Local Timbers.*

In 1918 a start was made to investigate the seasoning of local hardwoods. An experimental kiln of the Tiemann type was erected in the grounds of the University Engineering School at Crawley. It was shown that the principal commercial species, including Jarrah and Karri, could be kiln dried economically and, if properly seasoned, these timbers were as reliable and satisfactory as any high-grade cabinet wood. The investigation was then extended to include the seasoning of Jarrah flooring. The results being secured in the many large air seasoning stacks in the South-West were investigated, and recommendations for improved practice were supplied to the trade. As a result of this work, it was considered that a few months' preliminary air drying followed by a short period in a simple type of kiln was likely to prove the most economical and satisfactory treatment for large scale commercial operations. A simple type of reverse draught kiln for this purpose was designed and patented under the name of the Clarke kiln. The timber trade have been slow to take advantage of this work, but there are indications that developments may be expected in the near future.

(*b*) *Preservation.*

The durability of Jarrah is sufficient for all ordinary requirements, but Karri is a hardwood of lower resistance to both termite and fungoid attack. With the erection of large mills by the State Saw Mills for the cutting of Karri, in 1914, the Powellising process was adopted for the treatment of this timber for railway sleepers and similar purposes where durability was an important factor. By 1923 conflicting reports of the results secured by the use of Powellised sleepers were serious enough to warrant a thorough enquiry. This investigation was undertaken by the Department and the conclusion was reached that, while the process might be considered satisfactory in dry regions where termite attack was the main cause of failure, it was not equally effective in wetter areas as a specific against fungoid attack. As a result of considerable experimental work a new open tank process suitable for unseasoned hardwood timber was developed and patented under the name of Fluarising. The arsenic, which is used also in Powellising, is used as a specific against termites, and sodium fluoride and sodium dinitrophenate are included in fixed proportion as fungicides. This process has now been adopted by the State Saw Mills, who are the only sawmillers working Karri on a large scale.

(*c*) *Tannin-bearing Plants.*

One of the few investigations followed through by the Forests Products Division of the Commonwealth Bureau of Science and Industry was a tannin survey of Australian plants. As a result of this work it was considered that Western Australia offered the most promising field for the manufacture of tannin extracts on a commercial scale. To test the value of a number of local materials, such as Marri kino, Karri bark, and Tuart and Wandoo timber, for this purpose, an arrangement was entered into with the Commonwealth Council for Scientific and Industrial Research to make use of a quantity of machinery suitable for the purpose, which they had lying idle. A plant on a semi-commercial scale has been erected in proximity to the University School of Engineering at Crawley, and the first materials to receive attention have been those listed above. Tuart timber has been definitely rejected. Karri bark has given promising results, and bulk samples have been recently despatched to large tanneries in the Eastern States. The control of this plant has now been taken over by the newly-constituted Division of Forest Products of the Council for Scientific and Industrial Research.

(d). A number of minor projects have received attention, including the artificial tapping of Marri for the production of kino, the termite-resisting properties of local timber, and the microscopical structure and identification of some of our more important commercial species.

(e). The work of foresters undertaking silvicultural treatment of species not previously dealt with, and introducing exotics to a new country, brings to light many problems needing careful investigation. One example of the discovery of the obligatory relationship between pines and mycorrhiza has already been mentioned. Many other investigations have been undertaken and are proceeding.

The help of Professor H. E. Whitfeld and Professor N. T. M. Wilsmore of the University of Western Australia, who have acted with the Conser ator of Forests as a committee handling the research problems referred to above (with the exception of those relating to silviculture), has been of great value to the Department.

VII.—NOTES ON FUTURE POLICY.

(a) *General.*

Western Australia with an area of 624,500,000 acres, has a great future following the development of agricultural, pastoral and mining industries throughout this vast territory. The prime forest region is limited to a few million acres in the extreme south-west corner, and within a few decades every acre of these forests will need to be brought into full productivity to supply internal requirements. This can be accomplished by the proper control of an existing industry with little or no charge on the community. This fact is frequently lost sight of when considering the relation of forestry to land settlement. When a broad view is taken of State requirements there should be no conflict of interests, but the danger lies in the persistence of small local or even personal interests and the indifference of the general community to bigger issues. As the output of timber is brought on to a sustained yield basis, and reforestation work extends, the forests will continue to support an increasing population, and every acre carrying merchantable forest or good quality re-growth, which is alienated, is a set-back to the timber industry and a direct loss to the State. The depression which the timber industry is suffering at the present time, associated with the excessively low price for the few sleeper orders available, is due to a considerable extent to the alienation of jarrah country in past years. The possibility of utilising small

pockets or narrow gullies of good land in the forest will receive increasing attention as forest management is extended on more intensive lines. The locating of lines of transport for bulky forest produce, and the subdivision of the forest into definite compartments is the first step. This will be followed by the selection of sites where permanent water is obtainable for small mills, and homes for forest workers who will be encouraged to make use of the small pockets of rich land in the gullies. A substantial start has been made with this work, and each year should see considerable progress in building up a permanent rural population in timbered areas, who will recognise wealth and prosperity in the vigorous growth of well-managed forests around their holdings.

(b) *Utilisation.*

The importance of more efficient sawmilling practice, associated with better seasoning and grading, cannot be too strongly stressed. The Department can help by education and the advice of specially trained officers, but the solution lies primarily with the sawmilling industry, and considerable saving will be effected if reforms can be introduced in advance rather than in consequence of serious economic pressure. The days of cutting to tally and big production of low-priced lumber have passed, and in future it will become a matter of smaller output of higher quality and better priced timber.

(c) *Reforestation.*

A beginning has been made with the establishment of an organisation for forest management on economical and systematic lines, but funds at present available are not sufficient to make up the leeway resulting from 60 years of uncontrolled exploitation. The time has arrived when the Government should give earnest consideration to the allocation of the whole of the revenue from timber and other forest produce to this necessary and remunerative work.

(d) *Afforestation.*

The planting of pines to meet the softwood requirements of the next generation is a proper charge against loan funds, particularly if it is realised that the plantations, when once established, may be considered a permanent asset. If properly handled, it should be possible to secure future crops on the same country by natural regeneration. There has been a generally accepted idea throughout Australia that only land unsuitable for any other crop should be devoted to the planting of pines. When the loan money expended throughout Australia on pine plantations which have failed through excessively poor or unfavourable soil conditions is considered, the wisdom of this policy becomes open to question. Good pine planting land is not necessarily first-class wheat or potato land, but it may be good-class grazing country. The withdrawal of all the pine planting country required for a 1,000 acre per annum planting programme would not appreciably affect pastoral interests, and the return per acre would compare favourably with other forms of agriculture. Accessibility to markets is an important factor, and the cost of acquiring the land may be repaid many times over with compound interest from the increased growth and certain return which pines will show on selected country.

The results of our planting to date are being carefully watched, and it may be necessary to put forward recommendations to the Government on lines indicated above if results on land which has been considered too poor for anyone to select are not entirely satisfactory.

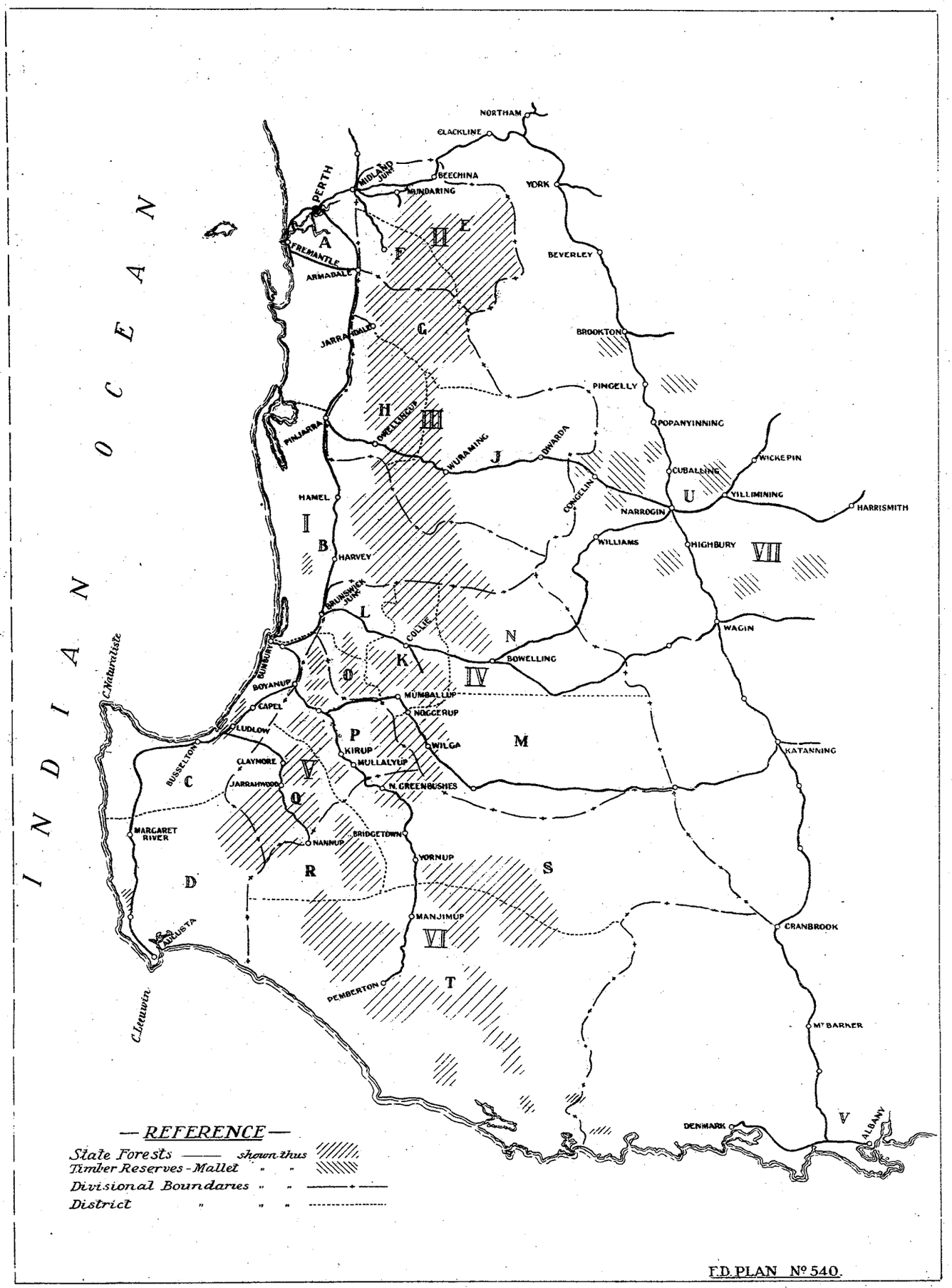
(e) *Timber in Agricultural Areas.*

The preservation of trees in our drier agricultural areas has not received the attention it deserves by either the farming community or the Government. In our older settled farming areas timber for fencing and even firewood is becoming scarce, and the shortage will become more serious every year. This is the direct effect of the wholesale destruction of indigenous forest, which the farmers are beginning to realise, but the indirect results of lack of shelter for stock and the dangers of wind erosion and "salt creep" are likely to be even more serious. In country of less than 20-inch rainfall the establishment of a new crop of trees in the form of shelter belts is likely to prove a difficult and expensive undertaking. In further surveys reserves of the best type of forest occurring in the district in central positions should be selected and immediately dedicated as State Forest. These reserves should consist of compact areas of several thousand acres, which will be sufficient to warrant supervision and regeneration operations when the demand for timber arises in the district. If, in the meantime, the individual farmer has learned to reserve and manage his own woodlot, the dedication can be reconsidered, but the prospect of this state of affairs arising within the next 25 years is remote.

(f) *Education and Research.*

The training of officers for senior positions in the Forest Service cannot be undertaken satisfactorily in the State owing to the limited number of positions available. The Commonwealth Government have established a school for the higher training of forest officers at Canberra, and there is scope for only one first-class school in Australia. Western Australia has selected eight nominees from students at the local University to finish their training at Canberra. This move for the co-ordination of education should be extended to include research work. As already stated, every forest officer is to some extent carrying on research work, but a number of senior research officers are needed who will be in a position to correlate work in different States and initiate lines of research into definite problems in consultation with local foresters. The employment of highly trained and experienced research workers for this purpose can only be arranged by co-operation of the States with the Commonwealth.

The same remarks apply to research in forest products, in connection with which certain work has already been carried out in co-operation with the Council for Scientific and Industrial Research. The establishment of a Division of Forest Products by the Council is a definite advance in this connection, and, if the new Forest Products Laboratory does not suffer the same fate as its predecessor in being starved for funds in early years, work of immense value to the States may be accomplished.



F.D. PLAN Nº 540.

KEY TO DISTRICTS AND SUB-DISTRICTS.

Division.	District or Sub-district.	
I.	A	Metropolitan.
	B	Yarloop.
	C	Busselton.
	D	Margaret.
II.	E	Mundaring.
	F	Karragullen.
III.	G	Jarrahdale.
	H	Dwellingup.
	J	Wuraming.
IV.	K	Collie.
	L	Worsley.
	M	Noggerup.
	N	Muja.
	O	Wellington.
V.	P	Kirup.
	Q	Jarrahwood.
VI.	R	Nannup.
	S	Bridgetown.
	T	Manjimup.
VII.	U	Narrogin.
	V	Albany.

Annual Report on the operations of the Forests Department for the Year ended 30th June, 1929.

CHAPTER I.

THE FOREST AREA.

(1) STATE FORESTS (FORESTS ACT, 1918).

——	June, 1928.	June, 1929.	Increase.
	acres.	acres.	acres.
Jarrah	1,836,087	2,423,660	587,573
Karri	7,200	152,130	144,930
Jarrah and Karri (Mixed)	540	372,190	371,650
Tuart	5,932	5,932	...
Tingle Tingle	...	13,667	13,667
Sandalwood	1,930	1,930	...
Pine Planting	4,835	4,835	...
Total	1,856,524	2,974,344	1,117,820

The increase is accounted for by the dedication of State Forests 31 to 45 inclusive, comprising 1,111,027 acres and by additions to State Forests 6, 14, 17 and 28 comprising 10,926 acres.

Three small areas totalling 80 acres were excised from State Forest No. 4 (Collie).

The difference between the total increase as shown in the above table and the increases referred to in this note is accounted for by adjustments to areas upon receipt of certified plans from the Surveyor-General.

As certified plans for all State Forests dedicated have not yet been deposited by the Surveyor-General it has been necessary in some cases for the purpose of this report, to use approximate figures only which will require adjusting upon the lodgment of plans.

(2) TIMBER RESERVES (FORESTS ACT, 1918).

——	June, 1928.	June, 1929.	Increase or Decrease.
	acres.	acres.	acres.
Jarrah	36,515	36,349	† 166
Karri	1,807	...	† 1,807
Other Species—			
Sandalwood	1,312,340	27,105	* 53,298
Pine Planting		5,331	
Mining Timber, Firewood, etc. ...		1,333,202	
	1,350,662	1,401,987	* 51,325

* Increase. † Decrease.

The increase is accounted for by the declaration of reserves 85/25, 87/25, 89/25, 90/25, 91/25 in the Goldfields areas, comprising 52,790 acres for the protection of timber, chiefly to meet pastoral requirements, and 88/25, comprising 1,188 acres for pine planting East of the railway line at Boranup.

During the year reserves were revoked as follows:—

57/25 Jarrah	166 acres	included in State Forest 33
58/25 Karri	1,767 acres	included in State Forest 39
61/25 Karri	40 acres	included in State Forest 36
65/25 Pine planting	180 acres	being portion included in State Forest 33
59/25 Sandalwood	500 acres.	

CHAPTER II.

REVENUE.

The Timber Trade.

Mainly owing to the falling off of overseas orders there was a decided drop in the revenue collected as compared with that of the previous year, the gross collections amounting to £191,023 compared with £228,615 for the year 1927-28.

The shortage of £37,592 can be attributed to reduced royalties from sawn and hewn timber and sandalwood, and a reduction in fees payable by contractors for the inspection of export timber by officers of the Department. But for the satisfactory operations of the departmental tuart mill, which produced £18,515, the position would have been even less favourable.

A further amount of £2,210 was credited to the Group Settlement Department, being 50 per cent. of the royalty on timber removed from Group areas, making the total contributed to that department under the existing arrangement £28,000.

The following statement shows the principal sources of revenue for the past two years. A detailed statement of revenue collections is given in Appendix Ia:—

Year.	Royalties.		Inspection fees.	Sawn Tuart.	Sandalwood.	Firewood, fencing, and mining timber.	Miscellaneous.	Total.
	Logs for sawmilling.	Hewn timber.						
	£	£	£	£	£	£	£	£
1927–28	139,420	9,443	15,559	1,690	53,484	2,019	6,999	228,614
1928–29	110,441	1,846	7,608	18,515	45,268	1,732	5,613	191,023

The toal production of sawn and hewn timber obtained during the past year from 43,388,685 cubic feet of logs amounted to 13,315,409 cubic feet, the value of which is estimated at £1,750,000. These figures show a marked decrease on the figures for the previous year, when 18,828,115 cubic feet of timber, valued at £2,500,000, were cut. The respective quantities obtained from Crown lands and private property are as follows:—

Year.	From Crown Lands.			From Private Property.		Estimated Value of timber obtained.
	Hewn sleepers.	Sawn sleepers.	Other sawn timber.	Hewn sleepers.	Sawn timber including sleepers.	
	cub. ft.	cub. ft.	cub. ft.	cub. ft.	cub. ft.	£
1928	1,067,099	1,047,564	11,756,387	4,152,214	804,851	2,500,000
1929	297,905	555,776	10,045,391	1,744,674	671,663	1,750,000

At the present time 41 mills are operating on Crown lands and 7 are idle. There are also 30 to 40 mills working intermittently on private property cutting chiefly fruit cases, pickets, laths and small scantling.

The volume of mill logs obtained from Crown lands during the year amounted to 30,800,235 cubic feet, and from private property 2,375,555 cubic feet. The total yield of sawn timber from these logs was 11,272,830 cubic feet.

Owing to the slackness of trade, a number of mills have had to close down temporarily, and others have found it necessary to reduce their output. With the object of bringing the log consumption on State Forests to a sustained yield basis, this reduction will be in part permanent, but it is anticipated that, with the stabilisation of industry thus effected and improved marketing methods, quality and price increments will largely offset the decreased volumes being handled.

The Jarrahdale Concession, which was granted from the first day of January, 1889, for a term of 40 years, will expire on the 31st December, 1929. On the expiration of this concession, the whole of the sawmilling rights will then be held on a royalty basis. Three Timber Leases expired during the past year, and only twelve now remain in force. Of this number seven will run out during the coming year.

2,042,579 cubic feet of timber were hewn during the past year, as compared with 5,219,313 cubic feet for the previous year. Eighty per cent. of the hewn output was obtained from private property where the bulk of the hewing is being done by Southern Europeans. The Department has followed the practice of granting monthly hewing permits on Working Plan areas to experienced hewers, who work up the timber in advance of silvicultural operations where sawmilling is not practicable. Arrangements were made with the Railway Department and local timber companies to purchase a limited number of sleepers from these hewers, and in this way it was possible to keep about 70 men in employment during the year.

The quantity of timber exported for the year totalled 7,635,237 cubic feet, valued at £967,038, and the local market consumed 5,680,172 cubic feet. The Eastern States of the Commonwealth were again the largest buyers of our hardwoods, purchasing for the year 1,983,428 cubic feet. The Union of South Africa ranked as the second most important market, with 1,963,442 cubic feet. New Zealand also purchased over a million cubic feet, which is more than double the quantity taken during the previous year. The United Kingdom, Persia and India were the only other countries purchasing quantities in excess of 500,000 cubic feet.

The demand from overseas for sleepers was very limited and resulted in contracts being taken at low prices, and much of the timber was supplied from stocks cut during the previous year in anticipation of orders. The timber strike and bad seasons in the Eastern States have also had a serious effect on the timber industry in this State, and no doubt account largely for the 49 per cent. decrease in the timber exports to our Eastern neighbours.

Timber Inspection.

Owing to the falling off in the export trade, revenue from this source shows a reduction of nearly £8,000 on last year's figures.

Only 2,593,533 cubic feet of sawn and hewn sleepers were inspected during the year. There was also a corresponding reduction in other sawn timber inspected, due in some measure to the position in the Eastern States of the Commonwealth.

Piles and poles submitted for inspection totalled 42,319 lineal feet.

Sandalwood.

The reduction in sandalwood revenue is accounted for by the restriction of output in accordance with an arrangement made with the South Australian Government towards the end of 1927, whereby the quantity of wood to be obtained annually from Crown lands in this State was fixed at 4,935 tons. This represents a reduction in output of approximately 1,000 tons of sandalwood per annum, the royalty value of which is about £9,000.

The efforts of the Department to limit the export of sandalwood to the estimated annual consumption of the wood in China have been nullified to some extent by the sandalwood operations on freehold land in this State and in South Australia.

Orders have been placed with 170 sandalwood getters and 202 prospectors for the delivery of 5,962 tons of sandalwood (inclusive of roots and butts), during the term of the current licenses.

All sandalwood on C.P. locations granted since the 15th February, 1924, is reserved to the Crown and owners of these blocks may only pull the sandalwood during the process of clearing, with the approval of the Department. Inspections of the sandalwood operations on these properties are carried out by officers of the Department and, subject to satisfactory reports, arrangements are made by the Department for the holders of sandalwood licenses to place orders for the sandalwood pulled. During the year 135 C.P. locations were inspected, and 50 orders were issued to the lessees for 235 tons of sandalwood.

Sandalwood from Private Property.—The quantity of sandalwood obtained from privately owned land during the year under review amounted to 1,552 tons, or 726 tons more than for the previous year. The increase was due mainly to operations on Hampton Plains properties and in the Merredin-Lake Brown districts where a very inferior quality of sandalwood was being obtained.

The Department has experienced considerable trouble in controlling the operations of persons engaged in pulling sandalwood from private property, and numerous cases of sandalwood stealing from Crown land have been reported. Where sufficient evidence has been available proceedings have been taken against the offenders and fines ranging from £5 to £25 have been imposed. Sandalwood to the value of £1,196 was confiscated for breaches of the regulations. A new regulation was gazetted in March last, which provides for the inspection and branding of all sandalwood obtained from private property before it is removed from the block on which it has been pulled. Although this has meant additional work for the sandalwood staff, it has greatly assisted in detecting the illegal pulling of wood and in preventing loss of royalty to the Department.

The total quantity of sandalwood exported during the year amounted to 7,582 tons, valued at £225,208.

Sandalwood for Oil Distillation.—The demand of oil distillers for increased quantities of roots and butts made it necessary for the Department to increase the percentage of roots and butts to be supplied with sandalwood logs from 12½ to 20 per cent.

Fourteen hundred tons of roots and butts and sandalwood were purchased by distillers during the year. Of this quantity 165 tons were obtained from the North-West.

Sandalwood oil amounting to 92,400 lbs. was exported during the year. With the reduced output of sandalwood from Crown lands, it is doubtful whether it will be possible to meet the future demands of local distillers for roots and butts.

Firewood and Mining Timber.

Thirty-one annual permits for the cutting of firewood remained in force at the close of the year. In addition 487 local monthly firewood permits were granted during the year over Working Plan areas. Firewood and charcoal obtained under these permits amounted to 51,363 tons and returned in royalty £700.

258,988 cubic feet of mining timber were obtained from Crown land in the Collie district, for which £968 was received by way of royalty.

Mallet Bark.

The royalty on Mallet bark amounted to £25, and sales of mallet bark obtained by direct conversion realised £232. In addition, mallet bark to the value of £95 was supplied to the Tannin Extract Plant, Crawley.

Two thousand nine hundred and fifty-five tons of tanning barks, valued at £35,850, or an average of £12 per ton, were exported from the State during the year. Practically the whole of this consists of mallet bark obtained from districts along the Great Southern Railway.

Forest Offences.

Fifty per cent. of the forest offences reported during the year were committed by Southern Europeans in the employ of contractors, who in many cases have failed to exercise any supervision over their operations. The number of offences reported to Head Office totalled 71, and in 40 cases summonses were issued against the offenders, which resulted in 39 convictions being recorded and to fines amounting to £268 10s. being imposed.

Sandalwood to the value of £1,196 was confiscated and sold by the Department for breaches of the regulations. In a number of instances, where it was evident that there was no intention on the part of the offender of evading payment of royalty to the Crown, compassionate payments from the proceeds from the sale of the wood were made, amounting to £224.

The total proceeds from the sale of forest produce illegally obtained and confiscated by the Department amounted to £1,550 for the year.

CHAPTER III.

EXPENDITURE.

(Total expenditure from all funds—£157,876.)

As the costing system now operating enables a complete check to be maintained on all avenues of expenditure, the increase of £32,131 on last year's figures is a fair indication of the extension of the operations of the Department. The cost of administration, which is charged to Consolidated Revenue Fund, amounted to £23,081, which represented a reduction of £1,364 on the previous year's expenditure. This was mainly due to the reduction in overseas orders, making it possible to dispense with the services of several timber inspectors. The whole of the increased expenditure was therefore in connection with definite developmental work, chiefly in connection with reforestation.

Reforestation Fund.

The following statements show the position of the Reforestation Fund (Sec. 41 "Forests Act, 1918") at the close of the financial year:—

	£	£
Revenue for 1928–29 (excluding Revenue from Sandalwood)	...	142,576
Less Consolidated Revenue Expenditure (excluding Sandalwood)	19,166	
Interest on Loan	2,920	
Sinking Fund	267	
Special Acts	1,020	
Audit Fee	150	
		23,523
Net Revenue		£119,053

Three-fifths of the above amount was placed to the credit of the Reforestation Fund, the position of which is shown hereunder:—

	£
Balance at 1st July, 1928	117,056
Three-fifths of Net Revenue transferred	71,432
Sundry Recoups	8,283
	196,771
Less Expenditure, 1928–29	120,124
	£76,647

Special Funds.

£5,000 was credited to the Sandalwood Trust Account, in accordance with the "Forests Act Amendment Act, 1928," and under Section 39 of the Forest Act, £968 was credited to the Mining Leases Royalty Account.

1.—REFORESTATION.

(i) *Forest Management.*

SUMMARY OF WORK CARRIED OUT DURING THE YEAR.

District.	Topographical Survey.	Assessment Survey.	Additional Local Working Plans approved.	Houses erected.	Roads and Tracks cleared.	Telephone Lines installed.
	acres.	acres.	acres.		miles.	miles.
Division 1:						
Metropolitan	...	...	...	...	...	...
Yarloop	64,000	...	...	...	...	...
Busselton	...	...	...	...	3¼	6
Division 2:						
Mundaring-Karragullen ...	16,360	38,000	...	4	30½	¼
Division 3:						
Dwellingup	16,700	28,000	7,880	11	68½	19¼
Jarrahdale	76,000	...	...	...	12	11¼
Wuraming	19,200	40,000	...	7	15	16
Division 4:						
Collie-Noggerup	31,200	...	...	...	42¼	...
Division 5:						
Kirup-Jarrahwood	2,000	70,000	35,240	6	99	14
Division 6:						
Greenbushes-Manjimup-Nannup	...	23,000	...	...	9¼	...
Division 7:						
Narrogin	5,000	50,000	...	4	28	...
Totals	230,460	249,000	43,120	32	307¾	67¾

Forest Surveys.

In the general survey of the State very little attention has been paid to topographical survey of forest areas. The earliest surveys of this type were carried out by the Forests Department in country close to centres of population and Government railways, where sufficient fixed points were available to ensure reasonable accuracy from forest surveys made by prismatic compass. In the less accessible forest regions, where topographic survey work is now in progress, such ties are not available, and consequently it has been necessary to carry out skeleton surveys by theodolite, on which to base future detailed surveys by compass. The theodolite survey is carried out along well-marked features, and, in country where milling operations have been carried out, formations on which timber tramlines have been laid are principally used. The survey lines, which are designed to surround every 3,000 to 5,000 acres, are marked by permanent pegs at regular intervals. During the year, 439 miles of traverses were run by theodolite, over an area of approximately 220,000 acres, and details were filled in by compass surveys over approximately 10,000 acres.

In the Dwellingup and Wuraming districts where there are considerable areas fully stocked, with regrowth of sapling size, assessment surveys have been carried out over an area of 68,000 acres for the preparation of plans showing the location and quality of the regrowth. Lines are run 10 chains apart on a grid-iron system, using a prismatic compass, and working from survey ties established by theodolite.

Stock maps have been prepared for considerable areas in the Kirup and Ellis Creek country, based on assessment surveys carried out by compass. With this work has been associated timber classification, and the collection of working-plan data generally.

Following a reconnaissance of areas thought to be suitable for pine planting at Mundaring, a detailed soil and timber type classification with grid-lines 10 chains apart was carried out over 21,000 acres. From the soil-type maps so prepared suitable areas are selected for subdivision. After a compartment has been planted a more intensive soil-type map is prepared. In this way it is hoped that growth results can be correlated with soil and timber types for guidance in future planting.

In the mallet country, east of Narrogin, the mapping of areas of mallet and types of vegetation was continued, as a preliminary to reservation of suitable areas and the commencement of fire protection and thinning thereon.

Working Plans.

Although a smaller area than last year was brought under local working plans approved by Executive Council, the year under review was noteworthy for the approval of the General Working Plan for the Jarrah Forest. This Working Plan deals with the assessment of the growing stock on the whole of the Jarrah forests of the State according to natural logging sections and makes provision for the control of log consumption by the sawmilling industry with a view to bringing the annual consumption on to a sustained yield basis within 10 years. Provisions for utilisation in all local Working Plans must conform with the requirements of the General Working Plan for the particular area concerned. In addition to the area of 616,860 acres now being managed under approved working plans, there are approximately 200,000 acres for which working plans have been prepared but not yet submitted to the Executive Council.

Permanent Establishments.

The practice of establishing forest workers in houses distributed through the area under management was considerably extended. At each house a small cultivation paddock and orchard are established.

In some places it has been found necessary to group the houses into small settlements in order to secure schooling facilities for the children of employees; but as far as practicable each overseer is provided with a residence on his own block. A number of huts have also been erected for the use of workmen.

During the early part of the year the new Divisional offices at Dwellingup and Kirup were completed.

In order to provide means of access to the various areas brought under management it has been necessary to continue the work of clearing existing tracks, and in some places to open up new ones. Three important main tracks completed during the year were the Jarrahdale-Dwellingup track, a track from Kirup to Jarrahwood, and a road into Ellis Creek mill site, portion of which after construction has been taken over by the Nannup Roads Board. Old whim tracks and tramway formations are largely used in such work.

For fire-control purposes and general organisation 67¾ miles of new telephone lines were installed during the year. These are a combination of tree and pole line, and are of the single wire (earth return) type. This method of communication has proved very satisfactory. Each resident overseer is taught how to keep the lines in repair and is responsible for the section within his own block. The use of field telephones and temporary lines, run from main lines, has been experimented with successfully, and serves to keep the man in the bush at all times in touch with headquarters during the fire season.

(ii) *Silviculture.*

(a) *Jarrah.*

SUMMARY OF OPERATIONS FOR THE YEAR.

District.	Top Disposal Operations.	Treated for Regeneration.	Thinning and Improvement of Existing Regrowth.	Tree-marking (Sawmilling and Hewing).
	acres.	acres.	acres.	acres.
DIVISION 1:				
Yarloop	3,077	*Nil*	*Nil*	*Nil*
DIVISION 2:				
Mundaring-Karragullen	2,340	1,272	249	2,607
DIVISION 3:				
Dwellingup	8,945	2,729	1,822	5,088
Wuraming	6,465	3,065	1,449	980
Jarrahdale	6,127	1,054	699	2,120
DIVISION 4:				
Collie-Noggerup	3,811	3,076	217	3,535
DIVISION 5:				
Kirup-Jarrahwood	15,277	1,346	1,986	7,318
DIVISION 6:				
Greenbushes	200	1,173	200	394
Nannup	1,407	300	395	*Nil*
Totals	47,649	14,015	7,117	22,052

An important feature of the Department's work in the jarrah forests has been the disposal of tops lying against the good piles and poles which remain when the bush has been cut over. Following the falling operations of 21 mills operating on Crown lands, 47,650 acres were treated during the year.

As a preliminary to regeneration operations, tree-marking was carried out at 21 centres in the jarrah forest. This work ensures better utilisation of the forest, in advance of regeneration cleaning. To quote only one instance: at Jarrahdale during the past two years an average volume of seven loads

per acre has been removed under tree-marking from country which had been cut over several times previously. Small mills have also been thereby enabled to operate on cut over bush, taking logs which large mills have rejected as unsuitable.

Excepting at Collie, where the forest is managed under the clear felling system, with the retention of standards which will eventually result in a system of coppice with standards for the production of mining timber, the silvicultural system adopted for jarrah is a type of Group Selection. The sequence of operations is briefly as follows:—

(a) Preliminary burning by controlled fires in advance of trade cutting, to prevent a serious fire following the fallings;

(b) Trade cutting by sawmilling or hewing under control by tree-marking.

(c) Top disposal operations;

(d) Regeneration cleaning by Departmental employees;

(e) Final burning by controlled fire, after regeneration cleaning.

Prior to the commencement of work in any blocks, maps showing quality classes are prepared. Work is at present limited to the first and second quality classes because of the necessity for concentration of effort on the better class forest, in view of the big leeway brought about by many years of trade cutting without any attempt being made to carry out regeneration operations. The third quality class occurs to a small extent in the prime bush, in the form of isolated patches, and on the fringes of the jarrah belt, particularly the northern and eastern limits, where the ridge tops and upper slopes carry good quality jarrah forest, while the lower slopes carry a poorer stand which will not be treated for the present.

The thinning operations which were commenced last year were continued, chiefly in the Dwellingup and Wuraming districts, where 68,000 acres of good regrowth of sapling size have been surveyed. This regrowth, which is from 8 to 15 years of age, has resulted from heavy cutting in the prime forests of that region, and much of it has so far escaped serious damage from fires. Frequently, however, fires have caused damage or malformation in the dominants, and thinning is urgently required to free subdominants of good form. Crown thinning has been applied rather than stem thinning on account of the lower cost, and because it avoids the heavy coppice growth which follows stem thinning. As thinning proceeds, the tops are burned in open spaces but the stems have not been disposed of in this way because of the cost.

At Jarrahdale, where the regrowth has reached pile and pole size, the thinned stems are disposed of as poles or firewood, as far as possible.

In addition to regeneration cleaning and thinning, improvement work was inaugurated in several districts, whereby large marri overtopping good groups of piles and poles, and interfering with their proper development, were ringbarked.

This year, the areas treated by regeneration cleaning, thinning, etc., were treble those of last year.

(b) *Other Species.*

Karri.

The only regeneration work being carried out in the karri forest is at Big Brook, near Pemberton.

As most of the trees left after felling operations are either over-mature and useless or too badly damaged to preserve after they have provided seed, the system of regeneration employed is that of clear felling. Any odd groups of immature trees which may survive falling operations are preserved.

This year 92 acres were afforded preliminary treatment, consisting of felling sheoak and large size undergrowth and ringbarking marri, while approximately 500 acres were given a final burn. Satisfactory regeneration having been secured on the areas burnt in the previous year, final ringbarking was commenced, and 168 acres were so treated.

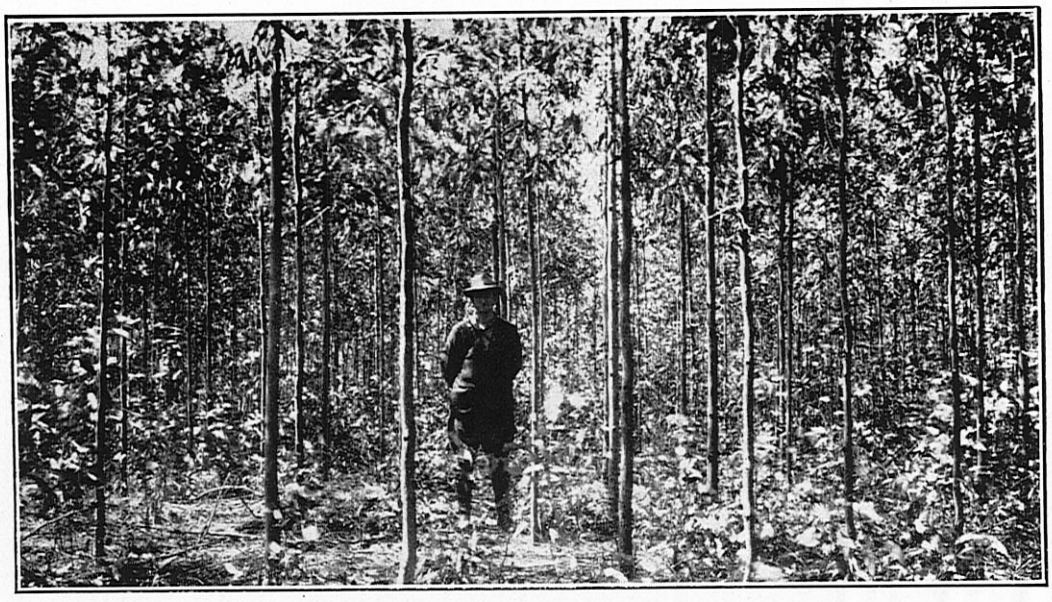
At Boranup where excellent regrowth about 25 years old has resulted from the operations of the Karridale mill, fire protection and improvement of the stands has been commenced.

Tuart.

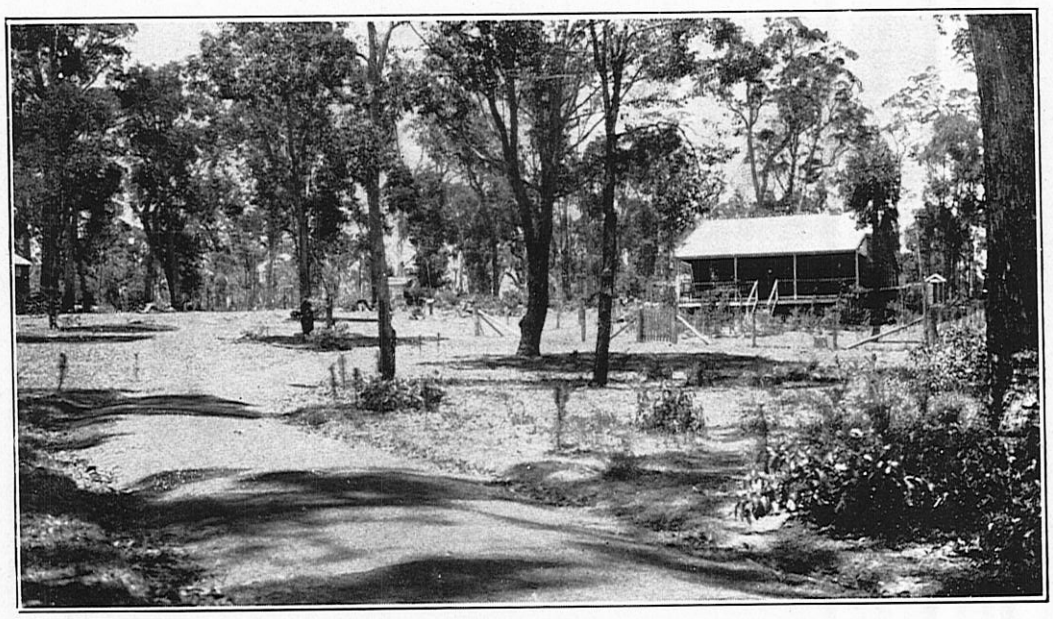
No regeneration cleaning was carried out in the tuart forest during the year. Results secured from silvicultural work in previous years have been very disappointing, and the problem of securing regeneration of this species is proving very difficult of solution.

The departmental Tuart mill continued its operations throughout the year, utilising mature and overmature trees. Logs which contained a certain amount of good timber, but not enough to warrant hauling to the mill, were worked up in the bush, being hewn into billets which could be readily hauled and sawn at the mill.

The total output for the year was 1,804 loads, of which 1,368 loads (76 per cent.) were cut from logs, and 436 loads (24 per cent.) from billets. The recovery from logs was 34 per cent., and from billets 88 per cent. With the exception of a small quantity of tuart cut for stair treads, the entire output was railway wagon stock, being sent to the workshops at Midland Junction. Thirty men were kept continuously employed by the milling operations.



Mallet (*Eucalyptus astringens*), 7-8 years.



An Overseer's cottage (Barton's Block).

Delegates to the Empire Forestry Conference, 1928, inspecting the Karri Forests.

The gross profit for the period from trading was £6,218, and this can be largely attributed to the introduction of the system of billeting faulty logs in the bush, eliminating the cost of hauling waste timber to the mill. At the commencement of the trading period the accumulated loss on this venture was £6,693, but the net profit of £3,810 has reduced that figure to £2,883. Although for the first seven years the mill was operated at a small loss so far as this Department was concerned, the State has considerably benefited in the working up for State requirements of over-mature trees which would otherwise have been destroyed. While the whole of the capital expenditure and working costs of the mill are met from the Reforestation Fund, the full revenue derived from the sale of the timber produced, which this year amounted to £18,515, is credited to General Revenue.

Mallet.

Following a detailed classification of mallet-bearing Crown lands along the Great Southern Railway, work was commenced at six new centres, on four of which resident overseers were established. At the other two centres mobile gangs are employed.

The possibility of extending the areas of mallet forest by spot sowing on suitable types of country occurring in the brown mallet habitat was further tested. During the year 155 acres were spot sown with mallet at Lol Gray, and an excellent germination secured. Previous spot sowings, dating back to 1926, have proved very successful and show excellent growth. The country on which spot sowings have been carried out is composed chiefly of poor gravelly slopes or rocky breakaways unsuited for agriculture.

Thinning of mallet regrowth was commenced at Wickepin, 48 acres being treated. Bark stripped from the trees removed practically paid for the whole of the operations, and, this work having been largely experimental, it is expected that future thinnings will pay for themselves.

The first work at all new centres has been the fire protection of existing regrowth, and now that this work is well advanced it is proposed during the coming season to proceed with thinning operations.

Last season the prices offering for mallet bark were higher than usual, and, as a result, extensive stripping took place, chiefly on private property. The trees stripped were, in the main, small, and many fine young stands were wiped out, a fact which will prejudice future supplies from private property. There are indications that the demand for mallet bark is greater than the present supply.

(iii) *Fire Control.*

District.	Area under Fire Control.	Indigenous Forest.		Pine Plantations.	
		Regenerated within past five years.	Fire losses.	Planted area.	Fire losses.
	acres.	acres.	acres.	acres.	acres.
DIVISION 1:					
Metropolitan	3,900	...	...	492½	...
Yarloop	5,600	...	...	388¼	...
Busselton	6,500	1,990	...	907¾	28
DIVISION 2:					
Mundaring	126,000	9,690	48	1,106¼	10
DIVISION 3:					
Dwellingup	200,000	5,393	100	...	...
Wuraming		3,065	...	...	...
Jarrahdale		1,916	...	...	...
DIVISION 4:					
Collie	155,000	12,348	45	292¼	...
DIVISION 5:					
Kirup-Jarrahwood	95,000	4,760	...	...	...
DIVISION 6:					
Greenbushes	35,000	6,771	...	82½	...
Nannup					
Manjimup					
DIVISION 7:					
Narrogin	50,000	760	...	...	...
Totals	817,000	46,693	193	3,269½	38

The erection and manning of fire towers has proved a most efficacious method of detecting outbreaks of fire at an early stage, and rapid communication with fire-fighting forces has been established by means of telephone systems connected to such fire lookouts. This year a fire tower was established on Mt. Wells, in the Wuraming district, overlooking an area extending from the River Serpentine to the

Murray River. Safety zones are established around treated areas by means of controlled burning early in the season. To attempt to carry out wholesale early burning by special gangs working according to a set programme would be impossible at anything like reasonable cost, but the resident overseer is able to take advantage of short periods of suitable weather throughout the year to burn portions of the area under his charge.

The solution of the whole question of fire control is bound up with the establishment of resident workmen throughout the forest, each man looking after a defined area which he knows thoroughly, and on which he can choose the best times for carrying out controlled burning.

In the jarrah forest the average size for compartments is 500 acres, surrounded by a firebreak belt five chains wide. Such fire belts are not treated in the course of regeneration cleaning, being kept for the purpose of burning at regular intervals until such time as the young crop within the compartment is big enough to permit of controlled burning beneath it. To provide cleared lines along the extreme boundaries of the firebreak belts from which to commence burning, a track about two feet in width is made by a triangular scraper, drawn by one horse; in this way about 10 miles of track can be cleared of leaves and scrub in a day by one man.

To ensure that these tracks shall be reasonably straight, they are blazed out in advance, and cleared of logs, etc., to avoid the necessity for deviations. During the year more than 550 miles of new scraper tracks were established.

In the mallet country, overseers' houses are established on high points commanding a view of large areas of surrounding country and connected by telephone. Firebreaks, one chain in width, ploughed along each edge and burnt out in the centre, subdivide the mallet reserves into areas of 300 to 500 acres. The reserves being in many cases bounded by cleared agricultural land, the problem of fire control is not so difficult as in the jarrah forest. Where areas of barren country occur controlled burning is caried out, and this type of country will burn again only at long intervals.

2.—AFFORESTATION.

SUMMARY OF PLANTING OPERATIONS FOR THE 1928 PLANTING SEASON.

Planting Area.	Area established prior to 1928 Season.	Area planted in 1928.		
		P. radiata.	*P. pinaster.*	Other species
	acres.	acres.	acres.	acres.
Myalup	104⅓	...	109	1½
Harvey	109½	13	...	4
Gnangara	139½	...	48	...
Collier	104⅓	...	45	...
Applecross	70	...	85½	...
Mundaring—Helena	402½	108	...	8
Greystones	343	55½	...	7½
Beraking	...	45¾	...	13⅓
Mudros	122½	...	...	...
Ludlow—Coolilup	831¼	...	...	...
Stirling	67½	...	9	...
Collie—*Mungalup	66½	...	...	...
Proprietary	154	...	16½	...
Hamel	47	...	...	...
*Bowelling	38¾	...	...	16½
*Nannup	30	9	5¼	11¾
Big Brook	...	26½	...	...
Totals	2,630¾	257¾	318¼	62¾

* Experimental areas.

During 1928 a further area of 638 acres was planted with pines, at 13 centres, bringing the total area of established plantations up to 3,269 acres. It is estimated that a further 700 acres will be planted during 1929.

The main operations were in the Mundaring district, where 238 acres were established on three blocks, *Pinus radiata* being the chief species used. These plantations are made on the non-jarrah soils of the Helena Reservoir catchment area and on country unsuitable for the production of good jarrah forest. The rapid growth secured on some of the soil types has been most gratifying. At Greystones the oldest plantation has reached an average height of 35 feet in seven years.

Other plantations of *P. radiata* were established at Harvey, on the catchment area of the Harvey Weir, and at Big Brook in the karri zone, on land which previously carried a crop of marri with a slight admixture of karri. At both these places the soils are heavy loams, which should be well suited to the growth of *P. radiata*.

On the coastal sandplain, where large areas of land otherwise apparently useless are available, the planting of *P. pinaster* has been continued at five centres, viz., Ludlow, Myalup, Applecross, Collier, and Gnangara. The three latter areas are close to Perth, which makes them of particular importance. Results thus far are distinctly promising. Thorough cultivation prior to planting, to eliminate scrub competition and preserve soil moisture, is essential for the success of plantations on the deep coastal sands.

The average percentage of survivals on unploughed land after the first summer is 50 per cent., and on land ploughed either once or twice, 88 per cent. It has been found that one ploughing is sufficient to bring the seedling pines through the first summer, but after that the indigenous scrub recovers sufficiently to cause a heavy mortality and to retard temporarily any further growth. Two ploughings, one at right angles to the other, have given the best results to date. Best results are obtained by ploughing immediately after the burn during the summer months, as it is then practically impossible for the scrub to recover.

Tests have been carried out to determine the value of certain artificial manures in assisting to establish *P. pinaster*. Superphosphate, potassium sulphate, and blood and bone have been tried, the first two having no apparent effect. Blood and bone assists the pines very materially through the early stages of their life. A marked increase in height, a higher percentage of survivals, and better general appearance, are noticeable in pines dressed with about 2 ounces of this fertiliser at the time of planting, over pines not so treated.

The root parasitism on the young pines of Christmas tree (*Nuytsia floribunda*), which suckers freely after being felled, has made it necessary to poison all stumps of this species.

At Collie, Bowelling and Nannup experimental planting has been continued to test the possibilities of the large areas of more or less waste country in those districts.

In the vicinity of the Bowelling plantation are many thousands of acres which cannot be classed either as good jarrah country or as good pastoral or agricultural land, but which may prove suitable for pines.

To the south and south-west of Nannup there is a large area of Crown lands, regarded as unsuitable for settlement purposes and carrying practically no prime jarrah forest. The soil over a considerable area is a sandy gravel overlying a stiff clay, and the mean annual rainfall is above 40 inches.

Although the bulk of planting carried out so far in this State has been with *P. radiata* and *P. pinaster*, many other coniferous species are being tried at various centres, *e.g. P. canariensis, longifolia, taeda, caribaea, Jeffreyi, Coulteri, Banksiana, ponderosa, palustris, laricio, echinata, muricata, Lambertiana, Torreyana, strobus, Taxodium distichum, T. mucronatum, Sequoia sempervirens, Picea sitchensis, Pseudotsuga taxifolia.*

Thinning was continued in some of the oldest stands of *P. pinaster* at Ludlow, 127 acres being treated, and at Greystones an experimental thinning was carried out on nine acres of *P. radiata* seven years old. At Hamel, where the *P. radiata* stands are much older, thinning was also carried out, the logs secured being sold for case-making.

3.—SANDALWOOD REFORESTATION.

Demarcation of the boundaries of sandalwood reserves at Coonaana, Bullock Holes and Wallaby Rocks was carried out, to obviate unintentional trespass by sandalwood getters. In all, 76¼ miles of such boundaries were cleared during the year. Notices forbidding pulling of wood within these reserves were posted at intervals along the boundaries.

The rainfall registered at Kalgoorlie for 1928 was only 5.85 inches, the lowest since 1911, with the result that a small percentage of young sandalwood plants died out. In all cases plants still alive show very slow growth. The only germination of sandalwood in the experimental plots took place on the lighter soils.

Owing to the long run of dry years it was not possible to secure a sufficient supply of good seed, and consequently a small area only (219 acres) was sown with sandalwood nuts, on light sandy loam soils at Scahill reserve. Seed was sown at the rate of approximately 5 lbs. per acre, but the bulk of the seed was smaller than is generally considered desirable.

Experimental plots were sown at Coonaana (six acres) and Calooli (half-acre) inside rabbit-proof fences

During May and June, 1929, good falls of rain were registered, totalling 4.49 inches. Germination commenced after the heavy rains in all sowings made during the past few years, but as a result of the cold dry spell which has followed, subsequent development has been very slow. There were practically no plants above ground by the beginning of July.

Provided that the nuts are sown a couple of inches below the surface, they appear to survive the light rains which fall during a dry season without deteriorating, and to retain their germinating capacity for several years.

4.—RESEARCH AND INVESTIGATION.

The Research and Investigation Committee, consisting of Mr. S. L. Kessell (Chairman), Professor H. E. Whitfeld and Professor N. T. M. Wilsmore, has continued to direct research work during the year, and the assistance rendered by members of the committee in an honorary capacity is gratefully acknowledged.

CHEMICAL INVESTIGATIONS.

Work under this head has been confined to the possibility of commercial production of tannin extracts from tuart wood and karri bark. The investigations were carried out at the semi-commercial Tannin Extract Plant established last year by the Commonwealth Council for Scientific and Industrial Research in conjunction with the Forests Department of Western Australia.

Results obtained from tuart sawdust and disintegrated tuart wood showed that the average tannin content of each was practically the same, *i.e.*, approximately 8 per cent. calculated on the dry weight of the wood. This yield is low, and, as the cost of disintegrating tuart wood is high, the extract of tannin from tuart is not a commercial proposition. For this reason the investigations were abandoned.

The work on the preparation of tannin extract from Karri bark has been more promising, and considerable advance has been made. The green bark has an appropriate moisture content of 60 per cent. estimated on the green weight, and in the fresh state has a soluble tannin content of 15 to 20 per cent. calculated on the dry weight. Extraction of this tannin by ordinary water processes has not given altogether satisfactory results, and a method has been evolved using small percentages of bisulphite of soda in the extraction liquors in contact with the raw material. Laboratory trials have shown that almost theoretical extractions can be obtained by this method.

The process employed in the plant is very simple, involving open vat treatment at ordinary pressures but at elevated temperatures, and displacement of the strong liquor by the press leach system. No complicated plant such as autoclaves will be necessary and the greatest cost items appear to be steam and power for disintegrating purposes. The establishment of a Tannin Extract Plant in the State as a result of the work referred to above appears most encouraging.

BOTANICAL INVESTIGATIONS.

Nomenclature of Sandalwood.

The specimen material collected in the past two or three years from all parts of Australia and abroad enabled the Government Botanist (Mr. C. A. Gardner) to write a taxonomic study of the genus Santalum. This has been published in bulletin form (F.D. Bulletin No. 44) and would appear to indicate that the findings of Sprague and Summerhayes (referred to in the last annual report) were based on inadequate herbarium material. Mr. Gardner's further work has done much to strengthen the position adopted by Gardner and Campion, in favouring the nomenclature of de Candolle, already reverted to by Perrot.

Thermo-Soil Tests.

Further tests were carried out in the loamy soils of the Mundaring district. At Greystones, during late November, theremometers were buried at 6 inches in soil containing 15.7 per cent. moisture. Scrub and leaf litter were fairly heavy, but, under controlled burning conditions, no rise of temperature was recorded by any of the thermometers.

Soil Moisture Tests.

Tests to confirm results obtained last year were carried out at South Perth (Collier), where plantations of *Pinus pinaster* are being established on deep sands. It was shown last year that the most important tests were those taken at 2 feet below the surface, and tests this year were confined to that depth.

Drought conditions exist at Collier Plantation when soil moisture at two feet falls below 2.5 per cent., and death occurs when the soil moisture falls below 1 per cent. for any length of time.

The tests establish the value of thorough ploughing prior to planting as a means of preserving the moisture content above the wilting coefficient, at the 2 foot level.

Resin-Tapping.

Resin-tapping experiments have been carried out at Hamel upon *Pinus pinaster* during the past two summers, and are being continued through the present winter. Summer results have been extremely disappointing, the average yield per tree this season being only ¾ lb., as compared with 1½ lbs. from the same pine in France, 5 to 8 lbs. from *P. caribaea* and *P. palustris* in the United States, and 6¾ lbs. from *P. longifolia* in India.

A careful study of conditions in the resin belts of the world has shown that temperature conditions here are ideal for tapping purposes. But, contrary to the impression given by much of the literature on the subject, an absence of summer rain and low humidity appear to retard the production and flow of resin. Throughout Western Australia there is a deficiency of summer rainfall and humidity, which militates against the success of tapping operations.

5.—ARBORICULTURE.

During the season ended 31st August, 1928, 222,252 trees were distributed by the Hamel Forest Nursery. Of these, 53,359 were sold to the public at cost price, 2,121 were supplied free to public bodies, charitable institutions, etc., and 166,772 were distributed amongst the various departmental plantations and arboreta.

Pinus radiata and *P. pinaster* proved the most popular trees for planting, followed by Red Flowering Gum, Sugar Gum, Blue Gum, and *Pittosporum undulatum*. *Cupressus macrocarpa* and *C. lusitanica* were also in great demand.

Trees planted in the Departmental arboreta at Collie, Nannup, Donnybrook, and Manjimup continued to show good growth. New arboreta were established at Inglehope, Hamel, and Big Brook.

CHAPTER IV.

1.—EMPIRE FORESTRY CONFERENCE.

The Empire Forestry Conference held its inaugural session in Perth in August, 1928, the meetings here being confined to the formal business of presentation of reports. This was followed by an inspection of forest areas. The districts visited by members of the Conference were Mundaring, Dwellingup, Wuraming, Pemberton, and Kalgoorlie *en route* to South Australia. After a visit to each of the States, the Conference met for a final session in Canberra from 26th September to 2nd October.

During the visit of the Conference to Perth an exhibition of local timbers and forest products was arranged in the hall of the Council of Industrial Development, Barrack Street, to afford members an opportunity of seeing the beauty and variety of West Australian woods and the various uses to which they may be put.

Among the first business of the Conference was the appointment of a Committee on Australian Forestry, which prepared a general report referring to the whole of Australia, and special reports with regard to each of the States. The general report, together with that referring to Western Australia, is included as an appendix to this report. It is satisfactory to note that this Conference of the leading forest authorities throughout the Empire, after inspecting the reforestation work in progress in various forest areas, included the following note in the report referring to Western Australia:—"The regeneration methods adopted during the last few years have given satisfactory results, and their further development and extension is much to be desired."

2.—LEGISLATION.

"Forests Act, 1918."

The amendment to the "Forests Act, 1918," providing for the exclusion of Sandalwood revenue from the provisions of Section 41 (2) of the Act, and for the payment of 10 per centum of the net revenue from Sandalwood, or the sum of £5,000, whichever sum shall be the greater, to a special account at the Treasury to be applied to the improvement and reforestation of Sandalwood reserves and the development of the Sandalwood industry, was again continued for twelve months from the first day of July, 1928, by the "Forests Act Amendment Act, 1928."

Amendments to Forest Regulations.

The only regulations of importance gazetted during the year were in connection with the Sandalwood industry.

The regulation prohibiting the pulling of Sandalwood within 15 miles of any Government railway line was repealed in February last. New regulations were published prohibiting the pulling or removal of wood from certain Sandalwood reserves and making it illegal for any person to pull or remove from Crown land any living Sandalwood tree of smaller dimensions than 13 inches in circumference measured over the bark at six inches from the ground level, or the log of which, when cleaned of sapwood, is less than 10 inches in circumference measured at a point equivalent to six inches above ground level.

With a view to preventing the illegal pulling of Sandalwood from Crown land by persons operating on private property, a regulation was introduced in March last prohibiting the export of Sandalwood beyond the Commonwealth unless it has been inspected by an Inspector of the Forests Department, and providing for the inspection and branding of all Sandalwood obtained from privately-owned land before such Sandalwood is removed from the land on which it has been obtained.

Although this regulation has meant additional work for the field staff engaged on Sandalwood patrol, the number of cases of Sandalwood stealing detected has justified the action taken.

3.—ADMINISTRATION.

The following changes took place on the Staff of the Department during the financial year:—

(A) PROFESSIONAL DIVISION.

The following Assistant Divisional Forest Officers were promoted to the rank of Divisional Forest Officer:—

Messrs. B. H. Bednall, A. C. Harris, W. Lockhart, D. R. Moore, G. W. Nunn.

Mr. A. J. Milesi was appointed Assistant Divisional Forest Officer.

Mr. F. Gregson, B.E., was appointed Officer in Charge of Seasoning Investigations, after completing a year at the Federal Forestry School, Canberra.

Mr. S. A. Clarke, B.E., Forest Utilisation Officer, was granted twelve months' leave of absence in order to proceed on loan to the Commonwealth Council for Scientific and Industrial Research.

(B) FIELD STAFF.

Six assistant foresters, "D" grade, were retrenched and two resigned.

One forest guard and two assistant foresters, "C" grade, also resigned, and the indenture of one apprentice was cancelled.

Three of the above-mentioned "D" grade assistant foresters were reappointed as overseers.

One assistant forester, "D" grade, and three forest guards were promoted to the rank of assistant foresters, "C" grade, and four apprentices were promoted to the rank of forest guard.

Five assistant foresters, "D" grade, were appointed.

(C) HEAD OFFICE.

Three officers resigned, three were transferred to other Departments, one was dismissed, and seven were appointed.

(D) TRAINING OF STAFF.

Two nominees to the Federal Forestry School (Messrs. W. R. Wallace and D. W. R. Stewart) completed their diploma course and returned to take up their duties as probationers.

Two nominees are at present studying at Canberra, and two are engaged in the preliminary two years' course at the University of Western Australia.

CASUAL WORKERS.

No change took place during the year with regard to the schedule of wages or conditions of employment. About 400 wages men were engaged at the end of June.

The staff of the Department now totals 105, and, in addition, there are 73 overseers, mostly in charge of Minor Working Plan Areas or Blocks where pine-planting or reforestation operations are being carried on.

All officers have shown commendable keenness in their work and interest in the welfare and progress of the Department generally.

S. L. KESSELL,
Conservator of Forests.

Forests Department,
Perth, 12th August, 1929.

LIST OF APPENDICES.

APPENDIX 1a.

General Statement of Revenue and Expenditure for the Year ended 30th June, 1929.

Dr. 30th June, 1929.	£ s. d.	£ s. d.
To Log Royalty from Permits granted under Section 11 of "The Land Act, 1898"	48,182 4 2	
„ Log Royalty from Permits granted under "The Forests Act, 1918"	31,622 17 7	
„ Log Royalty from Leases and Concessions	30,636 8 6	
		110,441 10 3
„ Sandalwood Revenue— £ s. d.		
Royalty	43,044 3 7	
Roots and butts... 17,624 14 8		
Less cost credited to Licensees Royalty A/cs.... 15,847 0 0		
	1,777 14 8	
Confiscated wood	445 19 10	
		45,267 18 1
„ Miscellaneous Royalties—		
Piles and poles	318 7 4	
Hewn sleepers (Forests Act) ...	1,572 17 0	
Hewn sleepers (Land Act) ...	233 9 2	
Hewn sleepers (Leases) ...	39 10 9	
Firewood	699 14 10	
Sheoak	13 0 9	
Posts	63 10 11	
Illegally cut timber	305 16 10	
Mining timber	968 10 4	
Sundries	46 16 5	
Mallet bark	24 15 11	
		4,286 10 3
„ Inspection Fees—		
Hewn sleepers (Crown Land) ...	631 3 6	
Sawn sleepers „ „ ...	1,321 13 9	
Sawn timber „ „ ...	1,499 10 10	
Hewn timber „ „ ...	2 11 2	
Hewn sleepers (Private Property)	3,615 3 9	
Sawn sleepers „ „	1 4 8	
Sawn timber „ „	50 0 5	
Hewn timber „ „	80 8 2	
Piles and poles	378 0 3	
Reinspected sleepers	27 17 8	
		7,607 14 2
„ Rents—		
Concessions	100 0 0	
Tramways	713 14 2	
Sawmill sites	185 10 0	
Forest leases	118 3 2	
Cottage rents	878 8 1	
		1,995 15 5
„ Sales—		
Tuart	18,514 13 11	
Trees and seeds	651 15 6	
Branding hammers	44 4 6	
Illegally cut timber	224 1 1	
Mallet bark	232 9 1	
Sleepers (Direct conversion) ...	213 18 9	
Pine logs	398 16 2	
Miscellaneous	17 6 2	
		20,297 5 2
„ Miscellaneous Revenue—		
Registration fees	302 9 9	
Exemption fees	52 17 9	
License fees	426 10 8	
Agistment fees	95 5 0	
Apiary sites	50 0 0	
Business sites	5 0 0	
Residence permits	21 15 0	
Sundries	172 9 0	
		1,126 7 2
Total collections		191,023 0 6
„ Less amounts transferred—		
Group Settlement Department, 50 % royalty from Group areas	2,210 1 10	
Sandalwood Trust Fund ...	5,000 0 0	
Mining Leases Royalty Account	968 10 4	
		8,178 12 2
Net amount credited to Consolidated Revenue Fund		£182,844 8 4

Cr. 30th June, 1929.	£ s. d.	£ s. d.
By Salaries of Officers and Administrative Field Staff	16,310 7 4	
„ Travelling and forage allowance	2,918 1 3	
		19,228 8 7
„ Maintaining State Nursery ...	74 13 5	
„ Workers' Compensation premiums	404 7 8	
„ Library	61 18 7	
„ Postage and telephones ...	198 1 11	
„ Stationery and printing ...	294 6 6	
„ Museum	1 15 0	
„ Advertising	32 7 9	
„ Timber inspection	24 16 11	
„ Acquiring Sandalwood illegally pulled	17 12 8	
„ Sandalwood control	726 5 3	
„ Roots and butts (stock) ...	94 9 0	
„ General equipment	43 16 3	
„ Allowances	644 13 1	
„ Freights and fares	439 8 5	
„ Travelling allowances	220 6 2	
„ Sandalwood Board	36 13 10	
„ Acquiring timber illegally cut ...	93 7 5	
„ Marketing of pines	309 0 8	
„ Mallet bark	9 15 0	
„ Miscellaneous	125 0 6	
		3,852 16 0
„ Forests Improvement and Reforestation Fund		120,123 19 0
„ Sandalwood Trust Fund		2,825 11 6
„ Mining Leases Royalty Account ...		1,798 0 0
„ General Load Fund		9,997 8 5
„ Balance Excess of Net Revenue over total Expenditure		25,018 4 10
		£182,844 8 4

APPENDIX 1b.

Statement of Forests Improvement and Reforestation Fund for the Year ended 30th June, 1929.

Dr. 30th June, 1929.	£ s. d.	£ s. d.	Cr. 1st July, 1928.	£ s. d.
To Reforestation Operations—			By Balance brought forward	117,056 1 6
,, Division No. 1—			30th June, 1929.	
Ludlow Working Circle ...	8,363 1 11		By three-fifths net Revenue in accordance with "Forests Act, 1918"	71,388 2 8
Boranup ,, ,, ...	742 7 6		,, Sundry recoups	2,037 3 4
Wonnerup Mill	5,138 4 8			
Top Disposal operations ...	498 19 0			
General	9 9 10			
		14,752 2 11		
,, Division No. 2—				
Mundaring District	8,338 14 5			
Karragullen District	7,884 18 10			
General	899 1 11			
		17,122 15 2		
,, Division No. 3—				
Wuraming Working Circle ...	9,031 17 7			
Dwellingup ,, ,, ...	16,670 9 0			
Jarrahdale ,, ,, ...	1,938 15 8			
39 Brook Block	548 3 6			
General	1,008 8 0			
		29,197 13 9		
,, Division No. 4—				
Collie Working Circle ...	4,750 17 2			
Mumballup ,, ,, ...	354 6 5			
Noggerup ,, ,, ...	397 19 5			
Worsley and Potter's Gorge Working Circle	383 11 11			
Lowden Working Circle ...	344 14 1			
Harris River ,, ,, ...	404 19 11			
Top Disposal operations ...	131 1 7			
General	2,000 13 3			
		8,868 3 9		
,, Division No. 5—				
Upper Capel Working Circle ...	564 10 2			
Harrington ,, ,, ...	820 10 1			
Sussex ,, ,, ...	1,333 13 9			
Greenbushes ,, ,, ...	693 12 11			
Mullalyup ,, ,, ...	744 3 4			
Millbrook ,, ,, ...	816 18 9			
Barrabup ,, ,, ...	876 15 0			
Top Disposal operations ...	802 14 1			
General	4,164 1 11			
		10,817 0 0		
,, Division No. 6—				
Yornup Working Circle ...	547 2 3			
Big Brook ,, ,, ...	2,174 2 9			
Ellis Creek ,, ,, ...	807 2 3			
Top Disposal operations ...	455 7 6			
General	1,968 8 4			
		5,952 3 1		
,, Division No. 7—				
Lol Gray Working Circle ...	1,179 17 7			
Montague ,, ,, ...	1,373 16 7			
Contine ,, ,, ...	1,252 3 8			
Congelin ,, ,, ...	1,345 17 10			
Wickepin ,, ,, ...	393 16 9			
Highbury ,, ,, ...	1,824 19 4			
Dongolocking ,, ,, ...	111 8 4			
General	1,141 5 3			
		8,623 5 4		
,, Training of Staff		1,845 7 5		
,, Research and Investigation		1,803 16 1		
,, Preparation of forest working plans and topographical survey ...		4,186 3 2		
,, General silviculture, arboriculture and forest protection		363 3 11		
,, Salaries and allowances		6,868 18 1		
,, General equipment and incidentals ...		3,434 0 2		
,, Balance carried forward		76,646 14 8		
		£190,481 7 6		£190,481 7 6

APPENDIX 1c.

Statement of General Loan Fund for Year ended 30th June, 1929.

Dr. 30th June, 1929.	£ s. d.	£ s. d.	Cr. 30th June, 1929.	£ s. d.
To Purchase of Land		1,414 14 11	By Loan Provision	9,997 8 5
,, Pine Planting—				
Pardelup	806 0 0			
Collier	497 15 1			
Applecross	1,001 1 10			
Myalup	718 1 0			
Gnangara	884 8 4			
Harvey Weir	1,690 7 3			
Mundaring	2,985 0 0			
		8,582 13 6		
		£9,997 8 5		£9,997 8 5

APPENDIX 1d.

Mining Leases Royalty Account for Year ended 30th June, 1929.

Dr. 30th June, 1929.	£ s. d.	£ s. d.
To General equipment		28 2 8
,, Paddocks		22 17 8
,, Stables		22 5 7
,, Water supply		23 13 8
,, Maintenance of equipment		29 7 9
,, Maintenance of buildings		8 12 1
,, Maintenance of roads and tracks		44 3 1
,, Maintenance of telephone lines		31 4 4
,, Fire Control—		
Publicity	3 5 7	
Maintenance of plant	4 16 11	
		8 2 6
,, Grazing Control—Ranging		18 0 0
,, Administration—		
Salaries	109 0 5	
Annual leave to casuals	65 3 6	
Allowances to casuals	14 15 0	
Upkeep of horses	84 12 9	
Special services	13 17 9	
		287 9 5
,, Regeneration Cleaning—		
Proprietary Block	677 13 9	
Arklow and Mungalup	281 6 3	
		959 0 0
,, Improvement work—Hardwoods		48 8 5
,, Controlled burning		101 19 4
,, Horse allowance (fire-fighting)		7 10 0
,, Raising plants in Nursery		12 17 3
,, Clearing for planting		71 6 0
,, Planting		43 11 7
,, Formation of fire-breaks		29 8 8
,, Balance carried forward		1,272 16 3
		£3,070 16 3

Cr. 1st July, 1928.	£ s. d.	£ s. d.
By Balance brought forward		2,102 5 11
30th June, 1929.		
By Royalties collected during year		968 10 4
		£3,070 16 3

APPENDIX 1e.

Sandalwood Trust Fund for Year ended 30th June, 1929.

30th June, 1929.	£ s. d.	£ s. d.
To Administration and General Supervision		992 6 2
,, General Reconnaissance		412 8 7
,, Survey—Scahill		59 11 7
,, Fencing		10 4 2
,, Demarcation—		
Bullock holes	109 5 0	
Coonana	56 17 5	
Wallaby Rock	53 19 2	
Supervision	32 0 11	
		252 2 6
,, Road Clearing		2 3 6
,, Burning firebreaks		33 0 0
,, Sowing		73 6 0
,, Experimental work		6 8 0
,, Rabbit poisoning		22 3 10
,, Patrol		722 19 6
,, Bendering—		
Supervision	30 0 0	
Sowing Jam	2 3 0	
		32 3 0
,, Workers' Compensation—		
Fund premiums		35 12 11
,, General equipment		20 4 0
,, Incidentals		150 17 9
.. Balance carried forward		9,307 8 5
		£12,132 19 11

1st July, 1928.	£ s. d.	£ s. d.
By Balance brought forward		7,127 2 11
30th June, 1929.		
By Receipts in accordance with Forests Act Amendment		5,000 0 0
,, Sundry Recoups		5 17 0
		£12,132 19 11
1st July, 1929.		
By Balance brought forward		£9,307 8 5

APPENDIX 1f.

WONNERUP TUART MILL.

Trading, Profit and Loss Accounts and Balance Sheet for trading period ended 30th June, 1929.

TRADING ACCOUNT.

Dr.	£ s. d.	£ s. d.	Cr.	£ s. d.
June 30th, 1929.			June 30th, 1929.	
To Stock on hand		2,778 0 10	By Sales	20,629 7 7
,, Falling for log timber	1,715 1 5		,, Stock on hand	1,250 0 0
,, Billeting	1,462 4 11			
		3,177 6 4		
,, Hauling logs	3,136 19 6			
,, Hauling billets	836 17 2			
		3,973 16 8		
,, Mill cutting by contract		4,490 15 3		
,, Wages		716 8 8		
,, Repairs and Maintenance		255 6 1		
,, General Mill expenses		269 9 1		
,, Gross profit to P. and L. Account ...		6,218 4 8		
		£21,879 7 7		£21,879 7 7

PROFIT AND LOSS ACCOUNT.

Dr.	£ s. d.	Cr.	£ s. d.
30th June, 1929.		30th June, 1929.	
To Interest	1,221 5 7	By Gross Profit	6,218 4 8
,, Depreciation	982 2 11		
,, Insurance	116 17 0		
,, Compensation premiums	20 9 5		
,, Rent	67 10 6		
,, Net Profit to Appropriation Account ...	3,809 19 3		
	£6,218 4 8		£6,218 4 8

APPROPRIATION ACCOUNT.

	£ s. d.		£ s. d.
To Balance brought forward	6,692 12 4	By Profit for trading period	3,809 19 3
		,, Balance carried forward	2,882 13 1
	£6,692 12 4		£6,692 12 4

Balance Sheet for Trading Period ended 30th June, 1929.

Liabilities.	£ s. d.	£ s. d.	Assets.	£ s. d.	£ s. d.
Capital Account	14,368 1 5		Buildings—		
Reforestation Fund	2,562 12 1		Workers' cottages	1,073 16 8	
			Mill buildings	1,721 2 1	
			Turnery shop	50 0 0	
					2,844 18 9
			Mill tramline		5,356 17 11
			Pipe line (water supply)		350 0 0
			Railway siding		1,500 0 0
			Bridges and crossings		200 3 7
			Plant and machinery		1,941 18 0
			Tools and equipment		604 2 2
			Stock on hand		1,250 0 0
			Loss to 30th June, 1927	6,692 12 4	
			Less profit as per Profit and Loss A/c.	3,809 19 3	
					2,882 13 1
	£16,930 13 6				£16,930 13 6

APPENDIX 1g.

Statement of Timber Inspected by the Inspection Branch of the Forests Department during the year ended 30th June, 1929.

Timber Inspected.	Inspection Fees.	
	Cubic Feet.	Amount.
		£ s. d.
Sawn sleepers	555,828	1,322 18 5
Hewn sleepers	2,037,705	4,246 7 3
Sawn timber	498,209	1,549 11 3
Piles and poles	*42,319	378 0 3
Beams	6,529	110 17 0
Miscellaneous timbers	...	
	...	7,607 14 2

* Lineal feet.

APPENDIX 1h.

Revenue and Expenditure.

The following statement shows the Revenue and Expenditure of the Department since its inception in 1895:—

Year.	Gross Revenue.	Expenditure.					
		Consolidated Revenue Fund.	General Loan Fund.	Reforestation Fund.	Mining Leases Fund.	Sandalwood Trust Fund.	Total.
	£	£	£	£	£	£	£
1st January to 31st December, 1895	3,175	1,108	...	...	...	...	1,108
1st January to 31st December, 1896	4,839	2,021	...	...	...	...	2,021
1st January to 31st December, 1897	12,320	3,490	...	...	...	...	3,490
1st January to 31st December, 1898	30,150	3,356	...	...	...	...	3,356
1st January to 31st December, 1899	17,000	2,438	...	...	...	...	2,438
1st January to 31st December, 1900	15,526	2,649	...	...	...	...	2,649
1st January to 31st December, 1901	18,478	2,747	...	...	...	...	2,747
1st January to 31st December, 1902	18,753	4,301	...	...	...	...	4,301
1st January to 31st December, 1903	20,478	3,789	...	...	...	...	3,789
1st January to 31st December, 1904	20,019	4,193	...	...	...	...	4,193
1st January to 31st December, 1905	18,480	5,090	...	...	...	...	5,090
6 months, 1st January to 30th June, 1906 ...	10,974	3,385	...	...	...	...	3,385
1st July, 1906, to 30th June, 1907	22,783	6,208	20	...	...	...	6,228
1st July, 1907, to 30th June, 1908	23,499	8,802	443	...	...	...	9,245
1st July, 1908, to 30th June, 1909	29,484	9,031	584	...	...	...	9,615
1st July, 1909, to 30th June, 1910	31,549	8,531	1,833	...	...	...	10,364
1st July, 1910, to 30th June, 1911	37,477	8,863	2,888	...	...	...	11,751
1st July, 1911, to 30th June, 1912	44,561	10,469	3,135	...	...	...	13,604
1st July, 1912, to 30th June, 1913	48,237	11,463	3,842	...	...	...	15,305
1st July, 1913, to 30th June, 1914	53,039	12,093	4,432	...	...	...	16,525
6 months, 30th June to 31st December, 1914	22,906	5,469	1,063	...	...	...	6,532
1st January to 31st December, 1915	45,726	8,870	1,399	...	...	...	10,269
1st January to 31st December, 1916	29,821	9,575	911	...	...	...	10,486
1st January, to 31st December, 1917	36,129	10,263	842	...	...	...	11,105
6 months, 1st January to 30th June, 1918 ...	22,113	6,199	268	...	...	...	6,467
1st July, 1918, to 30th June, 1919	42,051	10,873	594	...	...	...	11,467
1st July, 1919, to 30th June, 1920	59,220	12,962	...	7,241	...	...	20,203
1st July, 1920, to 30th June, 1921	75,469	16,128	11,742	*50,470	...	...	78,340
1st July, 1921, to 30th June, 1922	88,530	16,439	2,324	28,158	965	...	47,886
1st July, 1922, to 30th June, 1923	87,658	15,246	1,779	21,955	238	...	39,218
1st July, 1923, to 30th June, 1924	127,253	15,835	873	31,625	...	...	48,333
1st July, 1924, to 30th June, 1925	182,764	17,816	1,000	‡ 65,497	778	1,648	86,739
1st July, 1925, to 30th June, 1926	227,061	23,191	2,349	71,780	732	3,269	101,321
1st July, 1926, to 30th June, 1927	222,507	23,192	2,958	72,645	1,053	3,471	103,319
1st July, 1927, to 30th June, 1928	228,614	24,081	9,972	86,242	837	4,613	125,745
1st July, 1928, to 30th June, 1929	191,023	23,081	9,997	120,123	1,798	2,826	157,827
Totals	2,169,666	353,247	65,248	555,736	6,401	15,827	996,459

* This amount includes the sum of £15,448 paid to liquidate the advances made to the Department from Land Improvement Loan Fund.

‡ Includes £9,316 recouped to Treasury on account of Sandalwood Trust Fund.

It will be seen from the above statement that to the 30th June, 1929, the revenue exceeded the total expenditure by the sum of £1,173,207.

APPENDIX 2a.

Production of Mill Logs for Year ended 30th June, 1929.

Species.	Crown Lands.								*Private Property.		Total.	
	Concessions.		Leases.		Permits.		Total.					
	In Log.	In Square.	In Log.	In square.	In Log.	In square.	In Log.	In square.	In Log.	In square.	In Log.	In square.
	cub. ft.	cub. ft.	cub. ft.	cub. ft.	cub. ft.	cub. ft.	cub. ft.	cub. ft.	cub. ft.	cub. ft.	cub. ft.	cub. ft.
Jarrah	3,114,421	1,090,047	7,295,532	2,553,436	18,089,694	6,331,393	28,499,647	9,974,876	360,351	126,123	28,859,998	10,100,999
Karri	...	...	...	...	2,236,441	603,839	2,236,441	603,839	1,997,263	539,261	4,233,704	1,143,100
Tuart	...	...	...	...	5,154	1,804	5,154	1,804	3,744	1,310	8,898	3,114
Wandoo ...	...	...	...	...	25,945	9,081	25,945	9,081	11,997	4,199	37,942	13,280
Sheoak	...	...	...	...	5,500	1,925	5,500	1,925	2,200	770	7,700	2,695
Blackbutt ...	...	...	218	76	2,118	741	2,336	818	...	...	2,336	818
Pine	...	...	...	...	25,212	8,824	25,212	8,824	...	...	25,212	8,824
Totals ...	3,114,421	1,090,047	7,295,750	2,553,512	20,390,064	6,957,607	30,800,235	10,601,167	2,375,555	671,663	33,175,790	11,272,830

NOTE.—Percentages of recovery of sawn timber from the round are:—Jarrah, 35 per cent.; Karri, 27 per cent.; and other timbers, 35 per cent. * Reported to Forests Department.

APPENDIX 2b.

Hewn Timber obtained during Year ended 30th June, 1929.

Species.	Crown Lands.				Private Property.	Total.
	Leases.	Concessions.	Permits.	Total.		
	cubic feet.	cubic feet.	cubic feet.	cubic feet.	cubic feet.	cubic feet.
Jarrah	93	15,570	281,939	297,602	1,593,596	1,891,198
Wandoo	...	...	303	303	151,078	151,381
Total	93	15,570	282,242	297,905	1,744,674	2,042,579

NOTE.—The average recovery by the hewer is 20 per cent. of the log. The above total represents 10,212,895 cubic feet in the round.

APPENDIX 2c.

Total Production of Timber for Year ended 30th June, 1929.

(Exclusive of Mining Timber, Firewood and Piles and Poles.)

Appendix Reference.	Crown Lands.		Private Property.		Total.	
	In the Log.	In the Square.	In the Log.	In the Square.	In the Log.	In the Square.
	cubic feet.	cubic feet.	cubic feet.	cubic feet.	cubic feet.	cubic feet.
Total Mill Logs (Appendix 2a) ...	30,800,235	10,601,167	2,375,555	671,663	33,175,790	11,272,830
Total Hewn Timber (Appendix 2b)...	1,489,525	297,905	8,723 370	1,744,674	10,212,895	2,042,579
Total	32,289,760	10,899,072	11,098,925	2,416,337	43,388,685	13,315,409

APPENDIX 2d.

Sandalwood pulled during the Year ended 30th June, 1929.

Locality.	Quantity in Tons.
From Crown Lands, South of 26th parallel of South Latitude	*5,503
From Crown Lands, North of 26th parallel of South Latitude	† 165
From Private Property	1,552
Total	7,220

* Includes 1,042 tons roots and butts and 6 tons of logs for oil distillation.

† For oil distillation within the State.

APPENDIX 2e.

Forest Produce, not elsewhere included in production tables, obtained under permit or license from Crown Lands during the Year ended 30th June, 1929.

Description of Forest Produce.	Number.	Lin. Feet.	Cubic Feet.	Weight.
				tons.
Barks	...	...	...	61
Blackboy	...	...	...	142
Bull Banksia Cones	...	...	...	8
Fencing Posts and Rails	36,912	...	...	...
Firewood and Charcoal	...	...	...	51,363
Mining Timber (Collie)	...	...	258,988	...
Piles and Poles	...	21,955	...	...
Used Sleepers	50	...	...	...
Total	36,962	*21,955	*258,988	*51.574

* Includes only South-West Division of State.

APPENDIX 2f.

Mining Timber and Firewood Consumed during Year ended 30th June, 1929.

Locality.	Wood Fuel Consumed.	† Mining Timber Consumed.		
	tons.	tons.	cubic. ft.	lineal ft.
Greenbushes Mining Field	1,875	...	...	...
Collie Coal Fields	...	...	258,988	...
Metropolitan Area	170,000	...	...	...
Golden Mile, Coolgardie, Norseman, Kunanalling, Kanowna, Mt. Monger, St. Ives and Carbine	157,297	4,028	...	...
Northern Goldfields, Broad Arrow, Ora Banda, Comet Vale, Menzies, Kookynie, Laverton, Mt. Morgans, Leonora, and Mt. Magnet Districts	26,689	37	3,979	50,014
Southern Cross, Marvel Loch, Mt. Rankin, Burbidge, Westonia, Manxman, and Bullfinch Districts	1,250	15	...	...
Goldfields Water Supply Pumping Stations, Nos. 1 to 8	18,381	...	...	...
Railway Pumping Stations (Northern Line)	250	...	...	...
Eastern Goldfields Districts (household)	14,449	...	...	...
Eastern Goldfields (bakers)	850	...	...	...
Eastern Goldfields Breweries, Cordial, Confectionery, Soap Factories, and Saltworks	2,115	...	...	...
Eastern Goldfields Batteries	452	...	...	...
Eastern Goldfields Electric Power and Light	72,559	...	...	...
Eastern Goldfields Producer Plants and Blacksmiths (as charcoal)	200	...	...	...
Engine Wood (used on Wood Lines)	20,136	...	...	...
Sleepers for Goldfields Firewood Lines	* 14,800	...	...	...
Total	486,503	4,080	262,967	50,014

* Number of Sleepers not included in total of column.

† Exclusive of Mining Timber and Firewood consumed on the Murchison and other Distant Goldfields not mentioned above.

APPENDIX 2g.

Exports of Timber, Tanning Barks, Sandalwood and Essential Oils for the Year ended 30th June, 1929.

Item and Country of Destination.	Quantity.	Value.
Timber, Dressed, N.E.I.—	cubic feet.	£
Commonwealth of Australia	84	85
British Malaya	858	186
Total	942	271
Timber Undressed—		
Commonwealth of Australia	1,983,428	244,330
United Kingdom	655,883	81,779
British Malaya	47,859	5,745
Ceylon	339,058	46,051
India	510,284	70,201
Mauritius	103,125	12,345
New Zealand	1,036,125	135,550
South African Union ...	1,963,442	242,817
Belgium	100,275	12,067
Sudan	3,884	480
Italy	2,033	270
Denmark	13,908	1,670
Germany	24,258	3,198
Holland	3,583	460
China	165,925	20,327
Persia	638,250	77,191
Africa, Portuguese East ...	42,292	5,595
United States of America	683	88
Total	7,634,295	960,164
Casks and Shooks—		
*Commonwealth of Australia	...	2,569
Wood Manufactures, N.E.I.—		
*Commonwealth of Australia	...	3,717
British Malaya	...	46
New Zealand	...	2
Norway	...	3
Total	...	3,768
Staves, Undressed—		
Commonwealth States ...	...	266
Total, Timber Exports...	...	967,038
Sandalwood—	cwt.	
British Malaya	3,000	4,418
Ceylon	333	594
Hong Kong	81,709	117,787
India	6,743	11,890
China	59,190	89,174
Netherlands East Indies ...	380	1,125
Japan	278	220
Total	151,633	225,208
Tanning Barks—		
Commonwealth of Australia	28,564	18,425
Germany	26,466	15,256
United Kingdom	4,089	2,169
Total	59,119	35,850
Essential Oils—		
Commonwealth of Australia	...	5,384
United Kingdom	...	28,232
British Malaya	...	46
Ceylon	...	22
Hong Kong	...	3,158
China	...	392
Netherlands East Indies ...	...	2,557
Germany	...	14,444
Japan	...	2,476
United States of America...	...	1,204
Austria	...	39
India	...	67
Holland	...	5,237
Philippine Islands	...	49
Total	...	63,307
Total, all Exports ...	...	1,291,403

*A very large proportion of this amount represents empty returns.

APPENDIX 2h.

Imports of Timber, Tanning Substances and Essential Oils for the Year ended 30th June, 1929.

Item and Country of Origin.	Quantity.	Value.
Timber, Dressed, N.E.I.—	cubic feet	£
United Kingdom	17	9
Holland	...	2
Norway	22,450	2,757
Sweden	149,250	23,347
United States of America ...	5,016	832
Germany	8	21
Total	176,741	26,968
Timber, Undressed, N.E.I.—		
Commonwealth of Australia	133,700	36,451
British Malaya	9,975	1,593
United Kingdom	...	7
New Zealand	8,592	1,351
India	7,183	3,553
Siam	117	90
Norway	3,281	642
Russia	2,092	390
Sweden	8,143	2,151
New Caledonia	923	402
Japan	5,138	1,581
Philippine Islands	3,474	1,070
United States of America ...	435,244	68,783
Total	617,862	118,064
Timber for making Boxes and Doors—		
Commonwealth of Australia	6,792	962
United Kingdom	266	56
United States of America ...	5,800	529
Malaya, British	9,917	902
Germany	66	53
Holland	234	286
Norway	12,359	2,058
Sweden	62,333	7,804
Latvia	758	119
Total	98,525	12,769
Architraves and Mouldings—		
United Kingdom	...	2
Commonweaith of Australia	...	1,756
Germany	...	204
Total	...	1,962
Logs not sawn, and Spars in the rough—		
Peru	42	29
British Malaya	5,808	90
Total	5,850	119
New Zealand Pine—		
New Zealand	16,973	4,312
Plywood and Veneers—		
Commonwealth of Australia	...	17,423
United Kingdom	...	106
France	...	435
Germany	...	157
Holland	...	183
Canada	...	486
Sweden	...	219
Japan	...	5,686
Serbia	...	154
United States of America ...	...	4,256
Norway	...	53
Russia	...	123
Total	...	29,281

Item and Country of Origin.	Quantity.	Value.
Spokes, Dressed—	No	£
Commonwealth of Australia	13,577	441
United States of America ...	3,200	99
Total	16,777	540
Barrels, Casks, etc. :		
Commonwealth of Australia	...	1,590
United Kingdom	...	18
Total	...	1,608
Brushmaker's Woodware and Wood Tool Handles—		
Commonwealth of Australia	...	2,687
United Kingdom	...	480
Germany	...	4
Norway	...	205
Sweden	...	286
United States of America ...	...	7,068
France	...	5
Total	...	10,735
Clothes Pegs—		
Commonwealth of Australia	...	2,307
United Kingdom	...	10
Sweden	...	18
Germany	...	5
Total	...	2,340
Doors of Wood—	No	
Commonwealth of Australia	1,400	1,513
United States of America ...	492	506
Total	1,892	2,019
Oars and Sculls—		
Commonwealth of Australia	...	56
United Kingdom	...	47
Japan	...	46
United States of America ...	...	312
Total	...	461
Picture and Room Mouldings—		
Commonwealth of Australia	...	360
United Kingdom	...	206
Germany	...	127
Belgium	...	12
Total	...	705
Wood Manufactures, N.E.I. —		
Commonwealth of Australia	...	15,805
United Kingdom	...	8,914
British Malaya	...	15
Canada	...	547
India	...	13
Austria	...	49
Ceylon	...	8
Belgium	...	4
Czecho-Slovakia	...	67
France	...	46
Germany	...	1,019
Holland	...	19

APPENDIX 2h—continued.

Item and Country of Origin.	Quantity.	Value.
Wood Manufactures, N.E.I.—continued—		£
Italy		4
British Honduras		3
Sweden		293
Switzerland		38
China		14
Cyprus		2
Japan		87
United States of America		2,770
Denmark		1
Total		29,718
Total, Timber Imports		£241,601
Tanning Barks—	cwts.	
Commonwealth of Australia	1,262	996
Tanning Extracts—		
Commonwealth of Australia		235
United Kingdom		222
British Malaya		1,086
India		248
Netherlands East Indies		120
Italy		372
France		254
Norway		227
Argentine		659
Turkey		189
South America		178
Tanning Extracts—continued—		£
United States of America		119
Dutch Borneo		1,906
Jugo Slavia		528
Smyrna		178
Czecho-Slovakia		297
Total		5,898
Essential Oils—		
Commonwealth of Australia		1,753
United Kingdom		261
Ceylon		396
India		3
British Malaya		2
Belgium		7
Bulgaria		7
France		495
Switzerland		14
Germany		10
Italy		965
Russia		2
Spain		28
Holland		72
Netherlands East Indies		1
China		48
Japan		249
United States of America		84
West Indies, British		3
Sicily		13
Total		4,413
Total, All Imports		£252,908

APPENDIX 2i.

Summary of Exports of Forest Produce since 1836.

Year.	Timber.		Sandalwood.		Year.	Timber.		Sandalwood.		Tanning Bark.	Essential Oils.*
	cub. ft.	Value.	Tons.	Value.		cub. ft.	Value.	Tons.	Value.	Value.	Value.
		£		£			£		£	£	£
1836*a*	10,000	2,500	...	...	1883	997,000	79,760	7,031	56,250	...	...
1837	...	...	...	...	1884	861,700	68,936	2,620	20,960	...	...
1838	...	...	...	...	1885	848,150	67,850	4,527	36,216	...	...
1839	...	...	...	...	1886	626,150	50,092	3,431	27,450	...	...
1840	...	...	...	...	1887	354,800	28,384	4,317	34,533	...	...
1841	...	...	...	...	1888	525,750	42,060	4,470	33,525	...	...
1842	...	...	...	...	1889	788,500	63,080	6,385	57,465	...	...
1843	...	...	...	...	1890	1,172,200	82,052	5,136	51,355	...	...
1844	*b*	163	...	...	1891	1,273,950	89,179	3,760	37,600	...	...
1845	...	...	4	40	1892	1,082,650	78,419	5,716	42,870	...	...
1846	2,550	255	32	320	1893	512,950	33,888	3,893	32,160	...	...
1847	12,200	1,120	370	4,444	1894	1,063,700	74,804	2,784	23,430	...	...
1848	3,350	333	1,335	13,353	1895	1,255,250	88,146	3,851	30,863	...	...
1849	...	...	...	...	1896	1,545,600	116,420	6,848	65,800	...	...
1850	10,500	1,048	...	...	1897	2,393,300	192,451	5,852	49,480	...	...
					1898	4,086,150	326,195	4,349	31,812	...	...
1851	1,250	268	219	1,593	1899	6,913,550	553,198	4,084	29,719	...	...
1852	7,050	806	...	...	1900	5,725,400	458,461	5,095	39,038	...	...
1853	52,200	5,220	...	...							
1854	58,500	7,023	...	...	1901	7,150,600	572,354	8,864	73,931	...	...
1855	76,900	12,076	...	...	1902	6,256,750	500,533	7,995	61,771	...	...
1856	70,500	9,671	...	...	1903	7,748,450	619,705	4,406	37,913	859	...
1857	69,200	9,449	280	2,524	1904	8,072,300	654,949	4,510	25,417	32,876	...
1858	29,250	2,340	745	7,455	1905	8,709,500	689,943	5,521	38,817	154,087	...
1859	67,250	6,051	1,278	17,259	1906	8,830,700*c*	708,993	8,848	70,958	140,720	...
1860	54,800	4,932	1,687	16,360	1907	6,409,550*c*	511,923	9,212	65,999	98,773	...
					1908	9,869,500*c*	813,591	9,564	76,668	79,934	...
1861	27,750	2,497	2,558	24,945	1909	10,830,450*c*	867,419	4,805	37,456	59,633	...
1862	68,800	7,151	2,393	21,541	1910	12,074,100*c*	972,698	8,228	70,775	93,733	...
1863	32,900	2,963	2,807	25,265							
1864	58,300	5,508	2,724	24,520	1911	12,449,500*c*	986,341	6,907	65,506	83,470	...
1865	183,950	15,693	1,686	13,490	1912	11,297,100*c*	903,396	3,154	27,533	49,094	...
1866	85,650	6,849	2,965	23,722	1913	13,619,850*c*	1,089,481	6,260	47,589	47,377	...
1867	56,750	4,541	2,305	18,442	1914*d*	6,279,750*c*	502,153	4,702	39,800	18,197	5
1868	8,000	638	3,256	26,045	1915*e*	9,968,500*c*	808,392	8,375	78,926	6,127	381
1869	179,900	14,273	4,124	32,998	1916*e*	5,432,100	441,991	6,271	61,381	10,208	1,102
1870	157,200	17,551	6,112	48,890	1917*e*	3,890,650	310,893	7,230	72,669	18,959	2,060
					1918*e*	3,436,250	274,141	6,504	81,834	16,886	3,995
1871	218,500	15,304	3,366	26,926	1919*e*	4,135,750	344,119	8,998	117,072	18,875	3,987
1872	37,000	2,590	3,942	31,536	1920*e*	5,065,300	487,666	14,355	240,579	22,121	3,704
1873	68,150	4,771	6,292	62,916							
1874	345,600	24,192	7,057	70,572	1921*e*	9,816,250	1,162,735	10,839	181,801	23,073	10,107
1875	342,350	23,965	6,646	66,465	1922*e*	8,309,750	1,063,475	3,990	54,769	13,328	6,878
1876	219,050	23,743	6,577	65,772	1923*e*	7,911,310	1,009,831	7,623	102,912	21,161	20,075
1877	336,150	36,979	4,247	31,851	1924*e*	11,126,861	1,379,022	14,081	348,713	29,606	39,877
1878	580,900	63,902	4,675	35,064	1925*e*	11,844,303	1,491,925	6,243	186,775	40,136	42,057
1879	627,250	69,742	4,667	35,001	1926*e*	12,001,384	1,533,030	7,771	238,203	15,056	47,819
1880	662,550	66,252	5,197	51,970	1927*e*	12,580,262	1,659,876	6,821	199,754	15,818	26,454
					1928*e*	10,384,784	1,274,482	4,829	147,426	27,662	39,131
1881	792,750	79,277	7,716	77,165	1929*e*	7,635,237	967,038	7,582	225,208	35,850	63,307
1882	936,500	93,650	9,605	96,050	TOTAL	291,714,991	£27,740,756	405,504	£4,753,175	£1,173,619	£310,939

a The exports up to the year 1834 consisted only of supplies to shipping of which no record is kept. *b* Not available. *c* Approximately figures only.
d Six months ended 30th June. *e* Year ended 30th June. * Principally Sandalwood Oil.

APPENDIX 2j.

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

Year.	Timber, Woodware, etc. (not including furniture, bamboo, cane, etc.)	Tanning Materials.	Essential Oils.
	Value £	Value £	Value £
1848	464	...	...
1849	...	...	...
1850	189	...	...
1851	3,216	...	...
1852	2,479	...	...
1853	790	...	...
1854	831	...	...
1855	1,464	...	...
1856	1,124	...	...
1857	774	...	...
1858	1,528	...	...
1859	690	...	...
1860	2,095	...	...
1861	1,459	...	...
1862	1.920	...	...
1863	1,568	...	...
1864	894	...	...
1865	548	...	...
1866	1,442	...	...
1867	1,727	...	...
1868	1,451	...	...
1869	1,408	...	...
1870	1,518	...	...
1871	736	...	...
1872	1,660	...	...
1873	1,008	...	...
1874	1,774	...	...
1875	2,707	...	...
1876	3,098	...	...
1877	2,036	...	...
1878	2,947	...	...
1879	2,340	...	...
1880	3,061	...	...
1881	3,639	...	...
1882	3,692	...	...
1883	6,667	...	...
1884	2,930	...	...
1885	11,479	...	...
1886	17,888	...	...
1887	8,136	...	...
1888	4,461	...	...
1889	7,686	...	...
1890	14,979	...	...
1891	18,406	...	...
1892	26,713	...	...
1893	14,493	...	...
1894	17,964	...	...
1895	47,128	...	...
1896	5,381	...	...
1897	164,552	...	...
1898	55,566	...	...
1899	45,689	...	...
1900	56,266	1,416	1,105
1901	80,134	1,740	1,546
1902	97,810	3,418	1,751
1903	102,383	3,556	1,348
1904	157,856	1.322	2,122
1905	98,494	582	1,592
1906	95,229	1,412	1,915
1907	122,016	2,767	1,549
1908	93,205	2,392	4,584
1909	90.502	4,129	4,003
1910	171,280	3,531	3,686
1911	152,133	2,912	4,938
1912	167,244	3.089	4,598
1913	202,640	2,651	5,392
1914	78,736	629	2,823
1914–15	107,763	2,082	4,988
1915–16	76,849	3,313	4,788
1916–17	75,681	2,848	3,484
1917–18	58,305	2,020	4,358
1918–19	62,824	1,181	4,168
1919–20	100,083	3,748	10,043
1920–21	171,654	*4,899	6,106
1921–22	92,448	5,865	6,577
1922–23	109,428	6,991	4,033
1923–24	133,893	2,790	3,301
1924–25	161,898	2,670	4,429
1925–26	144,989	5,826	4,449
1926–27	162,193	8,971	4,254
1927–28	183,196	9,648	6,955
1928–29	241,601	6,894	4,413
Totals ...	4,177,128	105,292	119,298

*This and subsequent years include Tanning Extracts, not previously recorded.

APPENDIX 3a.

Timber Concessions in Force as at the 30th June, 1929.

Concessionaire.	No.	Locality.	Term.	Present Area.
				acres.
Millars' T. & T. Co., Ltd.	12/0	Cockburn Sound	1-1-1889 to 31-12-1929	244,394

APPENDIX 3b.

Timber Leases in Force as at the 30th June, 1929.

Lessee.	No.	District.	†Original Term, under Land Act, 1898.	Expiration of extension under Forests Act, 1918.*	Present Area.
					acres.
Millars' T. & T. Co., Ltd.	227/113	Yarloop	1- 1-1901 to 31-12-1925	31-12-1929	2,743
Millars' T. & T. Co., Ltd.	228/113	Yarloop	1- 1-1901 to 31-12-1925	31-12-1929	4,130
Millars' T. & T. Co., Ltd.	229/113	Yarloop	1- 1-1901 to 31-12-1925	31-12-1929	3,962
Millars' T. & T. Co., Ltd.	230/113	Yarloop	1- 1-1901 to 31-12-1925	31-12-1929	4,480
Good, Frederick Daniel	244/113	Wuraming	1- 7-1899 to 30-6-1924	15-7-1929	13,259
Good, Frederick Daniel	257/113	Kirup	1-10-1899 to 30-9-1924	31-8-1929	28,876
Millars' T. & T. Co., Ltd.	261/113	Yarloop	1-10-1899 to 30-9-1924	15-10-1929	25,316
Ainslie, James	291/113	Kirup	1- 1-1901 to 31-12-1925	30-11-1930	17,308
Ainslie, James	299/113	Wuraming	1- 7-1900 to 30-6-1925	15-7-1930	25,580
Wittenoom, Edward Horne	322/113	Yarloop	1- 4-1902 to 31-3-1927	15-4-1932	22,024
Wittenoom, Edward Horne	325/113	Yarloop	1- 4-1902 to 31-3-1927	31-3-1931	1,197
Smith, Henry Teesdale	331/113	Dwellingup ...	1- 1-1903 to 31-12-1927	15-1-1933	3,953
				Total ...	152,828

* On royalty basis. † On rental basis.

APPENDIX 3c.

Saw Mill Permits in Force as at the 30th June, 1928 (Granted under Section II. of the Land Act Amendment Act, 1904).

Permit Holder.	No.	Locality.	Term.	Present Area.
				acres.
Port & Co., Ltd.	34/11	Pindalup	1- 7-1910 to 30-6-1931	31,585
Wilgarrup Karri and Jarrah Co., Ltd. ...	42/11	Jarnadup	1- 4-1910 to 31-3-1930	14,728
Buckingham Bros.	44/11	Muja	1- 7-1910 to 30-6-1930	48,058
Commissioner of Railways	60/11	Yourdanning	1- 4-1912 to 31-3-1930	37,710
The Kauri Timber Co., Ltd.	61/11	Nannup	1- 1-1912 to 31-12-1929	72,146
Trees, Ltd.	71/11	Yarloop	1- 4-1914 to 31-12-1929	20,028
Commissioner of Railways	78/11	Dwellingup	1- 7-1915 to 30-6-1929	80,719
State Saw Mills	79/11	Wuraming	1-10-1915 to 30-9-1929	36,760
Minister for Works and Industries	80/11	Bingham River	1-10-1915 to 30-9-1929	21,260
State Saw Mills	81/11	Wourahming Hill	1-10-1915 to 30-9-1929	21,386
State Saw Mills	82/11	Worsley	1-10-1915 to 30-6-1930	9,790
McGibbon, Sinclair James (Whittaker Bros.)	84/11	North Dandalup	1- 1-1916 to 31-12-1929	14,620
State Saw Mills	85/11	Pemberton	1- 7-1916 to 30-6-1929	81,446
State Saw Mills	86/11	Manjimup	1- 7-1916 to 30-6-1930	156,242
Westralian Powell Wood Process, Ltd. ...	87/11	Donnelly River	1- 1-1919 to 31-12-1929	15,000
Bunning Bros., Ltd.	89/11	Muja	1-10-1916 to 31-5-1930	49,879
Bunning Bros., Ltd.	94/11	Collie	1-10-1916 to 19-8-1929	10,123
Bunning Bros., Ltd.	95/11	Noggerup	1- 1-1917 to 19-8-1929	9,464
Bunning Bros., Ltd.	97/11	Collie	1- 4-1917 to 19-8-1929	11,160
Bunning Bros., Ltd.	99/11	Collie	1- 7-1918 to 19-8-1929	9,960
			Total	752,064

APPENDIX 3d.

Sawmilling Permits in Force as at the 30th June, 1929 (Granted under Forests Act, 1918).

Permit Holder.	No.	Locality.	Term.		Area.
			From.	To.	
					acres.
Adelaide Timber Co., Ltd.	57	Wilga	28–11–18	31–7–29	18,570
Swan Saw Mills, Ltd.	91	Quilergup	22–8–19	21–8–29	19,660
Collie Land & Timber Co., Ltd. ...	107	Bingham River ...	29–11–19	30–6–30	9,440
Nicholson, John	145	Barrabup	1–9–21	31–8–29	13,780
Miller, E. E.	243	Donnybrook	1–12–21	30–11–29	50
Adelaide Timber Co., Ltd.	380	Benjinup...	1–8–23	31–7–29	4,752
State Saw Mills	387	Pindalup	1–10–23	30–9–29	16,038
W.A. Jarrah Forests, Ltd. (in liquidation)	403	Margaret River ...	22–10–23	31–10–29	11,775
Trees, Ltd.	422	Collie	7–12–23	31–12–29	3,750
Harper, A. J.	427	Marbellup	1–2–24	30–4–30	2,990
Bunning Bros., Ltd.	451	Claymore	1–6–24	31–5–30	7,330
The Mumballup Timber Syndicate ...	492	Mumballup	1–9–24	31–8–29	6,699
Busselton Saw Mills, Ltd.	508	Quindalup	1–10–24	30–9–29	6,852
Millars' Timber & Trading Co., Ltd. ...	524	Jarrahwood	1–1–25	31–12–29	19,562
Timber Corporation, Ltd....	552	Wilgarrup	1–4–25	31–3–30	8,140
Millars' Timber & Trading Co., Ltd. ...	571	Marrinup	1–6–25	31–5–30	9,465
Millars' Timber & Trading Co., Ltd. ...	617	Barton's Mill	16–12–25	31–12–29	6,840
Scott W. J. R.	625	Capel	1–3–26	28–2–30	2,400
Millars' Timber & Trading Co., Ltd. ...	650	Lowden	14–8–26	13–8–29	2,335
Lewis, J., and Stirk, F.	658	Mullalyup	1–11–26	31–10–29	4,902
Curtis & Co.	664	Bedfordale	18–12–26	31–12–29	2,600
Bonola, T. D.	676	Witchcliffe	20–4–27	30–4–30	4,164
Bunning Bros., Ltd.	677	Yornup	1–4–27	31–3–30	8,125
Adelaide Timber Co., Ltd.	683	Wilga	13–7–27	31–7–29	9,500
Adams, W. F.	689	Ludlow	1–8–27	31–7–29	55
Smailes, S.	717	Pickering Brook ...	1–3–28	28–2–30	2,600
Thompson, G. P.	720	Donnybrook	11–5–28	31–5–30	2,278
W.A. Jarrah Forests, Ltd. (in liquidation)	723	Chapman Brook ...	1–7–28	30–6–29	13,510
Bunning Bros., Ltd.	725	Claymore	1–7–28	31–5–30	11,990
Harnett, P. J.	739	Worsley	1–12–28	30–11–29	492
Millars' Timber & Trading Co., Ltd. ...	744	Mornington	1–3–29	28–2–30	14,050
W.A. Jarrah Forests, Ltd. (in liquidation)	745	Margaret River ...	1–4–29	31–3–30	8,780
				Total ...	253,474

APPENDIX 3e.

Hewing Permits in Force as at 30th June, 1929.

Permit Holder.	No.	Locality.	Term.		Area.
			From.	To.	
					acres.
W.A. Jarrah Forests, Ltd (in liquidation)	399	Margaret River ...	22–10–23	31–10–29	8,125
W.A. Jarrah Forests, Ltd. (in liquidation)	400	Margaret River ...	22–10–23	31–10–29	4,927
W.A. Jarrah Forests, Ltd. (in liquidation)	401	Margaret River ...	22–10–23	31–10–29	4,770
Bonola, T. D.	404	Margaret River ...	22–10–23	31–10–29	14,372
Bonola, T. D.	411	Margaret River ...	1–12–23	30–11–29	16,840
Bonola, T. D.	412	Margaret River ...	1–12–23	30–11–29	3,000
Bonola, T. D.	413	Margaret River ...	1–12–23	31–8–29	7,803
Bonola, T. D.	490	Busselton	11–8–24	31–8–29	5,984
Ryan, P. D.	657	Busselton	1–10–26	30–9–29	16,091
Bonola, T. D.	688	Busselton	10–8–27	31–8–29	4,288
Ryan, P. D.	690	Carbunup	27–8–27	31–8–29	15,400
Wilson, G. N. and Galvin, J.	707	Margaret River ...	1–12–27	30–11–29	4,183
Aubin, L.	742	Margaret River ...	12–12–28	31–12–29	1,250
Palandri, G.	748	Cowaramup	1–6–29	31–5–30	8,560
				Total ...	115,593

APPENDIX 3f.

Firewood Permits in Force as at 30th June, 1929.

Permit Holder.	No.	Locality.	Term.		Area.
			From.	To.	
					acres.
Hunter, C. H.	205	Clackline	1–5–21	30–4–30	470
Georgeff, M.	244	Balcatta	1–12–21	30–11–29	1,180
Dean, G.	264	Nannup	1–4–22	31–3–30	845
Gordin, A. A.	385	Byford	1–9–23	31–8–29	1,091
Gableish, A....	389	Albany	1–11–23	30–4–30	1,100
Harvey, A. R.	458	Albany	1–7–24	30–4–30	940
Mollison, G.	553	Wanneroo	1–5–25	30–4–30	1,310
Fisher, G. W.	557	Albany	1–5–25	30–4–30	385
Mazzuchelli, H. H.	596	Kelmscott	1–9–25	31–8–29	1,090
Trew, S. G.	644	Mundaring	1–8–26	...	12,600
Considine, J. R.	645	Mundaring	1–8–26	...	6,830
Page, J. E.	647	Albany	1–8–26	31–7–29	700
Shanhun, A. H.	675	Albany	1–4–27	31–3–30	750
Dale, C. H.	678	Applecross	1–7–27	31–1–30	176
Powell, A. G	686	Redmond	1–7–27	30–6–29	660
Groat, A. G.	709	Balcatta	1–1–28	31–12–29	180
Dunn, T.	710	Armadale	1–1–28	31–12–29	3,130
Metropolitan Lime, Stone and Firewood Co., Ltd.	719	Wanneroo	1–5–28	30–4–30	770
Battel, G.	722	Byford	1–6–28	31–5–30	1,170
Della Bosca, A.	727	Wooroloo	1–7–28	30–6–29	4,025
Weir, J. H.	728	Albany	1–8–28	31–7–29	460
Brown, F. J.	729	Redmond	18–8–28	31–8–29	960
Lunt, N. L.	730	Albany	18–8–28	31–8–29	1,117
Shanhun, A. V.	732	Albany	5–10–28	31–10–29	1,536
Sims, J.	733	Chorkerup	5–10–28	31–10–29	1,338
Fleming, D.	734	Wundowie	15–10–28	31–10–29	3,947
Tysoe, G. A.	736	Denmark	18–10–28	31–10–29	55
Georgeff, M.	740	Wanneroo	5–12–28	31–12–29	880
Kingston, H. J.	743	Denmark	1–1–29	31–12–29	93
Doherty, P.	746	Applecross	16–4–29	31–1–30	29
Pratt, W. J.	747	Bedfordale	22–5–29	31–5–30	1,490
				Total ...	51,307

APPENDIX 3g.

Miscellaneous Permits in Force as at 30th June, 1929.

Permit Holder.	No.	Locality.	Term.		Forest Produce.
			From.	To.	
Hall, W. R....	104	Kalgoorlie	1–10–19	31–7–29	Tanning Barks
Blackboy Tanning, and By-Products, Ltd.	568	Collie	1–7–25	30–6–29	Blackboy
Rimmer, W.	696	Wanneroo	1–10–27	30–9–29	do.
Lawson, S. E.	700	Mungalup	1–12–27	31–5–30	Piles
Reganwool, Ltd.	712	Mundaring, Karragullen and Metropolitan Districts	1–1–28	31–12–29	Bull Banksia Cones
S.A. Blackboy Products, Ltd. ...	724	Katanning	1–7–28	30–6–29	Blackboy Gum
Colley, J. H.	731	Albany	1–9–28	31–8–29	Blackboy
Gibbs, A.	735	Wanneroo	17–10–28	31–10–29	Blackboy
Pumphrey, W.	741	Baker's Hill	1–12–28	30–11–29	Wandoo Logs

APPENDIX 3h.

Summary of Appendices 3a to 3g.

Number in Force.	Class of Holding.	Area.
		acres.
1	Timber Concessions (Appendix 3*a*)	244,394
12	Timber Leases (Appendix 3*b*)	152,828
20	Sawmill Permits (Appendix 3*c*)	752,064
32	Sawmilling Permits (Appendix 3*d*)	253,474
14	Hewing Permits (Appendix 3*e*)	115,593
31	Firewood Permits (Appendix 3*f*)	51,307
9	Miscellaneous Permits (Appendix 3*g*)	...
119	Total	1,569,660

APPENDIX 4.

Table showing the number of various Timber Workers' Registration Certificates issued from 1st July, 1928, to 30th June, 1929, as compared with those issued during the year ended 30th June, 1928.

Class of Registrations.	Number issued for year ended 30th June, 1928.	Number issued for year ended 30th June, 1929.
Hewers	305	202
Fallers	636	368
Haulers, Teamsters, etc.	209	171
Carters	45	35
Managers and Bush Foremen	65	48
Swampers	186	141
Firewood Cutters and Carters	307	284
Charcoal-burners and Carters	1	3
Mining Timber Cutters *	19	22
Ropemen	1	2
Whistle Boys	7	5
Shoemen	2	2
Beam Squarers	1	...
Engine Drivers	4	1
Hookmen	17	6
Chaser	1	...
Winchmen	14	5
Permit Holders	7	3
Sandalwood Getters	554	555
Pole Cutter	1	...
Totals	2,382	1,853

*Working on Coal Mining Leases.

APPENDIX 5.

Table showing the number of Licenses issued from 1st July, 1928, to 30th June, 1929, as compared with those issued during the year ended 30th June, 1928.

License.	Number issued for year ended 30th June, 1928.	Number issued for year ended 30th June, 1929.
Firewood	1,881	1,776
Mining Timber	46	48
Fence Posts	31	38
Sandalwood	30	44
Pile and Pole	22	18
Other	24	13
Totals	2,034	1,937

APPENDIX 6.

Summary of Prosecutions for Year ended 30th June, 1929.

Act under which taken.	Charge.	Number of Prosecutions.	Number of Convictions.
Forests ...	Illegally cutting and removing forest produce	19	19
Do. ...	Unlawfully obtaining sandalwood	12	11
Do. ...	Employing unregistered persons to pull sandalwood ...	2	2
Do. ...	Illegally injuring and destroying trees	1	1
Do. ...	Illegally using a brand registered in another person's name ...	1	1
Land ...	Illegally stripping bark from prime Jarrah trees and cutting young saplings	1	1
Police ...	Wilfully damaging a departmental telephone line	1	1
	Unlawfully occupying a departmental dwelling	1	1
Criminal Code	Uttering a document issued by lawful authority to another person	1	1
Bush Fires ...	Unlawfully lighting fires	1	1
	Total	40	39

APPENDIX 7.
LIST OF SAWMILLS.

Name of Sawmill Owner and District.	Date of Erection of Mill.	Saw Mill Site, Timber Lease or P.P. Location No.	Horse-power of Mill.	Length of Tramway connecting Mill with Main Line Siding.	Output in loads of Squared Timber per day.	Remarks.
				M. C.		
ALBANY DISTRICT.						
Douglas, J. R., Denmark	1912	P.P. Town Lot 302	14	...	1	Cutting Karri, Banksia, Yellow Tingle Tingle from P.P. for general wheelwright work. Works intermittently.
Drage, J. E., Effiedale	Nov., 1913 ...	P.P. Loc. 79	10	...	½	Cutting Jarrah from P.P. for fruit cases. Works intermittently.
Edgley, A., Redmond	April, 1921 ...	P.P. Loc. 2698	12	...	½	Cutting Jarrah from P.P. for fruit cases. Works intermittently.
Fitch, F. W., Millbrook	April, 1925 ...	P.P. Loc. 1379 ...	25	...	...	Cutting Sheoak from P.P. for fruit cases. Closed down June, 1925.
Harper, A. J., Marbellup	April, 1928 ...	Railway Property, Marbellup	12	...	1	Cutting Jarrah and Sheoak from Permit 427 for barrel staves, furniture, fruit cases and firewood. Works intermittently.
Haynes, A. G., Nornalup Glen	Jan., 1927	P.P. Loc. 464	5-7	...	1	Cutting Karri and Tingle Tingle from P.P. for scantling. Works intermittently.
Keith, A. E., Hay River	1910	P.P. Loc. 2685 ...	5	...	1	Cutting Jarrah from P.P. for fruit cases. Closed down 1922.
Livesey, S. C., Napier River	Sept., 1923 ...	P.P. Loc. 1999 ...	12	...	½	Cutting Jarrah from P.P. for fruit cases for own use. Works intermittently.
Parsons & Sons, Nunigup	May, 1926	P.P. Loc. 1156 ...	18	...	1	Cutting Wandoo and Jarrah from P.P. for sleepers scantling and timber for own use. Works intermittently.
Paterson, J. W., Torbay	Jan., 1926	P.P. Loc. 712 ...	8	...	½	Cutting Jarrah and Karri for fruit cases and firewood for own use. Works intermittently.
Steele, H., Albany	May, 1921	P.P. Town Lot 43 ...	6	...	1	Cutting Sheoak for fruit cases, staves, and firewood. Closed down April, 1928.
Steicke Bros., Porongorups	June, 1913 ...	P.P. Loc. 1855 ...	18	...	1	Cutting Karri and Jarrah from P.P. for fruit cases and scantling. Works intermittently.
BRIDGETOWN DISTRICT.						
Bunning Bros., Ltd., Yornup	Nov., 1927 ...	S.M. Site 69/33 ...	52	...	20	Cutting Jarrah from Permit 677. Closed down.
Flint, S. F., Scott's Brook	Jan., 1925	P.P. Loc. 5263 ...	6-10	...	...	Cutting Jarrah from P.P. for small orders and fruit cases. Closed down.
Holdsworth, C. J. H., Hester	Mar., 1921	P.P. Loc. 11	10	...	1	Cutting Jarrah and Karri for fruit cases from waste ends from various mills.
Machin, H. J., Glentullock	July, 1922	P.P. Loc. 767	25	...	...	Cutting Jarrah from P.P. for fruit cases for own use.
Morrison, A., Tamar Gully	June, 1923 ...	P.P. Loc. 9693	6	...	½	Cutting Jarrah from P.P.
BUSSELTON DISTRICT.						
Bentley, J. L., Capel	Nov., 1924 ...	P.P. Loc. 26	8	...	¾	Cutting Jarrah from P.P.
Busselton Saw Mills, Ltd., Yallingup ...	May, 1927	S.M. Site 65/33 ...	22	...	5	Cutting Jarrah from Permit 508. Closed down.
Donald, R. & Sons, Yallingup	1922	P.P. Loc. 461 ...	10-12	...	1	Cutting Jarrah from P.P. for own use.
Forests Department, Wonnerup	June 30, 1921 ...	State Forest, No. 2 ...	40	0 20	25	Cutting Tuart. Bulk of output for W.A.G.R.
Scott, W. J. R., Capel	July, 1926	S.M. Site 61/33 ...	10	...	3	Cutting Jarrah from Permit 625 for fruit cases and scantling.
COLLIE DISTRICT.						
Bunning Bros., Ltd., Lyall's Mill ...	1918	P.P. Loc. 2519 ...	75	6 0	25	Cutting Jarrah from Permits 94/11, 95/11, 97/11 and 99/11.
Collie Land & Timber Co., No. 2, Shotts ...	Jan., 1925	P.P. Loc. 755	40	...	15	Cutting Jarrah from private property. Closed down, Nov. 1927
Collie Land & Timber Co., No. 3, Collie	Oct., 1928	P.P. Loc. 752	14	...	5	Cutting Jarrah from P.P.
MUJA SUB-DISTRICT.						
Buckingham Bros., Buckingham's Siding...	1911	S.M. Site 30/33 ...	40	0 60	18	Cutting Jarrah from Permit 44/11.
Bunning Bros., Ltd., Muja	Jan., 1914	P.P. Loc. 1676 ...	32	0 65	15	Cutting Jarrah and Wandoo from Permit 89/11.

Wellington Sub-District.						
Millars' Timber & Trading Co., Ltd., Wellington Mills, No. 6	Jan. and Feb., 1926	S.M. Site 74/33 ...	32	13 0	12	Cutting Jarrah from Permit 650. Closed down, Oct., 1928.
Worsley Sub-District.						
Harnett, P. J., Worsley	May, 1929	S.M. Site 76/33 ...	25	...	4	Cutting Jarrah from Permit 739.
State Saw Mills, No. 6E	Dec., 1928	S.M. Site 75/33 ...	32	...	14	Cutting Jarrah from Permit 82/11 (Part 1).
Worsley Timber Co., Ltd., No. 1 ...	Sept., 1928... ...	P.P. Loc. 56	25	...	9	Cutting Jarrah from private property.
Worsley Timber Co., Ltd., No. 2 ...	April, 1929 ...	P.P. Loc. 56	16	...	8	Cutting Jarrah from private property.
Dwellingup District.						
Edgeworth & Co., Pinjarra	1920	P.P. Lot 14	10	...	2	Cutting fruit cases from waste Jarrah from other mills.
Forsyth, W. C., Murray River	July, 1928	P.P. Loc. 233	20	...	8	Cutting Jarrah from P.P.
Millars' Timber & Trading Co., Ltd., Marrinup	1910–1911	S.M. Site 55/33 ...	35	0 20	16½	Cutting Jarrah from Permit 571.
Millars' Timber & Trading Co., Ltd., Nanga Brook	1909	Timber Lease 261/113...	100	28 0	50–55	Cutting Jarrah from Timber Leases 244/113, 261/113 and 299/113.
Port & Co., Ltd., Duncan's No. 8, Holyoake	April, 1925 ...	S.M. Site 47/33 ...	35	15 0	25	Cutting Jarrah from Permit 34/11 (Part 1).
Railway Department, No. 2, Dwellingup ...	1912	P.P. Loc. 1037 ...	200	5 0	50	Cutting Jarrah from Permit 78/11.
Rosenthal, C. H. A., Meelon	May, 1929	Railway Property ...	27	...	1½	Cutting fruit cases from waste jarrah from other mills.
Whittaker Bros. (S. J. McGibbon, Receiver and Manager), North Dandalup	1901	S.M. Site 56/33 ...	120	4 0	25	Cutting Jarrah from Permit 84/11.
Jarrahwood District.						
Millars' Timber & Trading Co., Ltd., Jarrahwood	... ...	P.P. Loc. 361	40	On main line	23	Cutting Jarrah from Permit 524.
Nicholson, J. (Sussex Timber Co., Ltd.), Dellerton	Oct., 1923	P.P. Loc. 3898 ...	28	2 0	12	Cutting Jarrah from Permit 145.
Swan Sawmills, Ltd., Claymore	1921	S.M. Site 4/33	40	2 0	16	Cutting Jarrah from Permit 91.
Kirup District.						
Bendall, W.A., Donnybrook	July, 1920	P.P. Locs. 988 and 989...	10	...	½	Cutting Jarrah from P.P. for sleepers and fruit cases.
Bowman, J. H., Orange Grove	1921	P.P. Loc. 109	12	...	½	Cutting Jarrah from P.P. for fruit cases for own use.
Bunning Bros., Ltd., Argyle	1904	P.P. Loc. 2354	240	0 20	24	Cutting Jarrah from Permits 451 and 725.
Lewis & Stirk, Mullalyup	Jan., 1927	S.M. Site 66/33 ...	16	...	5	Cutting Jarrah from Permit 658.
Martin, R. M., Inglewood Park	1917	P.P. Loc. 3249	16–22	...	...	Cutting Jarrah from P.P. for fruit cases for own use.
Millars' Timber & Trading Co., Ltd., East Kirup	1910	S.M. Site 53/33 ...	60	12 7	32	Cutting Jarrah from Timber Lease 257/113.
Miller, W. K., Charley Creek	1927	P.P. Loc. 62	30	...	2	Cutting Jarrah from P.P. for fruit cases and scantling.
Miller, E. E., Beelerup	1923	P.P. Loc. 168	6	...	¼	Cutting Jarrah from Permit 243 for fruit cases and timber for own use.
Slattery, B., Ferguson	1921	P.P. Loc. 2468	4	...	¼	Cutting Jarrah from P.P. for fruit cases.
Thompson, G. P., Boyanup	June, 1928 ...	S.M. Site 73/33 ...	8	...	2	Cutting Jarrah from Permit 720.
Manjimup District.						
Edwards, R. H., Balbarrup	Sept., 1920 ...	P.P. Loc. 2200	8	...	½	Cutting Jarrah from P.P. for fruit cases and own use.
Johnson, J., Balbarrup	1912	P.P. Loc. 1098 ...	10	...	3	Cutting Jarrah from P.P. for fruit cases and own use. Closed down.
Ralph, W., Balbarrup	Oct., 1910 ...	P.P. Loc. 2383 ...	7½	...	½	Cutting Jarrah from P.P. for fruit cases and own use.
State Saw Mills, No. 1, Manjimup ...	July, 1926 ...	Reserve 1655	150	4 0	30	Cutting Jarrah and Karri from Permit 86/11.
State Saw Mills No. 2, Pemberton ...	1920	Reserve 16354	400	0 40	48	Cutting Karri from Permit 85/11 and private property.
State Saw Mills No. 3, Pemberton ...	1914	Reserve 16354	280	0 40	26	Cutting Karri from Permit 85/11 and private property.
State Saw Mills, Fruit Case Mill ...	... ...	... ...	...	...	...	Cutting fruit cases from waste timber from Nos. 2 and 3 Mills.
Timber Corporation, Ltd., Palgarup ...	May, 1928	P.P. Loc. 1024 ...	41	1 40	23	Cutting Jarrah from Permit 552.
Wilgarrup Karri & Jarrah Co., Ltd., Jardee	Nov., 1911 ...	S.M. Site 7/33	75	0 20	30	Cutting Jarrah and Karri from Permit 42/11 and private property.

Name of Sawmill Owner and District.	Date of Erection of Mill.	Saw Mill Site, Timber Lease or P.P. Location No.	Horse-power of Mill.	Length of Tramway connecting Mill with Main Line Siding.	Output in loads of Squared Timber per day.	Remarks.
				M. C.		
MARGARET RIVER DISTRICT.						
Bonola, T. D.	1927	Group Block 1017 ...	12	...	5	Cutting Jarrah from Permit 676.
W.A. Jarrah Forests, Ltd. (in liquidation) Pilgrim's Mill	June, 1925 ...	S.M. Site 48/33 ...	312	1 40	30	Cutting Jarrah and Karri from Permits 403, 723 and 745.
METROPOLITAN DISTRICT.						
Buckingham, W. S., Kelmscott	1900	P.P. Loc. 33	15	...	½	Cutting Jarrah and Red Gum from private property.
Curtis & Co., Bedfordale	July, 1927	P.P. Loc. 483	44	...	2	Cutting Jarrah from Permit 664.
Dennis, H. J., & Son, Wanneroo ...	April, 1925... ...	P.P. Loc. 2737 ...	10	...	2	Cutting Jarrah and Red Gum from P.P. for fruit cases.
Howard, J., Kelmscott	Jan., 1927	Kelmscott Town Site Lot 31	20	...	½	Cutting Jarrah from private property for fruit cases and pickets.
McKenna, Bros., Cardup	July, 1927	P.P. Loc. 33	12	...	½	Cutting Jarrah from P.P. Closed down.
Millars' Timber & Trading Co., Ltd., No. 1, Jarrahdale	July, 1913	P.P. Cockburn Sound Loc. 282	75	7 0	50	Cutting Jarrah from Concession 12/0.
Millars' Timber & Trading Co., Ltd., No. 2, Jarrahdale	Mar, 1922	P.P. Cockburn Sound Loc. 282	55	7 0	27	Cutting Jarrah from Concession 12/0.
Millars' Timber & Trading Co., Ltd. (Board Mill), Mundijong	July, 1918	P.P. Cockburn Sound Loc. 524	20	1 0	16	Cuts boards only from flitches supplied by other mills on Concession 12/0.
Turner, W. H., Aintree	Mar., 1928	P.P. Loc. 218	10	...	1	Cutting Jarrah from private property. Closed down.
Railway Department, Midland Junction...	1904	Midland Junction Workshops	80	...	10	Cuts Tuart, Wandoo and Banksia for own use.
MUNDARING DISTRICT.						
Waters, A., Sawyers Valley	1921	P.P. Loc. 297	8	...	1	Cutting Jarrah from P.P. Closed down, August, 1927.
KARRAGULLEN.						
Millars' Timber & Trading Co., Ltd., New Canning	Aug., 1924 ...	S.M. Site 59/33 ...	40	8 20	15	Cutting Jarrah from Permit 617.
Smailes, S., Pickering Brook	Feb., 1926	Railway Property ...	14	...	3½	Cutting Jarrah from Permit 717.
Walliston Orchardist Co., Walliston ...	1924	P.P. Town Lot 82 ...	12	...	1	Cutting Jarrah from P.P. for fruit cases.
NANNUP DISTRICT.						
Kauri Timber Co., Ltd., Nannup ...	1926	S.M. Site 28/33	100	0 25	55-60	Cutting Jarrah and Karri from Permit 61/11.
NOGGERUP DISTRICT.						
Adelaide Timber Co., Ltd., Wilga ...	1908	S.M. Site 14/33 ...	62	Mill on Siding	15	Cutting Jarrah from Permits 57, 380 and 683 and Private property.
Colmer, R. J.	... ...	... ...	16	...	2	Cutting Wandoo timber from P.P. Closed down.
Mumballup Timber Syndicate, Mumballup	April, 1925 ...	S.M. Site 42/33 ...	20	...	8-10	Cutting Jarrah from Permit 492. Closed down.
Qualeup Trading Co., Ltd. (in liquidation)	Sept., 1928 ...	P.P. Loc. 8843 ...	16	...	2	Cutting Wandoo and Jarrah from P.P.
WURAMING DISTRICT.						
Port & Co., Ltd., No. 1, Pindalup ...	1911	S.M. Site 13/33 ...	35	0 40	20	Cutting Jarrah from Permit 34/11 (Part 2). Closed down, Dec., 1928.
Port & Co., Ltd., No. 2, Pindalup ...	1923	S.M. Site 27/33 ...	22	...	15	Cutting Jarrah from Permit 34/11 (Part 2).
State Saw Mills, No. 4, Wuraming ...	1926	S.M. Site 45/33 ...	80	11 10	30	Cutting Jarrah from Permits 79/11 and 387.
Waroona Saw Mills, Ltd.	1929	P.P. Loc. 796	32	7 0	14	Cutting Jarrah from P.P.

YARLOOP DISTRICT.							
Millars' Timber & Trading Co., Ltd., Hoffman	1921	Timber Leases 261/113 and 322/113	83	18 0	27	Cutting Jarrah from Leases 261/113 and 322/113.
Millars' Timber & Trading Co., Ltd., Hoffman (Bandmill)	... ...	do. do.	32	18 0	10	do. do. do.
Millars' Timber & Trading Co., Ltd., No. 1, Mornington	1898	P.P. Loc. 1	60	7 0	45	Cutting Jarrah from Leases 297/113, 322/113 and 744.
Millars' Timber & Trading Co., Ltd., No. 2, Mornington	1898	P.P. Loc. 1	60	7 0	40	Cutting Jarrah from Leases 297/113 and 322/113. Closed down, Nov., 1928.
Trees, Ltd., Treesville	Sept., 1920 ...	S.M. Site 36/33 ...	30	31 0	20	Cutting Jarrah from Permits 71/11 and 422. Closed down, June, 1928

NOTE—P.P. denotes Private Property, S.M. denotes Sawmill.

APPENDIX 8.

Third Empire Forestry Conference.

REPORT OF THE COMMITTEE ON AUSTRALIAN FORESTRY.

The Committee appointed to report on Australian forestry begs to report as follows:—

General.

1. Since each State of the Comonwealth administers its forests independently, and since conditions in each vary to a greater or less extent, we propose to deal separately with each State in turn, and with the Commonwealth Territories. At the same time there are certain general considerations applying to Australia as a whole to which we desire to draw attention.

Historical.—The history of forestry in Australia is short. It is only just emerging from the chaos of pioneering settlement. As in all lands it has been preceded and accompanied by a phase of active and, for the most part, unavoidable spoliation and destruction of the indigenous forests, beginning with the more valuable areas close to centres of population. The truth has at last become apparent that present timberland resources are inadequate, and must now be organised to maximum productivity to supply the imperative needs of the country.

Forestry may be said to have commenced in South Australia, where native forests were least in evidence. The planting of *Pinus insignis* in that State by John Ednie Brown 40 years ago appears to have been the opening phase in afforestation in Australia. The tending of the indigenous Red Gum forests of the Murray River, both in New South Wales and Victoria, was probably the next important development. During the past twenty years more definite progress has been made. Specific forest legislation has been enacted, and forest services have been organised in all the States. In the establishment of a School of Forestry in South Australia in the year 1911, that State made an important contribution to the future of forestry in the Commonwealth by training men for technical appointments in those services, whilst Victoria in its Creswick Forestry School showed an early recognition of the needs of the times.

More recent developments show that the necessity for dedicating, organising, and managing the necessary area of State forests is forcing itelf upon the attention of the various Governments with greater and greater insistence. It may be anticipated that the rate of progress in forest management will now accelerate. The present forestry position of the several States and of the Commonwealth Territories is set forth briefly in sections 2 to 8 of the report. (*Section 7 dealing with Western Australia is published herewith.*)

Timber Supplies.—The question of an adequate timber supply must play an important part in the future development of Australia. During the year 1926-27, 41,660,000 cubic feet of softwoods were imported, and 47,500,000 cubic feet of hardwoods and 11,500,000 cubic feet of softwood were cut from local forests; 9,500,000 cubic feet were exported. The total Australian consumption was, therefore, 91,160,000 cubic feet, of which hardwoods represented 38,440,000 cubic feet, and softwoods 52,720,000 cubic feet. The *per capita* consumption amounted to 6.27 cubic feet of hardwoods and 8.6 cubic feet of softwoods.

With a normal increase in population, and with the further industrial development of the country, the demand for timber may be expected to increase steadily, and further, the shortage in the world's softwood supplies which is predicted during the next few decades, will render it increasingly difficult and costly for Australia to satisfy her demands from imported timber. It behoves her, therefore, to take all possible steps to become self supporting by the permanent reservation and proper management of a sufficient area of indigenous forests, chiefly of hardwoods, and by the establishment of plantations of softwoods.

Forest Management.—While cognisant of the progress which has so far been made in the preparation of forest working plans, we desire to impress on all Governments the importance of this work. The neglect of the principle of the sustained yield, which is universally recognised as one of the cardinal maxims of forest management, has resulted in the rapid exploitation of the forest wealth of Australia. The result of this reckless utilisation has been that timber industries have been forced to close down or migrate elsewhere with the exhaustion of the supplies of raw material on which they depended for their existence. Only by adopting the principles of forest management can such errors be prevented in the future, and only by this means can the supply of forest products to the community be maintained in perpetuity.

Firewood and Other Supplies.—We desire to draw attention to the necessity for re-sowing suitable areas of forest in the neighbourhood of growing towns for permanent management with the object of furnishing regular supplies of firewood and other small produce; in the absence of such precautions, the populations of these towns must in time suffer great inconvenience, and even privation, for want of some of the most important necessaries of life.

Forest Area.—In 1920 an Interstate Forestry Conference resolved that an area of 24,500,000 acres of forest should be permanently reserved. In the absence of any estimate of the productive capacity of this area the figure in question has little meaning. An examination of forest tracts since that date has disclosed the fact that the area of merchantable forest of reasonably good quality available for dedication as permanent forest is far less than was at one time supposed, and the 24,500,000 acres, even if dedicated, must include a large proportion of unproductive ground and forest of low volume yield capacity. In the case of States which have not carried out detailed assessments, the area figures given below should, therefore, be accepted with caution. The fact that in the Eastern States present requirements are met largely from private lands, from which the stock of timber will in time disappear, renders the question of reserving a sufficient area of State forest the more pressing. We recommend, therefore, that this question be approached from the point of view of estimated volume, and that a revision of the areas necessary to meet future probable demands be made on that basis. For this purpose every endeavour should be made to reserve all available areas of first-class forest land rather than to take up large tracts of poor forest which may even prove an embarrassment. The area required for timber production, for the benefit of the country as a whole, should be determined irrespectively of forest areas, often of somewhat poor quality which are required for the local supply of firewood and other small produce, and those which are required primarily for protective purposes, and which will not furnish appreciable supplies of timber.

Research.—We lay special stress on the need for silvicultural research in Australia, and strongly recommend that steps be taken to organise research work and prosecute it on a sound basis. We recognise that while each State should carry on research into problems confronting it, some central organisation for the encouragement and correlation of forest research is necessary. The Commonwealth Forestry Bureau, already in existence, should be strengthened in order to provide the necessary machinery for carrying out this work.

Fire Control.—We deplore the damage done by forest fires in Australia, and are of the opinion that the situation warrants detailed consideration. While admitting that complete fire protection is in all cases neither possible nor desirable, we consider that much greater precautions are often required against forest fires, more especially in the case of coniferous forest, eucalypts sensitive to fire, and water-supply catchment areas. Controlled burning, in the case of fire-resistant species, may be quite justified both from a silvicultural and a fire-protective standpoint either to secure definite conditions of soil or as the lesser of two evils. In no case, however, can uncontrolled fires be anything but a menace both to the forest and to the surrounding population. We recommend that the whole question of forest fire control be made the subject of detailed consideration by the Federal and State Governments in Australia.

Plantations of Softwoods.—So far as our information goes, the area available for the cultivation of softwoods is insufficient to meet the probable future needs of Australia. It is imperative, therefore, that every effort be made to plant the maximum area available.

While recognising the value of *Pinus insignis* on suitable sites as a means of reducing the deficiency in softwood supplies, we are not satisfied that in this species Australia has found a complete solution of her softwood requirements. That species shows itself rather exacting in site demands, and yields may drop very quickly under adverse conditions. Any large planting scheme must inevitably entail considerable variation in site conditions. Prospective yields based on calculations derived from simple plots or small cuttings in the better locations must be viewed with extreme caution. Furthermore, enemies of this species may appear at any moment, and there is always the possibility of very serious inroads and loss from such a cause. We feel that it will be dangerous to place too much reliance on any one species of exotic; rather the species should be varied to meet the site conditions and the market requirements. Other species of pine are apparently at home under Australian conditions, and selected strains from localities having soil and climatic conditions similar or comparable to those found in Australia may show even better results. We feel that the question of seed supply of exotic conifers warrants future detailed study, and that experimental plantations of selected strains should be made.

Thinnings.—We desire to draw attention to the importance of thinnings, which on financial grounds are apt to be neglected to the serious detriment of the final crop. This applies particularly to the fast-growing conifers worked on a comparatively short rotation. This question, as well as that of pruning, is deserving of careful study both from a silvicultural and from an economic point of view.

Staff.—The training of the professional staff in Australia is a matter which is being dealt with by the Committee on Education. We wish to emphasise the importance of employing an adequately trained staff for the management of the very valuable forests of the States. Technical management is becoming more and more developed in Australia, and with this development fully trained officers will be required in increasing numbers for the public service. We consider that forestry should be recognised in Australia as one of the learned professions, and that recruits to the service should have a standard of education fitting them for such a position.

Finance.—We recommend that each Government be asked to consider what measures can be taken to secure continuity of financial assistance over a series of years, without which the formulation and execution of programmes of work is rendered difficult.

* * * * * * * * * * *

7.—Western Australia.

Forest Area.—In view of the large area of the State, its rapid development and consequent increase in population, it is most desirable that every effort be made not only to attain the area of 3,000,000 acres which was allotted to it by the 1920 Interstate Forestry Conference, but to extend it until it embraces the whole of the forest area available. The forest assessment already executed by Mr. Kessell covers an area in excess of the 3,000,000 acres, and it is anticipated, in the light of the present knowledge, that an additional area of 500,000 acres is available.

Regulation of Cut.—The principle of sustained yield can be brought into effect only by regulating the cut, so that it does not exceed the annual increment of the forest. At present Western Australia is cutting its principal species (jarrah) at the rate of 700,000 loads a year, and the volume of mature standing timber has been estimated by the department at 20,666,000 loads; from this it is clear that, at the present rate of exploitation, supplies will last 28 years. Forest surveys have revealed a very marked deficiency in the lower age classes, so that it is incumbent on the Government to reduce the cut so as to extend the milling operations over a period of years sufficient to enable the lower age classes to reach maturity.

The extent of this reduction has been estimated by Mr. Kessell in his general working plan for the Jarrah forests of the State, and it is proposed that this be effected within the next ten years. The benefit to be derived from the reduction of cutting is the permanency of the timber industry. Present supplies will, under reduced output, last 45 years, by which time it is anticipated that the younger age-classes will have reached maturity. Such reduction in itself, however, will not achieve the object of a sustained yield, unless it is accompanied by an active development of regeneration work over the very large area of forest cut over in the past. The regeneration methods adopted during the last few years have given satisfactory results, and their further development and extension is much to be desired.

Softwoods.—A planting programme is necessary to supply the softwood requirements of the State, and while the figure of 1,000 acres per annum which is proposed may be considered adequate at the present time, this programme may need to be increased considerably to meet local requirements following rapid increases in population and development of industries.

By Authority: John Lee, Acting Government Printer, Perth.