

CHAPTER XXII.

FORESTRY.*

§ 1. General.

1. **Objects of Forestry.**—Scientific forestry aims at the preservation and development of existing forest areas by safeguarding them against fire, pests and destructive agencies generally, by expert supervision of the removal of timber, by judicious thinning and by reforestation of denuded areas with suitable forest growths of local or exotic origin. It provides also for the continuance of this indispensable form of national wealth by the afforestation of available bare lands proved capable of producing various timbers. Only small areas of virgin forests still remain in Australia, as extensive inroads have been made by timber-getters, by agriculturalists and by pastoralists—who have destroyed large areas by “ring-barking”—and it is not unlikely that climatological changes have resulted therefrom. It is recognized that beneficial consequences follow on the planting of trees on denuded lands, or along eroding coasts, and that a forest covering tends to regulate to the best advantage the effects of rainfall. The existing virgin forests consist of hardwood jungle, or brush, with very little softwood, and the need for extensive softwood planting is urgent.

Efficient forestry is of particular interest in connexion with the Murray River Basin, where a large expenditure from the public funds has been incurred in the provision of locks and weirs and in the formation of irrigation settlements in the lower course of the river. The stability of flow of this river in so far as it can be assured by forest plantation may be regarded as of national importance.

Successful planting of exotics in various parts of Australia has demonstrated that both climate and soil are suitable for the cultivation of a number of highly serviceable softwoods.

2. **Extent of Forests.**—(i) *Australia.* The bulk of the present local timber supply comes from the thickly forested areas in the 30-inch and over rainfall belt south of the tropics, and the 70-inch and over rainfall belt within the tropics. The total forest area included in the divisions specified is comparatively small, and is confined to the following regions:—(a) The coastal belt in the extreme south-west of Western Australia, from a little north of Perth to Albany; (b) the Otway country in the south of Victoria, and the whole of the south-eastern portion of that State; (c) the mountain forests of Victoria and New South Wales; (d) the coastal districts of New South Wales and Queensland; (e) the greater portion of Tasmania; (f) the forests on the Murray River near Echuca; and (g) the cypress pine belt from the Murray northward to Queensland and westward of the coastal belt.

Over 90 per cent. of the timber trees of Australia consists of hardwoods belonging to the genus *Eucalyptus* (Gum Trees). Including the mallees over 400 species are now recognized, but the chief commercial varieties are confined to about 50 species.

In addition to the hardwood forests and the cypress pine belt the coastal strip in Queensland and northern New South Wales provides “rain” or “brush” forests. These tropical forests furnish the serviceable hoop pine and furniture timbers such as black bean, Queensland walnut and maple, silkwood, etc.

* A specially contributed article dealing with Forestry in Australia appeared as part of this Chapter in Official Year Book No. 19 (*vide* pp. 701 to 712 therein).

The drier wooded area of the continent contains a large number of xerophilous trees and woody shrubs which thrive in regions receiving less than 10 inches of rain per annum. Country devoid of tree growth is rare. Unsuitable soil conditions such as basalt formations, clay pans, rock exposures or sand dunes are as a rule more responsible for treeless areas than lack of rainfall. The 300-mile stretch of the Nullarbor Plain is a treeless area where the non-retentive limestone foundation accentuates the effects of a low rainfall. While, however, the major portion of Australia carries trees, and may be said to be wooded (the term "desert" applying to relatively small areas only), dense forest is confined to a very narrow fringe. The savannah forests of the interior yield minor products such as sandalwood and tan barks, but do not produce timber. These open, park-like formations carry scattered trees of low habit only. Practically the whole of Papua and New Guinea carry or has carried dense forests, the exceptions being certain small dry belts where the rainfall is less than 70 inches. Norfolk Island was originally covered with a thick jungle.

Special articles relating to Australian Eucalyptus timbers and the chemical products of Eucalypts will be found in Official Year Book No. 10, pp. 85-98.

Scientific surveys of the forests of the various States have not yet been completed and there are, in consequence, conflicting reports regarding the total forest area of Australia. At the Interstate Conference on Forestry, held at Hobart in April, 1920, it was resolved that a forest area of 24,500,000 acres was necessary to provide for the future requirements of Australia. This area was subsequently adopted at the Premiers' Conference held in May of the same year. Expert foresters, however, consider that approximately 19,500,000 acres represent the possible limit for permanent reservation in Australia. The distribution of the latter area throughout the States was estimated as follows:—

ESTIMATED FOREST AREA.

State.	Total Forest Area.	Percentage on Total Area.
New South Wales	4,000,000	2.02
Victoria	5,500,000	9.78
Queensland	6,000,000	1.40
South Australia	500,000	0.21
Western Australia	3,000,000	0.48
Tasmania	500,000	2.98
Australia	19,500,000	1.02

(ii) *Comparison with Other Countries.* The table hereunder shows the absolute and relative forest areas of Australia and other countries, and the relative areas owned by the State, by Public Institutions and by private individuals, in so far as the details are available. The term "Public Institutions" appears to include local governmental and ecclesiastical authorities, while those held by public companies, co-operative societies, etc., are included with private individuals.

The figures are based on information supplied to the International Institute of Agriculture and are the latest available. Comparisons of the returns for different countries are, however, subject to the qualification that the significance of the term "forest" is not identical in all cases. In older countries, and chiefly in Europe, scientific forestry has been practised for centuries, whereas in newer lands, such as Australia, Canada, etc., it is of comparatively recent application. Moreover, considerable areas included as forests in the newer countries contain indigenous growth of little or no commercial value, and effective comparisons cannot, therefore, be made with countries where efficient forestry has been practised for many years.

FORESTS.—AREA AND OWNERSHIP, VARIOUS COUNTRIES.

Country.	Forest Area.	Per cent. of Total Area.	Percentage Owned by—		
			State.	Public Institutions other than State.	Privately.
	sq. miles.	Per cent.	Per cent.	Per cent.	Per cent.
Soviet Union	3,667,530	44.7	100.0	..	..
Canada	1,151,402	32.8	(a)	(a)	(a)
United States of America	733,539	24.7	(a)	(a)	(a)
India	307,928	27.5	(a)	(a)	(a)
Nigeria	234,990	63.8	(a)	(a)	(a)
Finland	97,540	73.5	39.8	1.7	58.5
Sweden	89,500	56.5	20.1	3.8	76.1
Japan	87,678	59.5	(a)	(a)	(a)
Germany	49,991	27.5	32.6	17.2	50.2
France	40,768	19.2	13.9	23.6	62.5
Poland	32,246	21.5	36.1	..	63.9
Australia (b)	30,469	1.0	(a)	(a)	(a)
Yugoslavia	29,504	30.6	37.5	28.9	33.6
Norway	29,454	24.7	13.0	6.4	80.6
Turkey	28,703	9.7	94.4	..	5.6
Rumania	27,544	24.2	30.5	18.3	51.2
Italy	22,425	18.7	3.0	34.0	63.0
New Zealand	20,778	20.2	(a)	(a)	(a)
Spain	19,305	10.0	(a)	(a)	(a)
Czechoslovakia	17,925	33.0	20.4	15.6	64.0
Union of South Africa	15,958	3.4	(a)	(a)	(a)
Algeria	12,257	10.7	(a)	(a)	(a)
Austria	12,116	37.4	15.7	12.6	71.7
Dutch East Indies	11,737	23.1	(a)	(a)	(a)
Bulgaria	11,469	28.8	23.0	58.8	18.2
Greece	9,291	18.5	69.3	10.3	20.4
Latvia	6,406	25.2	83.6	1.8	14.6
Great Britain	4,745	5.4	10.4	1.3	88.3

(a) Not available.

(b) Estimate of forest area possible for permanent reservation.

3. **Requisite Proportion of Forest Area.**—It is generally held that when the forest area in any country falls below 0.86 acres per head of population, that country will be obliged to import timber. Australia possesses 3.19 acres of forest per head of population, and normally the excess of imports of timber over exports amounts to approximately 28,000,000 cubic feet. There are two reasons for the excess. In the first place, the area of 19,500,000 acres given as the wooded area comprises all forest lands, reproductive or otherwise. The bulk of this area consists of cut-over forests swept by fire at frequent intervals, and the area of really productive forests has not been ascertained. Secondly, Australia does not possess a sufficient supply of softwoods, and must, therefore—with the exception of a small quantity produced in Queensland and New South Wales—import the bulk of its requirements from overseas. Provided that the area of 19,500,000 acres considered possible of permanent reservation by foresters was yielding under silvicultural treatment its maximum of hard and soft woods the timber supply of Australia would be sufficient for a population of 22½ millions.

§ 2. Forestry Activities of the Commonwealth Government.

Forestry was not included amongst the matters transferred from the States to the control of the Commonwealth, and federal supervision, therefore, is restricted to the forests in the Commonwealth Territories. These territories (including Papua, New Guinea and Norfolk Island) cover a large area, and, with the exception of the Northern

Territory, are capable of sound forestry development. It is only within comparatively recent years, however, that any attempt has been made to take stock of the forestry position. The Commonwealth Forestry Bureau was instituted in 1925 to initiate sylvicultural and other forest research work and to take charge of the education and training of the professional staffs required by the Commonwealth and the State services. The Bureau received statutory powers under an Act passed in 1930. In the meantime, the Australian Forestry School was established in 1926, and not only was the training of the State forest officers begun, but a nucleus of qualified officers was sent abroad to undergo special courses of instruction with the object of staffing the research side of the Bureau. The financial situation since 1930 has delayed progress on the research side, and the educational work of the Australian Forestry School is at present the Bureau's main activity.

The forest resources of the Territories of Papua, New Guinea, Norfolk Island and the Federal Capital have been investigated, and reports in connexion therewith have been published. In the case of the Federal Capital area an active forest policy has been inaugurated.

The investigation of the dead product of the forests is entrusted to the Council for Scientific and Industrial Research, which has established a Forest Products Division. Research work is being carried out by this institution in regard to various matters, e.g., paper pulp, seasoning, preservation, tan barks, the chemistry of woods, and the utilization of forest products generally, including the substitution of local for imported woods for such purposes as butter boxes and fruit cases.

§ 3. State Forestry Departments.

1. **Functions.**—With the exception of Queensland, the powers and functions of State forest authorities are laid down under Forestry Acts and Regulations. In each State there is a Department or Commission specially charged with forestry work. The functions of these administrations are as follows:—(a) The securing of an adequate reservation of forest lands; (b) The introduction of proper measures for scientific control and management of forest lands; (c) The protection of forests; (d) The conversion, marketing and economic utilization of forest produce; and (e) The establishment and maintenance of coniferous forests to remedy existing deficiency in softwoods.

Annual reports are issued by each State forest authority.

In Victoria a forestry school has been established at which recruits are trained for the forestry service of the State.

2. **Forest Reservations.**—At the Interstate Forestry Conference held in Hobart in 1920, the State forestry authorities agreed in regard to the necessity of reserving an area of 24,500,000 acres of indigenous forest lands in order to meet the future requirements of Australia but, as previously mentioned, it is the considered opinion of expert foresters that 19.5 million acres only are possible of permanent reservation. This area was distributed among the States as set out in Section 1, 2 *ante*.

Having been endorsed by the Premiers' Conference held later in the same year, this area was adopted as the Australian forest requirement towards the permanent reservation of which the authorities are now aiming. The progress made in the various States to the end of June, 1936, is set out in the following table:—

AREA OF FOREST RESERVATIONS, 30th JUNE, 1936.

Particulars.		New South Wales.	Victoria.	Queensland.	South Australia.	Western Australia.	Tasmania.	Australia.
		Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
Dedicated forests	State	5,117,447	4,083,587	2,540,377	(a) 264,075	3,138,662	1,488,908	16,763,056
Timber and fuel reserves	..	1,410,032	730,515	3,542,466	..	2,194,195	950,000	8,827,238
Total	..	6,557,479	4,814,132	6,182,843	264,075	5,332,857	2,438,908	25,590,294

(a) Includes Timber and Fuel Reserves.

In addition to the work of permanently reserving their respective areas the State foresters are endeavouring to survey all timbered lands with a view to the cutting out of all those unsuitable for forestry. Considerable areas have been revoked in certain States, while dedications of new areas have resulted in gains to the permanent forest estate.

The area of State forests reserved in perpetuity amounted in June, 1936, to 16,763,056 acres, or 86 per cent. of the area considered possible of permanent reservation in Australia. Of this area a considerable proportion consists of inaccessible mountainous country and cut-over lands, while the Australian area recommended refers to merchantable forest only. The foresters of Australia are, therefore, faced with a difficult task in improving and preserving the existing forests, and in securing the reservation of further suitable forest country to ensure a permanent supply.

The Forestry Departments also control 8,827,238 acres of temporary timber and fuel reserves, but, while these areas contain some land of high value for forestry purposes, the greater part does not justify permanent reservation.

3. **Sylvicultural Nurseries and Plantations.**—Recognition of the necessity for providing by systematic sylviculture for the future softwood timber needs has led to the creation in all of the States of a number of nurseries and plantations. A brief statement showing the locality of these establishments and the nature of their activities will be found in the previous issues of the Official Year Book. (See Official Year Book No. 6, pp. 451-3.) Details regarding forest plantations and the number of persons employed are given hereunder:—

FORESTRY.—AREAS AND EMPLOYMENT, 1935-36.

Particulars.	New South Wales.	Victoria.	Queensland.	South Australia.	Western Australia.	Tasmania.	Total.
Total area of indigenous forest improved or regenerated acres	1,158,689	808,916	178,429	9,906	374,813	..	2,530,753
Total area of Effective Plantations—							
Softwoods .. acres	42,864	45,658	13,810	85,552	10,260	1,150	199,294
Hardwoods .. acres	..	2,500	1,605	5,316	..	..	9,421
Number of persons employed in Forestry Departments—							
Office Staff .. No.	67	44	104	27	37	14	293
Field Staff .. No.	79	140	670	349	(a) 819	22	2,079

(a) Including casual hands.

4. **Revenue and Expenditure.**—The revenue and expenditure of State Forestry Departments from 1931-32 to 1935-36 are given below:—

STATE FORESTRY DEPARTMENTS.—REVENUE AND EXPENDITURE.

State.	1931-32.	1932-33.	1933-34.	1934-35.	1935-36.
REVENUE.					
New South Wales ..	£ 104,674	£ 139,211	£ 166,014	£ 188,471	£ 87,674
Victoria ..	77,189	126,058	179,150	158,608	176,626
Queensland ..	162,246	235,440	293,991	608,935	660,455
South Australia ..	83,714	62,766	82,888	95,730	115,513
Western Australia ..	57,267	65,875	89,895	119,232	143,158
Tasmania ..	8,584	13,229	17,445	23,066	26,904
Total ..	493,674	642,579	829,383	1,194,042	1,210,330

STATE FORESTRY DEPARTMENTS.—REVENUE AND EXPENDITURE—*contd.*

State.	1931-32.	1932-33.	1933-34.	1934-35.	1935-36.
EXPENDITURE.					
	£	£	£	£	£
New South Wales ..	(a) 114,151	(a) 132,814	(a) 213,067	(a) 349,119	(a) 179,234
Victoria ..	152,820	136,677	(a) 256,195	165,431	196,279
Queensland ..	(a) 160,311	(a) 175,073	(a) 232,930	420,178	496,928
South Australia ..	117,882	183,866	158,788	170,426	175,913
Western Australia ..	(a) 93,151	(a) 158,748	(a) 171,798	(a) 190,348	(a) 235,186
Tasmania ..	8,764	6,777	8,978	11,118	15,674
Total ..	647,079	793,955	1,041,756	1,306,620	1,299,214

(a) Including expenditure from Unemployment Relief Funds as follows:—1931-32—New South Wales, £7,782; Queensland, £22,650; and Western Australia, £45,454. 1932-33—New South Wales, £25,109; Queensland, £8,515; Western Australia, £134,097. 1933-34—New South Wales, £106,370; Victoria, £93,050; Queensland, £27; Western Australia, £141,320. 1934-35—New South Wales, £236,733; Western Australia, £157,627; 1935-36—New South Wales, £117,703; Western Australia, £183,549.

§ 4. The Australian Forestry School.

The Australian Forestry School situated at Canberra in the Federal Capital Territory was established in 1926 by the Commonwealth Government to meet the demand of the States for an institution which would give a professional training at least equal to that afforded by the recognized forestry schools abroad.

Under existing arrangements the head of the State forestry service may nominate candidates for enrolment at the school. According to the system in vogue in each State, the nomination may be made either at school leaving age or after the candidate has successfully completed the specified university course. In the first case, the youth is helped throughout his university career and is given employment in practical work during the long vacations to test his suitability as a forestry officer; in the second case he is chosen later, and the practical tests are not made until the long vacation immediately preceding his entry to the school. The possession of a nomination by a State government service is not, however, essential for enrolment, since any candidate possessing the necessary qualifications will be accepted for the diploma course, and in special cases applicants desirous of studying a particular branch of forestry will be required to follow certain lectures only. Refresher or post graduate courses are arranged to meet the needs of senior foresters.

A candidate for enrolment in the diploma course must possess—(a) a degree of a University, or (b) a certificate that he has completed the special two years' preliminary course at a University.

The qualifications for enrolment may be waived to assist an applicant of exceptional ability with a record of long service in a State Forestry Department, who has been specially recommended by the head of that service. Such applicants must show proof of education equal to that required for a school leaving certificate.

The course of instruction extends over three years, the first two of which are spent at the school, and the third in one of the forestry services of Australia.

The Commonwealth diploma of forestry is awarded to students on the following conditions:—(a) Successful completion of theoretical course; (b) Satisfactory field work during the course; and (c) One year's satisfactory practical forestry work following the school course.

Students who have passed the approved two-year preliminary science course at the Universities of Adelaide, Melbourne, Western Australia or Queensland, and two years of Diploma course at the School, may be granted the degree B.Sc.F. by their Universities, subject to certain conditions laid down, particulars of which may be obtained from the Registrar of the University concerned.

§ 5. Forest Congresses.

Reference to the various Forestry Conferences held in Australia and elsewhere will be found in Official Year Book No. 22, p. 743, but owing to limitations of space, the information cannot be repeated herein. The Third British Empire Forestry Conference was held in Australia and New Zealand in 1928, and the Fourth in South Africa in 1935. Publications issued in connexion with these Conferences are available on application to the various State and Commonwealth forestry authorities.

§ 6. Forestry Production.

1. Timber.—Particulars regarding the production of sawn timber from forest sawmills in each State for the year 1935-36 are shown in the following table:—

SAWMILL OUTPUT OF NATIVE TIMBER, 1935-36.

Particulars.	N.S.W.	Vic.	Qld.	S.A.	W.A. (a)	Tas.	Total.
LOGS MILLED.							
Hardwood— Quantity cub. ft.	11,934,086	(b)	68,108,560	615,423	27,333,220	(b)	(b)
Value.. £	427,919	(b)	469,138	10,234	373,613	(b)	(b)
Softwood— Quantity cub. ft.	6,384,571	(b)	8,722,141	1,713,596	38,601	(b)	(b)
Value.. £	233,139	(b)	642,202	32,737	(d)	(b)	(b)
Total— Quantity cub. ft.	18,318,657	(b)	16,830,701	2,329,019	27,371,821	(b)	(b)
Value.. £	661,058	(b)	1,111,340	42,971	373,613	(b)	(b)

SAWN TIMBER PRODUCED.

Hardwood— Quantity sup. ft.	87,805,695	105,866,503	42,295,994	3,493,360	109,211,575	66,804,342	415,477,469
Value.. £	864,056	718,997	556,004	39,864	865,452	423,840	3,468,213
Softwood— Quantity sup. ft.	45,536,746	68,400	71,144,013	9,364,364	162,433	859,513	127,135,469
Value.. £	484,336	717	1,048,073	84,871	2,475	23,669	1,644,141
Unspecified— Quantity sup. ft.	..	..	11,829,006	..	..	8,758,616	20,587,622
Value.. £	..	..	268,354	..	..	53,523	321,877
Total— Quantity sup. ft.	133,342,441	105,934,903	125,269,013	12,857,724	109,374,008	76,422,471	563,200,560
Value.. £	1,348,392	719,714	1,872,431	124,735	867,927	501,032	5,434,231

(a) Excluding timber amounting to 45,614,500 sup. feet, valued at £293,374, produced elsewhere than in forest sawmills. (b) Not available. (c) Including logs unspecified.

(d) Included with hardwood.

The next table gives the sawmill output of native timber in each State for 1923-24, 1928-29 and for the last three years:—

SAWMILL OUTPUT OF NATIVE TIMBER.

State.	1923-24.	1928-29.	1933-34.	1934-35.	1935-36.
	1,000 sup. feet.	1,000 sup. feet.	1,000 sup. feet.	1,000 sup. feet.	1,000 sup. feet.
New South Wales	167,493	136,051	91,032	122,604	133,342
Victoria	134,639	79,018	81,079	97,110	105,935
Queensland	141,672	106,862	75,043	116,818	125,269
South Australia	1,350	3,219	9,919	11,710	12,858
Western Australia	161,749	145,043	65,092	87,237	109,374
Tasmania	63,120	46,195	47,732	66,809	76,422
Total	670,023	516,388	369,897	502,288	563,200

In addition to the sawn timber shown in the table, a large amount of other timber, e.g., sleepers, piles, poles, fencing material, timber used in mining, and fuel, is obtained from forest and other lands. Complete information in regard to the volume of this

output is, however, not available. In Western Australia, particulars are obtained of the quantities of timber hewn by contractors for the Railway Department, mines, etc., as well as of the quantities produced by other agencies outside forest sawmills, but the figures have not been included in the preceding two tables. The quantities so produced in the last five years were as follows :—1931-32, 16,831,214 sup. feet ; 1932-33, 12,441,946 sup. feet ; 1933-34, 31,335,186 sup. feet ; 1934-35, 43,259,941 sup. feet ; and 1935-36, 45,674,500 sup. feet. The annual reports of the Forest Departments in each State contain particulars concerning the output of timber from areas under departmental control, but owing to lack of uniformity in measurements accurate determination of total production cannot be made. Efforts, however, are being made to obtain more comparable information. Moreover, there is a fair quantity of hewn timber produced from privately owned land, but information regarding output is not available.

2. **Other Forest Products.**—(i) *Eucalyptus Oil*. Oil may be distilled from the foliage of all varieties of eucalyptus, and several of them furnish a product widely known for its commercial and medicinal uses. Complete information regarding Australian production and consumption of eucalyptus oil is not available, but large quantities are manufactured, particularly in Victoria. Oversea exports amounted in 1931-32 to £40,977 ; in 1932-33 to £40,075 ; in 1933-34 to £41,010 ; in 1934-35 to £50,699 ; and in 1935-36 to £53,797, the bulk of the product being shipped from Victoria to the United Kingdom, the United States and Germany. Large quantities of the crude oil are used locally in flotation processes in connexion with the recovery of gold and other minerals.

(ii) *Sandalwood and Sandalwood Oil*. The distillation of oil from Western Australian sandalwood has been characterized by improvement both in quality and in quantity within recent years. It is claimed that the Western Australian oil is at least as valuable medicinally as the well-known Mysore oil, besides having an extensive use in the manufacture of perfumes. Exports of essential oils from Western Australia amounted in 1930-31 to £56,170 ; in 1931-32 to £59,301 ; in 1932-33 to £26,331 ; in 1933-34 to £26,720 ; in 1934-35 to £35,363 ; and in 1935-36 to £27,526. The bulk of the product consisted of sandalwood oil which was shipped principally to the United Kingdom, Eastern States of Australia and Germany. In addition to its distillation, quantities of sandalwood are gathered for export each year. Western Australia is the chief source of supply, followed by South Australia, while Queensland also produces a small quantity. In 1935-36, 2,352 tons valued at £66,845 were exported, the whole of which was shipped to the East ; Hong Kong 1,209 tons and China 932 tons were the principal countries of destination. A table giving these details is included in § 8 hereinafter.

(iii) *Grass Tree or Yacca Gum*. South Australia is the chief State producing this gum which is used in the preparation of varnishes and lacquers. Quantities are also obtained in New South Wales and Western Australia but these are small. The production in South Australia during 1935-36 amounted to 2,005 tons, whilst the exports from Australia amounted to 1,982 tons valued at £9,442 during the same period.

(iv) *Tan Barks*. The forests of Australia are capable of yielding a wealth of tanning materials ; many species of eucalyptus and other genera contain varying proportions of tannin, chiefly in the bark, but also in the wood and twigs. Although many of these species contain higher percentages of tannin than is found in the bark of oak, chestnut and hemlock, formerly the chief source of tannin material in the northern hemisphere, scattered distribution has resulted in the richest tan-bearing species only being used in Australia. These are :—Golden wattle (*Acacia pycnantha*), black or green wattle (*Acacia decurrens* or *mollissima*), and mallet (*Eucalyptus astringens*).

In pre-war days the production of wattle bark was more than sufficient for local requirements, and an export trade was built up. The supply diminished during the six years ending 1926-27, and Australia imported on the average about 2,900 tons each year from Natal, where the plantations were originally started from Australian seed. Since 1927-28, however, exports exceeded imports, averaging 2,635 tons valued at £25,538 during the five years ending 1935-36. The chief exporting States are South Australia, Tasmania and Western Australia. This matter is referred to in tables appearing in § 8 hereinafter. The other valuable tan bark, mallet (*Eucalyptus astringens*) of Western Australia, is not extensively used in Australian tanneries, but it is exported to Europe

and other countries, where it is used for producing a tannin extract. A brief account of the work done by the Council for Scientific and Industrial Research in connexion with tanning materials will be found in Official Year Book No. 22, page 743. The production of extract from the bark of karri (*Eucalyptus diversicolor*), of which very large quantities are available at karri sawmills, has passed the experimental stage, and private enterprise has started production on a commercial scale. The experimental work in kino impregnated marri (*Eucalyptus calophylla*) bark is not yet complete. The production of tan bark in Australia is estimated to exceed 25,000 tons per annum.

3. Value of Production.—As the outcome of a series of conferences of Australian Statisticians it is now possible to present the value of forestry production on a much more satisfactory basis than was possible hitherto. Provision is made for the inclusion of all phases of forestry output, including forest sawmills, the production of logs, poles, piles, sleepers and other hewn timber, firewood, sandalwood and gums and resins. It has not been possible within the time allowed to collect all of these items and consequently the values are understated in some of the States, but the deficiency is not serious.

GROSS, LOCAL AND NET VALUE OF FORESTRY PRODUCTION, 1935-36.

State.	Gross Production Valued at Principal Markets.	Marketing Costs.	Gross Production Valued at Place of Production.	Value of Other Materials Used in Process of Production.	Net Value of Production.(a)	
	£	£	£	£	£	
New South Wales ..	2,126,000	112,000	2,014,000	..	2,014,000	
Victoria ..	908,579	216,370	692,209	..	692,209	
Queensland ..	2,329,000	253,000	2,076,000	..	2,076,000	
South Australia ..	532,748	6,812	525,936	..	525,936	
Western Australia ..	1,326,715	163,822	1,162,893	27,042	1,135,851	
Tasmania ..	418,120	54,520	363,600	..	363,600	
Total	1935-36	7,641,162	806,524	6,834,638	27,042	6,807,596
	1934-35	7,331,603	867,464	6,464,139	26,791	6,437,348
	1933-34	5,853,862	716,712	5,137,150	..	5,137,150

(a) No account has been taken of maintenance costs and depreciation.

NOTE.—The relative proportions of marketing costs to gross production suggest that complete uniformity in method has not yet been attained.

4. Employment.—The number of persons employed in forestry operations as revealed by the Census of the Commonwealth of Australia at the 30th June, 1933, is shown in the following table. With the exception of those employed in forest sawmills referred to in Chapter XXIV, no later details are available.

EMPLOYMENT IN FORESTRY, 30th JUNE, 1933.

Sex.	New South Wales.	Victoria.	Queensland.	South Australia.	Western Australia.	Tasmania.	Total. (a)
	No.	No.	No.	No.	No.	No.	No.
Males ..	6,446	7,225	4,054	1,549	4,189	2,376	25,839
Females ..	38	29	27	8	7	5	114
Total ..	6,484	7,254	4,081	1,557	4,196	2,381	25,953

(a) Not including Northern Territory, N.T., and Federal Capital Territory, 152.

§ 7. Commercial Uses of Principal Australian Timbers.

1. General.—The uses of the more important Australian timbers are many and various, and are indicated in previous issues of this work. (See Official Year Book No. 6, pp. 454-6; and Official Year Book No. 10, Section III., § 7 and 8.)

A list of Australian timbers best known on the local markets appeared in Official Year Book No. 20, p. 713. [Further references are made in "Timber and Forest Products of Queensland" (E. H. F. Swain), published in 1928.]

2. Lack of Uniformity in Nomenclature.—Unfortunately the vernacular names applied to the gums, ironbarks, etc., in the various States, and even in different parts of the same State, do not always refer to identical timbers. The resulting confusion has not only been productive of loss, but it has, to some extent, prejudicially affected the timber trade. This subject is referred to at some length in the special article "Australian Eucalyptus Timbers" in Section III., § 7 and 8, in Official Year Book No. 10. At the Forestry Conferences previously mentioned, the matter came up for special consideration, and steps were taken to establish a uniform nomenclature.

§ 8. Oversea Trade.

1. Imports.—(1) *Dressed Timber*. The quantity and value of timber imported into Australia during the four years 1932-33 to 1935-36 inclusive are shown according to countries of origin in the following tables:—

DRESSED TIMBER.—IMPORTS, AUSTRALIA.

Country of Origin.	Quantity.				Australian Currency Values.			
	1932-33.	1933-34.	1934-35.	1935-36.	1932-33.	1933-34.	1934-35.	1935-36.
	sup. ft.	sup. ft.	sup. ft.	sup. ft.	£	£	£	£
United Kingdom ..	4,814	21,133	21,839	369	735	1,536	2,075	34
Canada ..	257,371	4,672,603	2,739,082	4,301,411	2,775	36,064	26,896	44,625
Other British Countries	7,374	10,246	38,356	208,443	153	94	1,225	2,910
Norway ..	5,457,889	4,510,936	4,688,155	5,972,177	44,446	42,499	46,646	53,670
Sweden ..	4,647,179	3,803,010	3,911,008	2,041,848	42,226	37,538	38,794	18,299
U.S. of America ..	763	1,105,408	2,698,135	1,637,157	41	8,334	23,116	13,891
Other Foreign Countries ..	709,255	1,019,977	742,195	1,967,025	9,203	13,733	11,835	18,379
Total ..	11,084,645	15,143,313	14,838,770	16,128,430	99,579	139,798	150,587	151,808

The figures in the table above are exclusive of items such as architraves, veneers, etc., quantities for which are either not shown, or are expressed in dissimilar units in the Customs entries. The total value of the items so excluded amounted to £79,743 in 1935-36 including plywood, veneered or otherwise, £21,700.

The bulk of the imports of dressed timber comes from Norway, Sweden and Canada. Practically the whole of this timber consists of softwoods—deal and pine—used for lining, weatherboards, flooring, shelving, doors, box-making, etc.

(ii) *Undressed Timber*. Australian imports of undressed timber for the years 1931-32 to 1935-36 are given hereunder:—

UNDRESSED TIMBER, INCLUDING LOGS.(a)—IMPORTS, AUSTRALIA.

Country of Origin.	Quantity.					Australian Currency Values.				
	1931-32.	1932-33.	1933-34.	1934-35.	1935-36.	1931-32.	1932-33.	1933-34.	1934-35.	1935-36.
	1,000 sup. ft.	1,000 sup. ft.	1,000 sup. ft.	1,000 sup. ft.	1,000 sup. ft.	£	£	£	£	£
United Kingdom	72	132	218	523	202	8,211	13,933	19,565	20,342	15,606
Canada ..	75,906	135,016	184,869	212,927	265,016	352,720	569,311	610,097	762,747	825,777
India ..	38	42	17	93	101	1,695	2,139	863	3,856	4,299
Malaya (British)	93	131	99	105	104	849	1,129	779	735	730
New Zealand	23,181	25,653	26,784	38,702	36,697	296,538	315,922	326,102	508,658	452,167
Other British Countries ..	1,177	1,751	2,366	4,398	3,690	12,843	11,280	14,402	28,055	34,212
Japan	312	694	1,334	916	1,186	3,371	7,429	17,365	12,584	14,166
Netherlands East Indies ..	29	..	7	..	41	183	..	152	104	185
Norway ..	28	175	236	798	33	169	..	2,149	7,172	237
New Caledonia ..	140	..	..	..	..	1,557	1,419	..	..	..
Philippine Islands	93	716	2,702	4,589	3,949	670	6,432	21,384	41,394	37,138
Sweden ..	538	1,872	1,935	3,486	2,251	4,452	14,076	15,802	28,732	16,778
U.S. of America ..	18,793	20,841	21,379	38,717	39,863	110,395	159,233	212,472	264,023	341,432
Other Foreign Countries ..	1,408	1,641	1,730	2,745	5,015	9,161	5,423	14,895	20,442	31,307
Total ..	121,808	188,664	243,676	308,001	358,148	802,814	1,107,726	1,256,027	1,699,044	1,774,124

(a) Exclusive of timber not measured in super. feet.

By far the larger proportion of the undressed timber imports consists of softwoods such as oregon, redwood, hemlock, western red cedar and yellow pine from the United States and Canada; kauri, rimu and white pine from New Zealand; and red and white deals from Norway and Sweden. Amongst the hardwoods imported the principal are oak from the United States of America and Japan, and furniture woods from the Pacific Islands.

2. Exports.—(i) *Undressed Timber*. The quantity and value of undressed timber exported from 1931-32 to 1935-36 are given below, the countries of destination being also shown:—

UNDRESSED TIMBER, INCLUDING LOGS.(a)—EXPORTS, AUSTRALIA.

Country to which Exported.	Quantity.					Value(b).				
	1931-32.	1932-33.	1933-34.	1934-35.	1935-36.	1931-32.	1932-33.	1933-34.	1934-35.	1935-36.
	1,000 sup. ft.	1,000 sup. ft.	1,000 sup. ft.	1,000 sup. ft.	1,000 sup. ft.	£	£	£	£	£
United Kingdom ..	13,062	7,918	8,293	12,196	12,875	152,589	109,872	101,692	142,066	147,530
Canada ..	41	39	156	103	140	697	622	2,539	1,920	2,565
Ceylon ..	6,700	2,453	1,184	764	635	65,952	21,930	12,311	7,643	6,353
Hong Kong ..	355	2,766	102	33	..	2,126	20,343	1,019	200	..
India ..	33	4	..	7	438	342	44	..	114	4,514
Malaya (British) ..	17	..	2	83	..	456	..	20	877	..
Mauritius ..	408	624	421	276	432	4,093	4,575	4,259	2,777	4,738
New Zealand ..	7,614	3,182	6,349	9,991	12,842	82,202	40,185	77,557	126,089	160,382
Pacific Islands—										
Fiji ..	515	506	414	555	727	7,488	7,037	6,136	8,658	10,832
Gilbert and Ellice Islands Colony ..	77	39	29	17	38	1,330	711	635	286	716
Papua ..	90	165	52	93	139	1,673	1,968	823	1,416	2,344
Solomon Islands ..	48	65	54	72	94	1,002	1,169	946	1,207	1,532
Territory of New Guinea ..	454	99	146	145	187	4,906	1,254	1,970	2,011	2,355
Other Islands ..	109	68	88	47	53	1,936	1,232	1,433	817	867
Union of South Africa ..	8,661	3,403	2,914	5,438	5,399	83,368	38,092	33,285	62,047	64,957
Other British Countries ..	21	278	..	18	18	297	2,968	..	173	211
Africa, Portuguese East ..	193	1,096	1,295	1,852	574	2,343	11,844	14,372	21,104	7,271
Belgium ..	615	573	412	528	1,078	6,132	5,746	4,257	5,686	11,181
China ..	3,704	684	180	1,621	1,153	23,710	5,308	1,719	16,227	11,504
Egypt ..	..	144	31	187	392	..	1,444	357	1,871	3,919
Germany ..	176	143	165	448	236	1,869	1,470	1,767	5,048	2,625
Japan ..	38	2	..	..	..	809	39	..	..	..
Netherlands ..	1,036	716	376	307	73	10,491	6,942	3,894	3,466	974
Pacific Islands—										
New Caledonia ..	4	4	72	85	210	76	57	1,115	1,435	3,412
New Hebrides ..	15	9	16	19	39	259	165	278	355	477
Other Islands ..	32	6	16	80	15	580	136	355	1,932	343
United States of America ..	3,018	404	916	1,656	2,445	42,280	6,449	18,875	37,335	63,081
Other Foreign Countries ..	1(c)	1,117	33	290(c)	75	2(c)	11,207	331	2,901(c)	1,339
Australian Produce ..	47,037	26,509	23,716	36,911	40,307	499,008	302,809	291,945	455,661	516,022
Other Produce ..	380	386	413	580	812	4,170	4,011	3,377	4,658	6,160
Total ..	47,417	26,895	24,129	37,491	41,119	503,178	306,820	295,322	460,319	522,191

(a) Exclusive of Timber not measured in super. feet. (b) Australian currency values.

(c) Includes Iraq, 1,097,000 super. feet, £10,971, in 1932-33, and 19,127 super. feet, £207, in 1935-36.

The bulk of the exports of undressed timber was consigned to South Africa, New Zealand and the United Kingdom, and consisted largely of the Western Australian hardwoods, jarrah and karri, which have earned an excellent reputation for such purposes as railway sleepers, harbour works, wood paving, etc. Considerable quantities of pole, pile and girder timber are also exported from New South Wales to New Zealand.

(ii) *Sleepers*. Prior to the year 1933-34 particulars of the quantity and value of sleepers exported were included in the table relating to Undressed Timber, including Logs. These details have been separated in the export returns and are now shown in the following table:—

SLEEPERS—RAILWAY.—EXPORTS, AUSTRALIA.

Country to which Exported.	Quantity.		Value.(a)	
	1934-35.	1935-36.	1934-35.	1935-36.
	sup. ft.	sup. ft.	£	£
United Kingdom	32,400	..	379	..
Ceylon	2,100,288	368,700	21,002	3,263
Hong Kong	2,566,191	90,690	18,694	680
Mauritius	694,584	..	6,944	..
New Zealand	8,998,876	8,538,619	64,520	69,475
Pacific Islands	92,032	178,249	1,039	2,394
Union of South Africa ..	4,318,242	7,528,343	40,773	74,276
Other British Countries ..	132,432	1,167,278	1,324	9,962
Africa, Portuguese East ..	520,665	98,508	5,096	1,018
China	13,393,504	4,986,036	115,361	49,631
Egypt	3,099,624	8,245,968	30,997	82,460
Iraq	1,364,664	2,174,999	13,647	21,401
Persia .. ..	..	1,437,024	..	14,370
Total	(b)37,313,502	(c)34,814,414	319,776	328,930

(a) Australian currency values.
1,290,064.

(b) Number of sleepers, 1,333,141.

(c) Number of sleepers,

3. Classification of Imports and Exports.—(i) *General*. The quantities of timber classified according to varieties imported and exported during the year 1935-36 are given in the next table:—

TIMBER, VARIETIES IMPORTED AND EXPORTED.—QUANTITIES, AUSTRALIA, 1935-36.

Description.	Unit of Quantity.	Imports.	Exports.	Excess of Imports over Exports.
Dressed	sup. ft.	16,128,430	982,092	15,146,338
Undressed, including logs ..	"	358,148,252	41,119,567	317,028,685
Sleepers	"	(c)	34,814,414	-34,814,414
Architraves, mouldings, etc. ..	lin. ft.	49,252	78,316	-29,064
Plywood, veneered or otherwise ..	sq. ft.	2,706,675	(b)	2,706,675
Palings	No.	..	133,668	-133,668
Shingles	"	770,190	..	770,190
Staves—				
Dressed, etc.	"	632,665	..	632,665
Undressed	"	1,008,066	..	1,008,066
Laths—				
For blinds .. ..	"	..	..	..
Other	"	209,790	179,860	29,930
Doors	"	3	(a)	(a)
Wood pulp	ton	37,186	(b)	37,186
Veneers	"	(a)	(a)	(a)
Spokes, rims, felloes, etc. ..	"	(a)	(a)	(a)
Other	"	(a)	..	(a)

(a) Quantity not available.
recorded separately.

(b) Exports not recorded separately.

(c) Imports not

NOTE.—The minus sign (–) denotes an excess of exports.

Similar particulars relative to the values of imports and exports during the year 1935-36 are shown hereunder:—

TIMBER, VARIETIES IMPORTED AND EXPORTED.—VALUES, (b) AUSTRALIA, 1935-36.

Description.	Imports.	Exports.	Excess of Imports over Exports.
	£	£	£
Dressed	151,808	13,984	137,824
Undressed, including logs	1,774,125	522,191	1,251,934
Sleepers	(c)	328,930	-328,930
Architraves, mouldings, etc.	377	557	-180
Plywood, veneered or otherwise	21,701	(a)	21,701
Palings .. .. .	..	1,357	-1,357
Shingles	1,296	..	1,296
Staves—			
Dressed, etc.	30,326	..	30,326
Undressed	13,527	..	13,527
Laths—			
For blinds .. .. .	..	..	..
Other	263	444	-181
Doors	80	648	-568
Wood pulp	317,503	(a)	317,503
Veneers	22,834	18,965	3,869
Spokes, rims, felloes, etc.	90	1,393	-1,303
Other	6,512	..	6,512
Total	2,340,442	888,469	1,451,973

(a) Exports not recorded separately. (b) Australian currency values. (c) Imports not recorded separately.

NOTE.—The minus sign (—) denotes an excess of exports.

(ii) *Sandalwood.* A considerable quantity of sandalwood is exported, principally from Western Australia to Hong Kong and China, where it is highly prized and largely used for artistic and ceremonial purposes. Particulars for the last five years are as follows:—

SANDALWOOD.—EXPORTS, AUSTRALIA.

Country to which Exported.	Quantity.					Value.(a)				
	1931-32.	1932-33.	1933-34.	1934-35.	1935-36.	1931-32.	1932-33.	1933-34.	1934-35.	1935-36.
	ton.	ton.	ton.	ton.	ton.	£	£	£	£	£
Hong Kong ..	1,286	3,481	2,309	2,390	1,208	38,068	95,575	64,735	70,007	32,842
India ..	209	144	203	112	75	6,270	4,311	6,210	3,475	2,339
Malaya (British) ..	115	99	168	112	99	3,370	2,623	5,115	3,409	2,997
Other British Countries ..	7	15	11	17	12	213	450	340	543	351
China ..	649	715	1,212	1,025	932	12,651	20,413	36,358	30,773	27,513
Other Foreign Countries ..	78	(b)400	(c) 50	14	26	2,342	(b)9,285	(c)1,537	434	803
Total ..	2,344	4,854	3,953	3,670	2,352	62,914	132,657	114,301	108,641	66,845

(a) Australian currency values. (b) Includes 386 tons £8,865 to Japan. (c) Includes 31 tons £953 to Japan.

(iii) *Tan Bark.* Tan bark figures both as an export and an import in the Australian trade returns. The table hereunder refers to exports :—

TAN BARK.—EXPORTS, AUSTRALIA.

Country to which Exported.	Quantity.					Value.(a)				
	1931-32.	1932-33.	1933-34.	1934-35.	1935-36.	1931-32.	1932-33.	1933-34.	1934-35.	1935-36.
	cwt.	cwt.	cwt.	cwt.	cwt.	£	£	£	£	£
United Kingdom ..	2,298	..	..	..	305	978	..	..	..	162
New Zealand ..	41,260	35,795	26,387	33,810	20,001	19,570	17,777	13,636	16,536	9,482
Other British Possessions ..	20	2	..	40	..	9	1	..	26	..
Germany ..	35,441	21,333	3,206	6,007	1,517	17,133	10,041	2,273	2,356	1,101
Other Foreign Countries ..	10,042	19,464	11,757	40	1,041	4,599	8,073	5,340	18	914
Total ..	89,061	76,594	41,350	39,897	23,764	42,289	35,892	21,249	18,936	11,659

(a) Australian currency values.

The exports of tan bark from Australia during recent years consisted largely of mallet bark from Western Australia. The shipments of this bark are not so large as in pre-war days owing to the cutting out of supplies. A vigorous policy of reforestation was put into operation and, as a result, a considerable improvement in exports has taken place concurrent with a diminution of imports of similar materials. For the twelve years prior to 1927-28, Australia had to import large quantities of tanning bark, but since then imports have dwindled to negligible quantities. During the year 1935-36 the chief exporting States were Tasmania, South Australia and Western Australia, these States providing 39 per cent., 37 per cent. and 15 per cent. respectively of the total quantities shipped.

A comparison of the imports and exports of tan bark during the last five years is given in the next table :—

TAN BARK.—IMPORTS AND EXPORTS, AUSTRALIA.

Particulars.	1931-32.	1932-33.	1933-34.	1934-35.	1935-36.
	cwt.	cwt.	cwt.	cwt.	cwt.
QUANTITIES—					
Imports	21	200	1	2,556	4,362
Exports	89,061	76,594	41,350	39,897	23,764
Excess of exports over imports	89,040	76,394	41,349	37,341	19,402
	£	£	£	£	£
VALUES (a)—					
Imports	13	101	1	827	1,395
Exports	42,289	35,892	21,249	18,936	11,659
Excess of exports over imports	42,276	35,791	21,248	18,109	10,264

(a) Australian currency values.

The imports consist almost exclusively of wattle bark from the plantations in South Africa. One variety of Australian wattle is found to flourish in the sandy belts near the coast, but it is the *Acacia decurrens*, var. *mollis*, which is chiefly relied upon for the

production of wattle bark in the South African plantations. Seed has been tried from New South Wales, Tasmania and Victoria, but it is stated that most of the seed is obtained from the best wattle bark areas in eastern Tasmania and western Victoria.

Two reasons are given to account for the success of the industry in the Union of South Africa:—(a) It is found that the treeless, grassy highlands of Natal are specially suitable for wattle culture, and the trees can therefore be grown in rows and economically attended to, while the necessary bark sheds and other appurtenances can be placed in the most advantageous positions; and (b) there is an abundance of cheap and efficient native labour.

(iv) *Other Tanning Substances.* Considerable quantities of tanning substances other than bark are annually imported into Australia. The total value of the importations in 1935-36 was £55,855, and was composed as follows:—Wattle bark extract, £1,359; quebracho extract, £17,143; other extract, £11,552; and valonia, myrobalans, cutch, etc., £25,801.