BRITISH EMPIRE FORESTRY CONFERENCE 1923.

FORESTRY IN WESTERN AUSTRALIA.

A Supplement to Statement prepared for British Empire Forestry Conference, London, 1920.

SECTION IV.

IMPORTANT TIMBERS AND OTHER FOREST PRODUCTS.

EXPORT OF TIMBER.

Although not up to pre-war figures, the quantity of timber exported annually since 1920 is greater than it was in that year:-

	1920		1923.	
	Cu. ft.	Value	Cu.ft.	Value
Timber exported	5,065,300	£487,666	7,911,310	£1,009,831

It will be seen from the above figures that the value per unit has also increased.

SANDALWOOD.

The quantity of sandalwood exported, practically all of which goes to China, has, during the last few years, been subject to great fluctuations. The ruling rates of exchange of the Hong Kong Dollar has of recent years had considerable influence on this trade. 1920 was a boom year, as the following figures indicate:-

	Tons.	Value.
1920 ...	14,355	£240,579
1921 ...	10,839	181,801
1922 ...	3,990	54,769
1923 ...	7,705	103,958

ESSENTIAL OILS.

The value of exports under this head has increased from £3,704 in 1920 to £20,075 in 1923. This increase is chiefly the result of the development of an export trade in Western Australian sandalwood oil.

TANNING BARK.

There has been little variation during the last few years in the value of export of tanning bark. In 1920 the figures were £22,121 and in 1923 £21,161. The State possesses in the wood and bark of various forest species great quantities of raw material, which experiments have shown to be quite suitable for the manufacture of tannin extracts.

SECTION VI.

B. Brief Summary of Administration and Methods of Forest Development.

Fire Control.

Great progress in fire control has been made since 1920. Fire control is the basis on which all the silvicultural and regeneration operations in Western Australia must rest. At the present time, an area of approximately 120,000 acres in the Mundaring District, i.e. at the northern end of the Jarrah Belt, and an area of about 120,000 acres in the Collie Coalfields District are protected from fire. In this State practically all fires arise from preventable causes, and the most important step to prevent forest fires is to educate the public in this matter. Popular education is being developed along

many lines, such as the delivery of illustrated lectures in various forest centres; personal talks between forest officials and persons living in the forest country; the posting up and delivery to residents of notices setting out the laws in relation to the lighting of fire and the penalties for their violation; the publishing of articles in the press, etc.

The clearedfire breaks have been abandoned owing chiefly to excessive cost of construction and maintenance. The need is realised, however, of certain definite lines from which, in case of emergency, a counter fire may be started.

Accordingly, the economy of burning strips by setting a running fire in the bush on a still day, without preliminary cleaning, was tested, but this system is being modified in favour of keeping open well-worn tracks which are to be found in any bush that has been cut over.

Fire fighting organisation has been built up on the principle that the first essentials are - (a) to locate the fire exactly, as soon as it starts, and then (b) to get a fire fighting force on the scene to suppress it as soon as possible. Lookout towers have been found to be invaluable in this work. Forest workmen are communicated with by means of telephone, heliograph and messenger. The heliograph has proved invaluable, but the efficacy of this method of communication is restricted owing to the fact that workmen are often in parts of the forest in which the contour of the ground prevents them from sighting the tower.

Enquiries are being made as to the economic possibility of using wireless telephony in fire control.

As an indication of the success that has attended measures

of fire control may be mentioned the fact that, on areas under observation at Collie, 34% of unprotected private property was burnt against 2% of protected Crown lands.

'Top disposal operations' are an important branch of fire control measures in areas where complete control is not yet possible. The large amount of debris, i.e. tops and branches left by fallers, serves as fuel to increase the size and intensity of the fires which in past years have been allowed to run through the forest destroying tremendous quantities of immature timber which is left behind by fallers owing to girth restrictions imposed by regulations. The present method of working is to burn by a creeping ground fire at night time, the bush to be worked in the immediate future. This preliminary burning facilitates hauling operations and renders safe the subsequent controlled burning of inflammable tops and branches early in the dry season, after the debris has been cleared from around the base of any saplings and poles. Top disposal operations have, during the past twelve months, been extended to include all areas where sawmilling and hewing operations are being carried out in prime Jarrah forest. Complete fire control will be extended to the remainder of the prime forest country as soon as funds and staff permit.

Regeneration of Natural Forests.

(a) Jarrah (Eucalyptus marginata). Where complete fire control has rendered possible extensive silvicultural work, the Group Selection system has been adopted as an expedient to provide for the restocking as rapidly as possible of the present abnormal cut over bush. Sawmilling companies

remove the best of the Jarrah trees, with the only restriction that no trees below 90 inches girth b.h. must be felled. Overmature and faulty trees are left, so that ringbarking or removing these and other valueless species forms an important part of the Department's silvicultural operations.

At Collie, however, the clear cutting system is employed, as this results in vigorous coppice, which furnishes small timber suitable for the coal mines in the vicinity.

(b) Tuart (Eucalyptus gomphocephala). This forest is being exploited under a working plan which aims at a sustained yield. For this purpose a departmental sawmill has been established, so that the silvicultural requirements of the forest receive first consideration in the determination of the annual cut. The coupe is marked on the Group Selection System by the Forester-in-Charge, and the control of grazing, and fire should solve the problem of regeneration, which for a period of 30 to 40 years has been negligible. The economy of introducing artificially raised seedlings into the forest, rather than wait for the considerable period which seems necessary for the existence of conditions favourable to natural regeneration is also being tested.

(c) Sandalwood (Santalum cygnorum).
Propagation. It has been scientifically demonstrated that this species, like the Santalum album of India, is definitely parasitical in habit, and the favourite host plant appears to be Acacia acuminata. Experiments of

artificial sowing on selected sites carrying a stock of Acacia acuminata have been made during the last three years, and favourable results have been obtained.

(d) Pine Plantations. As indicated in the statements prepared in 1920, the only land available within the sufficient rainfall belt is sand plain country on which Pinus insignis does not thrive after the first few years. The better land is required for agriculture. A comparatively small plantation of Pinus pinaster has been established in the vicinity of Busselton, but, owing to the slightly more severe conditions further north, work in the vicinity of Perth has been limited to experimental sowing and planting. It appears that the sparse crop of Banksia, scrub Jarrah and coastal Blackbutt at present growing on the sandplain country has a value when rung of sheltering young pines during the first summer, so that it would seem possible to proceed with the establishing of plantations on this country without waiting for a favourable opportunity to organise a fire-wood business for the utilisation of the existing crop of trees, as mentioned in the statement of 1920.

C. The principle of distributing trees from the State Nursery, at cost price, to persons residing outside the Metropolitan Area has been continued:-

No. of Trees Distributed 1923.

Sold to Public.	Distributed Free.	Raised for Plantations and Arboreta.
41,500	4,200	30,000

After discussion with the Education Department and the Forests League, a scheme has been prepared whereby it is hoped to promote the planting of trees by schools and instil into children a love of trees and a knowledge of their methods of growth. Schools are to be encouraged to establish endowment plantations, and, in certain approved centres, arboreta. In establishing an endowment plantation the full cost will be borne by the school assisted by organisations formed by old scholars and parents and citizens. Apart from fencing and any heavy clearing that may be necessary, all operations should be carried out by the children themselves. The Forests Department will assist with advice concerning species and planting methods. The returns realised by the sale of the mature crop will be credited to a fund for expenditure on the needs of the individual school carrying out the work.

In certain centres where the Forests Department is desirous of establishing arboreta for the purpose (a) of testing the rate of growth of certain species under varying soil and climatic conditions, (b) of serving as a demonstration area for persons desirous of planting trees on their own properties, (c) of serving the same educational purposes as a school endowment plantation, it is proposed that the establishment and control of these arboreta be undertaken by schools.

The financial assistance which the Forests Department will render to any proposed arboretum will depend largely on the value to be derived from the scheme under consideration. In all cases, the Department

will provide the design, supply the trees, and retain control of all operations relating to the cutting and removal of trees from the arboretum. The school assisting in the establishment, care and maintenance of an arboretum on these lines will receive all revenue obtained from sales of timber produced.

SECTION VII

FOREST AUTHORITY

In the statement of 1920 it was pointed out that with the passing of the "Forests Act 1918", the Department became established on a sound basis. On the 5th July, 1921, Mr. C.E. Lane-Poole resigned from the position of Conservator of Forests, and Mr. S.L. Kessell, B.Sc.(Adel.) Dip.For.(Oxon.) succeeded him.

The centralization of administration work at Head Office mentioned in 1920 still obtains, owing to the lack of trained District Forest Officers.

The revenue and expenditure since the statement of 1920 was prepared are as follows:-

	Revenue £	Expenditure. £
1st July, 1919, to 30th June, 1920 ..	59,220	20,203
1st July, 1920, to 30th June, 1921 ..	75,469	78,543
1st July, 1921, to 30th June, 1922 ..	87,182	47,522
1st July, 1922, to 30th June, 1923 ..	86,336	38,826

GENERAL STATEMENT OF REVENUE AND EXPENDITURE
for the year ended 30th June, 1923.

Dr.	£ s d	£ s d
th June,1923.		
Log Royalty rom Permits ranted under ection II of Land Act,1898"		
Jarrah	25434 19 2	
Karri	4713 18 4	
		30148 17 6
Log Royalty rom Permits der the 19 orests Act,18		
Jarrah	9012 14 3	
Banksia ...	3 8 4	
		9016 2 7
ellaneous Royalties-		
Piles & Poles	170 9 10	
Hewn Sleepers	4429 19 5	
Sandalwood ..	16429 14 1	
Firewood ...	503 8 6	
Beams	46 0 10	
Mining Timber	1322 3 11	
Illegally cut timber	926 0 8	
Sundries ...	363 0 8	
		24190 17 11
Inspection Fees-		
Hewn Sleepers, Crown Lands .	1306 3 2	
Sawn Sleepers, Crown Lands ..	2744 1 4	
Sawn timber, Crown Lands ..	349 6 8	
Hewn Sleepers, Private Property	3882 12 3	
Sawn Sleepers, Private Property	1438 8 4	
Sawn Timber, Private Property	172 13 3	
Piles& Poles	378 7 4	
Beams	13 13 8	
Re-inspected Sleepers ...	183 9 6	
Miscellaneous	97 16 10	
		10566 12 4
Rents-		
Concessions .	686 0 0	
Leases	6960 0 0	
Tramways	1027 14 9	
Sawmill Sites	101 17 8	
Forest Leases	287 0 6	
Cottages ..	58 5 0	
		9120 17 11
Sales-		
Tuart	3076 9 5	
Trees & Seeds	417 0 11	
Firewood ...	105 10 0	
Branding hammers	34 5 0	
Miscellaneous	64 14 4	
		3697 19 8
Miscellaneous Revenue-		
Registration Fees	269 7 10	
License Fees ..	473 6 0	
Exemption Fees	53 9 6	
Sundries	120 9 6	
		916 1210

Cr.	£ s d	£ s d
30th June,1923.		
By Salaries of Office and Administrative Field Staff	7051 15 2	
" Wages,temporary	2796 12 6	
" Travelling and Forage allowance..	2350 14 2	
		12199 1 10
" Maintenance of State Nursery ...	51 12 9	
" Workers Compensation Fund	53 7 11	
" Sandalwood Commissions	760 19 2	
" Postage and Telephones	282 6 7	
" Stationery	463 13 1	
" Advertising	67 15 0	
" Travelling Allowances	393 0 9	
" Library	173 13 11	
" Freight&Fares	534 16 1	
" Equipment	129 11 7	
" Miscellaneous	136 8 1	
		3047 4 11
" Expenditure from Forests Improvement& Reforestation Fund(Sec.41(2) "Forests Act, 1918"		21563 0 0
" Expenditure from Mining Leases,Royalty Account (Sec.39) (1),"Forests Act, 1918". ..		238 4 5
" Expenditure from General Loan Fund- Pine Planting	1694 4 5	
Purchase of Land	84 18 4	
		1779 2 9
"Balance-Excess of Revenue over Total Expenditure		48831 6 10
		£87658 0 9

FOREST IMPROVEMENT AND REFORESTATION FUND as on 30th JUNE, 1923.
Section 41 (2) "Forests Act, 1918".

Dr. 1923.	£ s d	£ s d
30th June-To Working Plan No.1-(Jarrah belt)	2783 0 0	
" Working Plan No.2 (Tuart belt)	5335 0 0	
" Working Plan No.3 (Collie MiningLeases)	2916 0 0	
		11034 0 0
" Sylvicultural Operations	664 0 0	
" Research	665 0 0	
" Education of Apprentices	1663 0 0	
" Popular Education	133 0 0	
" General Equipment	618 0 0	
" Advertising & Publicity	431 0 0	
" Sandalwood Propagation	527 0 0	
" Classification of timber	2379 0 0	
" Arboreta	192 0 0	
" Salaries of Field Staff engaged on non-administrative work	2533 0 0	
" Miscellaneous	524 0 0	
		10529 0 0
" Balance carried forward		38586 0 0
		£ 60149 0 0

1922 Cr.	£ s d
1st July-By Balance brought forward	19168 0 0
1923	
30th June-By three-fifths of net revenue in accordance with Forests Act	40981 0 0
	£ 60149 0 0
1923.	
1st July-By Balance brought forward ...	£ 38586 0 0

SECTION IX

The Western Australian Branch of the Australian Forest Leqgue still continues to be active in the cause of the advancement of forestry. Recently a junior branch of the Leagu has been established, open to boys and girls between the ages of

ten and eighteen. Membership implies a promise to abstain from injuring trees whether in the bush or in the streets and gardens; to assist in planting and caring for trees where opportunities are given, and to take an interest in the maintenance of the forests of the State. On payment of a subscription of 3d. each boy or girl will receive a certificate of membership. It is hoped that arrangements will be made later for the issue of a special badge to each child who obtains a certificate from his head teacher showing that he has planted a tree and looked after it successfully for 12 months.

SECTION X

A. EDUCATION.

There is no school of forestry for training higher forest officers in Western Australia.

For the training of subordinate field staff a school for forest apprentices was established at Ludlow in 1920. Six boys about 15 years of age are admitted annually on passing the necessary entrance examinations. The syllabus of training provides for six months at the school for the first year and two months a year for the next two years. The remainder of the apprentices' time is spent in practical work in the forests, where silvicultural operations are in progress. After apprenticeship and subject to passing the necessary examination, the apprentice is promoted to the grade of Forest Guard, and two years later, again subject to examination, to the grade of Assistant Forester.

B. RESEARCH.

The Forest Products Laboratory of the Commonwealth was established in Western Australia in 1920. The credit for a great deal of the valuable work done by the Laboratory is due to Mr. C.E. Lane-Poole, the late Conservator of Forests.

In addition to this, the State of Western Australia has contributed very largely towards the maintenance of the Laboratory, and it is a matter for regret, therefore, that it has been decided to transfer the institution to Melbourne, where it is feared that its identity will be sunk in a general research institution controlled by the Institute of Science and Industry. The continuing of the functions of the Forest Products Laboratory in encouraging the development of secondary industries to utilise forest products which are either ignored or wasted at the present time, will be continued in a restricted manner by the Western Australian Forests Department.

In view of the limited funds available, it is proposed to specialise on one or two problems at a time and seek to carry these to a satisfactory conclusion by working on a semi-commercial scale if necessary, before touching other problems.

(1) Tannin Survey. A tannin survey of upwards of 150 forest species of the State has been made. The species offering the most favourable commercial possibilities are included in the pamphlet "Tannin Resources of Western Australia", Appendix ... 3.

(2) Paper Pulp. Attention is directed to a Bulletin (Appendix 4) entitled "The Manufacture of

Pulp and Paper from Australian Woods", pages 33 to 37 of which refer more particularly to Western Australian hardwoods.

(3) Wood Technology. Further work since 1920 has been accomplished in the kiln drying of Jarrah and Karri. The expense has been borne by the Department with subsidies from the State Sawmills. A bulletin covering results secured during the past three years will be issued shortly.

(4) Botanical Investigation. The Department now possesses a properly catalogued herbarium containing over 2,000 species of indigenous plants, mostly trees and woody shrubs. During the year ending 30th June, 1923, 260 species were added to the collection, including two newly named genera and 29 newly named species.

The seeds of indigenous species were collected for propagation within the State, and a large number were supplied to scientific institutions, botanical gardens and forest departments in other parts of the world.

(5) Entomological Investigations. Problems relating to forest entomology have been investigated by the Government Entomologist.

C. EXPERIMENTAL WORK.

The 25 sample plots of 5 acres each established in the Jarrah, Karri and Tuart forests in 1916 and 1917 have been maintained and remeasured.

Experiments have been carried out to determine the best conditions for the natural regeneration of Jarrah and Tuart. Experiments have also been made in the methods of establishing softwood plantations. Various exotics of economic value have been planted on an experimental scale, e.g. Acacia sp., Cork Oak, Willows and Ash.

SECTION XI

TABLE IV

ANNUAL UTILISATION.

Type of Product	Quantity in the round	Value at place of preparation
		£
Jarrah	740,865	1,481,730
Karri	81,051	162,102
Tuart	305	610
	822,221	1,644,442

This table does not include the following :-

	Tons	Value £
Other Timbers	.. 9,741	19,482
Firewood & Mining Timber ..	..643,341	402,505
Sandalwood	7,511	113,609
Tan Barks	1,769	19,187
Piles and Poles	68,619 lin.ft.	-
Heart-in beams	27,606 lin. ft.	-

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* Not including 650,852 tons of mining timber etc.

SECTION XII

FOREST INDUSTRIES.

Table V hereunder does not include a number of industrial establishments which employ less than 4 persons.

TABLE V.

Industry	Value of Timber turned out or consumed.	Value of Product at place of preparation.	No. of persons employed
		£	
Forest Saw Mills and Timber Hewers	822,221 loads	1,341,068	4,603
Mining Timber and Firewood	643,841 tons	482,505	805
Sandalwood getters,	7,511 tons	113,509	156
Secondary Industries			
Town Saw Mills and Joinery Works	Not obtainable	329,567	678
Box and Case Making,	"	20,813	51
Chair Making	"	14,353	35
Boat Building,	"	11,303	35
Coach and motor body building,	"	149,707	354
Cabinet & Furniture Making (including Billiard Table Making)	"	228,860	481
Picture Frame Making	"	13,370	18
	822,221 loads	2,705,055	7,216

θ Not including 650,852 tons of mining timber etc.

SECTION XIII

ANNUAL AVERAGE IMPORTS AND EXPORTS OF TIMBER
(Average for four years 1920 - 1923).

Country of destination or origin	Exports		Imports		Balance Plus or minus	
	Loads	Value £	Loads	Value £	Loads	Value £
United Kingdom	12,294	76,822	35	4,175	+12,259	+ 72,647
Ceylon	4,170	23,730	-	1	+ 4,170	+ 23,729
India	9,382	52,971	40	2,141	+ 9,342	+ 50,830
Mauritius	3,486	25,123	-	-	+ 3,486	+ 25,123
New Zealand	8,468	52,846	247	2,564	+ 8,221	+ 50,282
Singapore	5	31	-	3	+ 5	+ 28
Argentine			-	-		
Belgium	1,198	11,695	-	-	+ 1,198	+ 11,695
Egypt	4,737	23,304	-	-	+ 4,737	+ 23,304
France			-	67		- 67
Germany			-	72		- 72
Holland	171	1,557	-	1	+ 171	+ 1,556
Java	109	910	9	51	+ 100	+ 859
Philippine Is.			10	199	- 10	- 199
Portuguese East Africa			-	-		
Uruguay			-	-		
China	2,157	13,833	-	16	+ 2,157	+ 13,817
Straits Settlements			177	1,423	- 177	- 1,423
Brazil			-	-		
Italy				57		- 57
Hong Kong	130	783	-	-	+ 130	+ 783
U.S.A.	-	93	1,164	23,333	- 1,164	- 23,240
South AfricanUnion	60,258	350,558	-	-	+60,258	+350,558
Ocean Is.			-	-		
Tonga			-	-		
Canada			4	478	- 4	- 478
Russia			1	59	- 1	- 59
Switzerland			-	2		- 2
Sweden			112	1,366	- 112	- 1,366
Norway			71	1,005	- 71	- 1,005
Austria			-	-		
Japan	52	324	231	2,944	- 179	- 2,620
Siam			1	29	- 1	- 29
East Indies			-	-		
Commonwealth of Australia Eastern States	48,106	296,323	2,162	74,312	+ 45,944	+222,011
Borneo			-	-		
Dutch Borneo			429	1,366	- 429	- 1,366
Spain			-	3		- 3
Palestine			-	2		- 2
Finland			-	21		- 21
Czecho-Slovakia			-	35		- 35
British Malaya	-	24	86	419	- 86	- 395
New Caledonia			2	52	- 2	- 52
Portugal			-	1		- 1
Denmark				2		- 2
	154,723	930,927	4,781	116,199	+149,942	+814,728

Table VII shows an annual debit balance of over 100,000 loads between the home consumption of timber and the net increment. When the net increment of 266,300 loads is deducted from the total utilisation of 822,221 loads, the annual debit balance is increased to over 550,000 loads.

As will be seen from the footnote to Table IV, even this total of 822,221 loads does not include very large quantities of firewood, mining timber, piles and poles, etc.

TABLE VII

Type of Product	Utilisation	Exports	Home Consumption of Home-grown timber	Imports	Total Consumption of Home and Imported Timber	Net Increment	Debit Balance
1	2	3	4	5	6	7	8
	Loads	Loads	Loads	Loads	Loads	Loads	Loads
Squared timber, sawn and hewn	274,073	154,723	119,350	4,781	124,131		
Timber measured in the round	822,221	464,169	358,052	14,343	372,395	266,300	-106,095
Total Consumption of sawn timber per head of population (343,436 Inhabitants)	40 cu.ft.	22.5 cu.ft.	17 cu.ft.	.7 Cu.ft.	18 cu.ft.		

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SECTION XIV

SUMMARY AND OUTLOOK.

On the first line of Table VII the figures for utilisation, exports, home consumption and imports represent measurement in the square. The second line gives figures for the same timber, measured in the round, so that a comparison can be made between utilisation and increment, the figures for which latter are given in the round. The figures given in column 7, "Net Increment", are little better than an estimate. Even this approximate figure only refers to the increment of jarrah, karri, and tuart forests. In order to arrive at the balance between increment and utilisation, therefore, the figures given in Column 2, "Utilisation", only refer to the abovementioned forests.

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APPENDICES.

1. Annual Reports of the Forest Department, 1921, 1922, 1923.
   Government Printer, Perth.

2. The Hardwoods of Western Australia.
   Government Printer, Perth, 1923.

3. A Note on the Tannin Resources of Western Australia.
   Government Printer, Perth, 1923.

4. The Manufacture of Pulp and Paper from Australian Woods, Government Printer, Melbourne, 1923.

5. Botanical Notes, Kimberley Division of Western Australia.
   Government Printer, Perth, 1923.