CHAPTER XIX.

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 reafforestation 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 (see pp. 701–12 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 carries 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 appear 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, 1920. 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.
	Acres.	Per Cent.
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.
U.S.S.R. (Russia) ..	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 2.8 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 sylvicultural 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 Australian 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 provide for 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 in 1930 and following years delayed progress on the research side, and the Australian Forestry School was the Bureau's main activity. Since then, however, the research work of the Bureau has been developed, and stations established in South Australia and Tasmania on a co-operative basis with the State Forestry services.

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

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 at 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 § 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, 1940, is set out in the following table :—

AREA OF FOREST RESERVATIONS, 30th JUNE, 1940.

Particulars.	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tasmania.	Total.
	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
Dedicated State forests ..	5,243,570	4,860,145	3,152,182	(*a*)267,649	3,666,974	1,593,070	18,783,590
Timber and fuel reserves ..	1,352,386	(*b*)	3,195,191	..	2,161,912	951,600	(*c*)7,661,089
Total ..	6,595,956	c4,860,145	6,347,373	267,649	5,828,886	2,544,670	c26,444,679

(*a*) Includes Timber and Fuel Reserves. (*b*) Not available. (*c*) Incomplete.

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 elimination of 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, 1940, to 18,783,590 acres, or 96 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 7,661,089 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 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, 1939–40.

Particulars.	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas.	Total.
Total area of indigenous forest improved or regenerated acres	1,387,472	1,037,478	369,470	9,928	499,381	1,935	3,305,664
Total area of effective plantations—							
Hardwoods .. acres	..	2,500	2,415	4,976	(a)12,763	250	22,904
Softwoods .. "	45,980	44,153	23,557	94,405	12,494	1,375	221,964
Number of persons employed in Forestry Departments—							
Office staff .. No.	142	41	127	36	41	24	411
Field staff .. "	124	137	1,256	349	(b) 439	46	2,351

(a) Mallet—mainly for bark for tanning. (b) Including 300 casual hands.

4. **Revenue and Expenditure.**—The revenue and expenditure of State Forestry Departments from 1935–36 to 1939–40 are given below :—

STATE FORESTRY DEPARTMENTS : REVENUE AND EXPENDITURE.

State.	1935–36.	1936–37.	1937–38.	1938–39.	1939–40.
			REVENUE.		
	£	£	£	£	£
New South Wales ..	87,674	206,770	201,416	224,266	244,993
Victoria	176,626	199,360	213,694	198,157	218,961
Queensland.. ..	660,455	669,457	835,311	764,557	888,360
South Australia ..	115,513	114,638	117,305	101,312	110,897
Western Australia ..	143,158	164,888	176,201	145,724	151,770
Tasmania	26,904	30,693	30,722	32,765	33,241
Total ..	1,210,330	1,385,806	1,574,649	1,466,781	1,648,222

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

State.	1935–36.	1936–37.	1937–38.	1938–39.	1939–40.
	EXPENDITURE.				
	£	£	£	£	£
New South Wales ..	(*a*)179,234	84,857	190,215	250,355	191,086
Victoria	196,279	(*b*)610,604	(*b*)491,964	(*b*)406,175	(*b*)475,517
Queensland.. ..	496,928	495,740	624,087	764,545	865,288
South Australia ..	175,913	174,973	182,534	182,633	222,915
Western Australia ..	(*a*)235,186	(*c*)196,698	(*c*)182,283	(*c*)164,943	(*c*)154,870
Tasmania	15,674	20,234	58,869	71,437	70,852
Total	1,299,214	1,583,106	1,729,952	1,840,088	1,980,528

(*a*) Including expenditure from Unemployment Relief Funds as follows:—1935–36—New South Wales, £117,703; Western Australia, £183,549. (*b*) Including expenditure from Relief Works, 1936–37, £350,564; 1937–38, £258,341; 1938–39, £167,611; 1939–40, £148,125. (*c*) Including expenditure from General Loan and Trust Funds, 1936–37, £122,011; 1937–38, £155,178; 1938–39, £136,254; 1939–40, £126,174.

§ 4. The Australian Forestry School.

The Australian Forestry School situated at Canberra in the Australian 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, Queensland or Sydney, 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.

References to the various Forestry Conferences held in Australia and elsewhere is given in Official Year Book No. 22, p. 743. 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 logs treated and the production of rough sawn timber in forest sawmills in each State for the year 1939–40 are shown in the following table :—

OUTPUT OF NATIVE TIMBER : FOREST SAWMILLS, 1939–40.

Particulars.	N.S.W.	Vic.	Qld.	S.A.	W.A.	Tas.	Total.
LOGS TREATED INCLUDING THOSE SAWN ON COMMISSION.							
Hardwood— Quantity '000 sup. ft.	138,096	214,434	115,686	4,843	304,253	152,808	930,120
Softwood— Quantity '000 sup. ft.	55,997	3,252	171,691	18,226	1,506	2,965	253,637
Total— Quantity '000 sup. ft.	194,093	217,686	287,377	23,069	305,759	155,773	1,183,757
ROUGH SAWN TIMBER PRODUCED FROM LOGS ABOVE.							
Hardwood— Quantity '000 sup. ft.	87,108	117,918	68,438	2,548	117,169	76,993	470,174
Softwood— Quantity '000 sup. ft.	33,670	1,667	119,322	8,632	429	1,816	165,536
Total— Quantity '000 sup. ft.	120,778	119,585	187,760	11,180	117,598	78,809	635,710

The next table gives the sawn output of native timber in both forest and town sawmills and in joinery works, box and case factories and other woodworking establishments in each State for 1923–24, 1928–29 and the last three years.

SAWN OUTPUT OF NATIVE TIMBER : ALL MILLS.

State.	1923–24.	1928–29.	1937–38.	1938–39.	1939–40.
	'000 sup. feet.	'000 sup. feet.	'000 sup. feet.	'000 sup. feet.	'000 sup. feet.
New South Wales ..	167,493	136,051	168,042	179,350	191,583
Victoria	134,639	79,018	141,439	120,197	138,634
Queensland	141,672	106,862	208,098	193,250	210,375
South Australia	1,350	3,219	16,167	14,537	19,232
Western Australia ..	161,749	145,043	129,986	125,453	117,819
Tasmania	63,120	46,195	83,009	84,228	79,330
Total	670,023	516,388	746,741	717,015	756,973

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 :—1935–36, 45,614,500 sup. feet; 1936–37, 44,771,668 sup. feet; 1937–38, 46,775,418 sup. feet; 1938–39, 35,862,540 sup. feet; and 1939–40, 36,000,000 sup. feet. The annual reports of the Forest Departments of the States contain particulars concerning the output of timber from areas under departmental control, but owing to lack of uniformity in classification and measurement, accurate determination of total production cannot be made. Moreover, there is a moderate quantity of hewn timber produced from privately owned land, but information regarding output is not available.

2. **Stocks of Timber, Logs and Sawn.**—Particulars are given below of timber stocks held on 30th June, 1939, as reported by mills and other factories included in the wood-working group. These latter establishments include box and case factories and joinery works, etc. Later details are not available for publication.

STOCKS OF TIMBER REPORTED BY FACTORIES, 30th JUNE, 1939.

State.	Logs.			Sawn Timber.		
	Hardwood.	Softwood.	Total.	Hardwood.	Softwood.	Total.
	'000 sup. feet.	'000 sup. feet.	'000 sup. feet.	'000 sup. feet.	'000 sup. feet.	'000 sup. feet.
New South Wales	9,918	17,164	27,082	(a)	(a)	61,953
Victoria ..	9,921	5,239	15,160	19,955	18,432	38,387
Queensland ..	(a)	(a)	(a)	(a)	(a)	(a)
South Australia	610	3,358	3,968	2,477	9,476	11,953
Western Australia	1,810	..	1,810	35,238	937	36,175
Tasmania ..	4,695	278	4,973	5,546	586	6,132
Total ..	(a)	(a)	(a)	(a)	(a)	(a)

(a) Not available.

3. **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 considerable quantities are manufactured, particularly in Victoria. Oversea exports amounted in 1935–36 to £53,797; in 1936–37 to £82,457; in 1937–38 to £94,538; in 1938–39 to £86,714; and in 1939–40 to £130,422; the bulk of the product is shipped from Victoria to the United Kingdom, the United States of America 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 improved 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 1935–36 to £27,526; in 1936–37 to £38,185; in 1937–38 to £35,128; in 1938–39 to £25,550; and in 1939–40 to £22,438. 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 and New South Wales also produce small quantities. In 1938–39, 1,648 tons valued at £42,330 were exported, the whole of which was shipped to the East; Hong Kong 805 tons and China 686 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 1939–40 amounted to 2,096 tons, whilst the exports from Australia amounted to 1,903 tons valued at £12,128 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 are found in the barks 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*).

Up to 1913 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 in every year except 1936–37 and 1939–40, the annual excess value averaging £2,945 during the past five years. The chief exporting States are Western Australia, South Australia and Tasmania. 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 is given in Official Year Book No. 22, p. 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.

4. **Value of Production—Gross and Net.**—(i) *General.* As the outcome of a series of conferences of Australian Statisticians it is now possible to present the value of forestry production on a more satisfactory basis than was possible hitherto, but the relative proportions of marketing costs to gross production suggest that complete uniformity in method has not yet been obtained. 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. All of these items are not yet collected in all the States, but the omissions are not serious.

GROSS, LOCAL AND NET VALUE OF FORESTRY PRODUCTION, 1939–40.

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 ..	2,510,000	163,000	2,347,000	..	2,347,000
Victoria	1,474,486	205,889	1,268,597	159,733	1,108,864
Queensland.. ..	2,786,000	255,000	2,531,000	..	2,531,000
South Australia ..	654,663	49,244	605,419	..	605,419
Western Australia ..	1,329,823	228,739	1,101,084	13,350	1,087,734
Tasmania	507,140	54,620	452,520	..	452,520
Total ..	9,262,112	956,492	8,305,620	173,083	8,132,537

(a) No deduction has been made for depreciation and maintenance.

(ii) *States* 1930–31 *to* 1939–40. In the following table the net value of forestry production and the net value per head of population are given by States for each year since 1930–31.

NET VALUE OF FORESTRY PRODUCTION.

NET VALUE. (a)

Year.	N.S.W.	Vic.	Qld.	S.A.	W.A.	Tas.	Total.
	£	£	£	£	£	£	£
1930–31	1,237,000	612,317	1,121,680	435,962	904,701	182,890	4,494,550
1931–32	1,158,000	541,665	833,994	473,915	655,923	189,070	3,852,567
1932–33	1,476,000	537,324	1,313,547	521,000	591,410	210,150	4,649,431
1933–34	1,737,000	588,837	1,334,088	488,069	729,796	259,360	5,137,150
1934–35	1,922,000	664,800	1,988,751	523,786	1,012,261	325,750	6,437,348
1935–36	2,014,000	692,209	2,076,000	525,936	1,135,851	363,600	6,807,596
1936–37	2,096,000	731,777	2,186,000	570,692	1,314,152	407,300	7,305,921
1937–38	2,179,000	1,029,174	2,514,000	570,199	1,272,707	431,200	7,996,280
1938–39	2,261,000	1,067,732	2,362,000	542,465	1,147,335	399,500	7,780,032
1939–40	2,347,000	1,108,864	2,531,000	605,419	1,087,734	452,520	8,132,537

NET VALUE PER HEAD OF MEAN POPULATION.

	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
1930–31	0 9 8	0 6 10	1 4 5	0 15 2	2 2 0	0 16 5	0 13 10
1931–32	0 9 0	0 6 0	0 17 11	0 16 5	1 10 3	0 16 9	0 11 9
1932–33	0 11 4	0 5 11	1 7 11	0 18 0	1 7 1	0 18 5	0 14 1
1933–34	0 13 3	0 6 5	1 8 1	0 16 9	1 13 2	1 2 8	0 15 5
1934–35	0 14 7	0 7 3	2 1 5	0 17 11	2 5 8	1 8 5	0 19 3
1935–36	0 15 2	0 7 6	2 2 8	0 17 11	2 10 9	1 11 7	1 0 2
1936–37	0 15 8	0 7 11	2 4 5	0 19 5	2 18 2	1 15 1	1 1 5
1937–38	0 16 1	0 11 1	2 10 6	0 19 4	2 15 8	1 16 8	1 3 4
1938–39	0 16 7	0 11 5	2 6 11	0 18 3	2 9 7	1 13 9	1 2 6
1939–40	0 17 0	0 11 9	2 9 9	1 0 3	2 6 8	1 17 11	1 3 3

(a) No deduction has been made for depreciation and maintenance.

5. **Employment.**—(i) *Census Returns.* 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.

EMPLOYMENT IN FORESTRY, 30th JUNE, 1933.

Sex.	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	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) Excluding Northern Territory, 11, and Australian Capital Territory, 152.

(ii) *Logging Operations: Forest Sawmills.* Particulars of employment and costs of logging operations in the forests are given for each State in the following table. These data have been compiled from the details furnished by those establishments which come within the definition of a forest sawmill as distinct from those defined as town sawmills.

FOREST SAWMILLS: LOGGING OPERATIONS, 1939–40.

Particulars.	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tasmania.	Total.
Number of men employed No.	(a)	991	551	32	838	696	(a)
Value of wages paid £		181,949	95,403	4,270	204,193	106,097	
Other Costs .. £		102,335	159,482	17,729	112,438	99,200	
Value of Royalties, etc., paid .. .. £		111,903	147,742	35,506	123,077	29,049	
Period worked by men above .. months		(a)	8.51	9.69	10.83	9.90	

(a) Not available.

(iii) *Mill Workers: Forest Sawmills.* Details of the number employed in the milling operations of these forest sawmills are given in the next table. Further details regarding the operations of these mills are given in Chapter XXI. "Manufacturing Industry".

FOREST SAWMILLS: MILL WORKERS, 1939–40.

Sex.	N.S.W.	Victoria.	Q'land. (a)	S. Aust.	W. Aust.	Tasmania.	Total.
	No.	No.	No.	No.	No.	No.	No.
Males ..	2,115	1,901	4,415	239	1,774	1,331	11,775
Females ..	40	9	106	1	8	9	173
Total ..	2,155	1,910	4,521	240	1,782	1,340	11,948

(a) Including town sawmills.

§ 7. Commercial Uses of Principal Australian Timbers.

1. **General.**—The uses of the more important Australian timbers are many and varied, and are indicated in previous issues of this work.

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, of 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.**—(i) *Dressed Timber.* The quantities and values of timber imported into Australia during the four years 1935–36 to 1938–39 inclusive are shown according to countries of origin in the following tables. Later details are not available for publication :—

DRESSED TIMBER : IMPORTS INTO AUSTRALIA.

Country of Origin.	Quantity.				Australian Currency Values.			
	1935–36.	1936–37.	1937–38.	1938–39.	1935–36.	1936–37.	1937–38.	1938–39.
	Sup. ft.	Sup. ft.	Sup. ft.	Sup. ft.	£	£	£	£
United Kingdom ..	369	2,609	235	551	34	238	76	48
Canada	4,279,916	6,772,408	12,267,864	8,926,950	44,288	66,826	165,374	99,797
Other British Countries	208,443	98,196	91,387	2,576	2,910	883	2,095	23
Norway	5,972,177	5,312,467	5,510,582	4,209,070	53,670	51,318	73,579	47,570
Sweden	2,041,848	2,504,871	5,362,982	1,977,921	18,299	28,514	81,694	26,687
U.S. of America ..	1,568,577	2,326,883	1,921,944	2,242,023	12,907	18,523	25,042	24,203
Other Foreign Countries	1,966,985	220,576	776,892	418,430	18,377	5,283	14,491	6,771
Total	16,038,315	17,238,010	25,931,886	17,777,521	150,485	171,585	362,351	205,099

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 £67,198 in 1938–39 including plywood, veneered or otherwise, £24,463.

The bulk of the imports of dressed timber come from Canada, Norway, Sweden and the United States of America. 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 1935–36 to 1938–39 are given hereunder. Later details are not available for publication :—

UNDRESSED TIMBER, INCLUDING LOGS (*a*) : IMPORTS INTO AUSTRALIA.

Country of Origin.	Quantity.				Australian Currency Values.			
	1935–36.	1936–37.	1937–38.	1938–39.	1935–36.	1936–37.	1937–38.	1938–39.
	'000. sup. ft.	'000. sup. ft.	'000. sup. ft.	'000. sup. ft.	£	£	£	£
United Kingdom ..	202	75	175	115	15,696	8,513	14,112	10,969
Canada	265,016	261,219	334,233	296,948	825,777	960,374	1,693,455	1,225,650
India	101	136	190	7	4,299	6,355	2,595	287
Malaya (British) ..	104	128	369	165	730	959	2,930	1,389
New Zealand	36,697	17,114	14,568	11,193	452,167	248,030	221,252	173,556
Other British Countries ..	3,690	4,254	9,684	10,840	34,212	27,914	73,256	75,136
Japan	1,186	786	727	374	14,166	10,411	14,837	8,439
Netherlands East Indies ..	41	..	..	20	185	36	..	130
Norway	33	..	124	21	237	90	1,668	385
New Caledonia	..	2	62	1,671	..	9	313	6,368
Philippine Islands ..	3,949	3,390	4,359	6,879	37,138	31,566	42,375	72,921
Sweden	2,251	2,549	2,409	4,654	16,778	20,116	28,066	40,592
United States of America ..	39,863	23,490	31,643	12,245	341,432	219,058	341,800	210,092
Other Foreign Countries ..	5,015	5,028	8,240	2,966	31,307	32,835	77,801	29,022
Total	358,148	318,171	406,783	348,098	1,774,124	1,566,266	2,514,460	1,854,936

(*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 Canada and the United States of America; and kauri, rimu and white pine from New Zealand. 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 1935–36 to 1938–39 are given below, together with the countries of destination. Later details are not available for publication :—

UNDRESSED TIMBER, INCLUDING LOGS. (*a*) : EXPORTS FROM AUSTRALIA.

Country to which Exported.	Quantity.				Value.(*b*)			
	1935–36.	1936–37.	1937–38.	1938–39.	1935–36.	1936–37.	1937–38.	1938–39.
	1,000 sup. ft.	1,000 sup. ft.	1,000 sup. ft.	1,000 sup. ft.	£	£	£	£
nited Kingdom ..	13,133	16,159	17,500	11,760	148,682	186,253	216,323	138,294
anada	140	131	341	223	2,565	2,483	7,715	4,723
eylon	635	760	567	535	6,353	7,941	5,893	5,563
Hong Kong	..	69	443	50	..	621	3,740	616
India	438	1	..	..	4,514	3	..	..
Mauritius	432	403	311	354	4,738	5,014	5,846	4,520
New Zealand	12,842	15,066	15,835	17,149	160,398	209,648	237,098	245,450
Pacific Islands—								
Fiji	727	744	896	841	10,832	11,745	14,788	15,637
Gilbert and Ellice Islands Colony	149	156	212	210	1,337	4,413	2,272	2,292
Nauru	153	243	282	293	1,020	4,858	4,218	3,013
Papua	262	267	424	241	3,932	4,074	6,980	3,670
Solomon Islands ..	160	246	236	161	2,383	4,160	4,800	2,527
Territory of New Guinea	241	207	289	141	3,158	3,595	4,741	2,188
Other Islands ..	26	74	125	169	391	1,360	2,372	4,172
Union of South Africa ..	5,399	5,099	7,358	7,164	64,957	57,788	83,055	80,668
Other British Countries ..	22	127	92	161	269	2,252	1,579	1,769
Africa, Portuguese East ..	574	382	346	415	7,271	4,370	4,983	5,023
Belgium	1,078	518	1,612	1,286	11,181	7,117	24,241	19,347
China	1,153	748	128	271	11,504	7,161	1,010	2,324
Egypt	302	132	228	719	3,919	1,317	2,280	7,186
Germany	236	298	81	648	2,625	4,661	1,066	9,989
Netherlands	73	196	685	224	974	2,169	8,541	2,777
Pacific Islands—								
New Caledonia ..	219	60	94	72	3,492	1,075	1,880	1,117
New Hebrides ..	64	150	128	51	725	1,733	2,306	836
Other Islands ..	18	36	44	33	378	862	995	780
United States of America	2,475	2,834	1,150	955	63,241	85,101	32,850	27,857
Other Foreign Countries ..	78	84	35	212	1,352	929	438	2,487
Australian Produce ..	40,307	44,056	48,882	43,798	516,022	606,702	674,187	588,746
Other Produce	812	1,134	560	540	6,169	16,001	7,823	6,079
Total	41,119	45,190	49,442	44,338	522,191	622,703	682,010	594,825

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

The bulk of the exports of undressed timber were consigned to New Zealand, the United Kingdom, South Africa and the United States of America, 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 quantities and values 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. Later details are not available for publication :—

RAILWAY SLEEPERS : EXPORTS FROM AUSTRALIA.

Country to which Exported.	Quantity.		Value.(a)	
	1937–38.	1938–39.	1937–38.	1938–39.
	Sup. ft.	Sup. ft.	£	£
United Kingdom	1,184,784	1,438,303	16,722	14,467
Ceylon	3,750,156	5,333,820	37,499	53,339
Hong Kong	1,396,604	..	14,888	..
Mauritius	964,987	562,500	10,217	6,216
New Zealand	7,628,809	16,895,691	78,636	165,303
Pacific Islands	216,038	201,036	2,180	2,341
Union of South Africa ..	6,299,076	4,941,144	62,990	49,412
Other British Countries ..	30,024	..	300	..
China	7,852,981	..	80,312	..
Egypt	8,148,120	4,198,210	81,481	41,986
Iran (Persia)	155,604	271,038	1,556	2,707
Iraq	14,479 697	164,769	141,034	1,696
Other Foreign Countries ..	44,556	29,160	445	291
Total	(b)52,151,436	(c)34,035,671	528,260	337,758

(a) Australian currency values. (b) Number of sleepers, 1,803,793. (c) Number of sleepers, 1,267,894.

3. **Classification of Imports and Exports.**—(i) *General.* The quantities of timber classified according to varieties imported and exported during the year 1938–39 are given in the next table. Later details are not available for publication :—

TIMBER : VARIETIES IMPORTED AND EXPORTED FROM AUSTRALIA, QUANTITIES, 1938–39.

Description.	Unit of Quantity.	Imports.	Exports.	Excess of Imports over Exports.
Dressed	Sup. ft.	17,777,521	881,055	16,896,466
Undressed, including logs ..	,,	348,098,462	44,338,109	303,760,353
Sleepers	,,	(a)	34,035,671	—34,035,671
Architraves, mouldings, etc. ..	Lin. ft.	18,810	72,960	—54,150
Plywood, veneered or otherwise ..	Sq. ft.	2,890,388	3,015,669	125,281
Palings	No.	5,665	125,420	—119,755
Shingles	,,	157,280	..	157,280
Staves—				
Dressed, etc.	,,	807,085	200	806,885
Undressed	,,	1,004,795	..	1,004,795
Laths—				
For blinds	,,	..	..	..
Other	,,	640,115	..	640,115
Doors	,,	1,069	(b)	(b)
Wood pulp	Ton	37,550	(a)	37,550
Veneers	Sq. ft.	4,493,339	4,358,479	134,860
Spokes, rims, felloes, etc. ..	No.	500	(b)	(b)
Other..	..	(b)	(b)	(b)

(a) Not recorded separately. (b) Quantity not available.

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

Similar particulars relative to the values of imports and exports during the year 1938–39 are shown hereunder. Later details are not available for publication :—

TIMBER : VARIETIES IMPORTED AND EXPORTED FROM AUSTRALIA, VALUES (*a*), 1938–39.

Description.	Imports.	Exports.	Excess of Imports over Exports.
	£	£	£
Dressed	205,099	20,130	184,969
Undressed, including logs	1,854,936	594,825	1,260,111
Sleepers	(*b*)	337,758	−337,758
Architraves, mouldings, etc.	132	567	−435
Plywood, veneered or otherwise	24,463	41,254	−16,791
Palings	65	1,265	−1,200
Shingles	342	..	342
Staves—			
Dressed, etc.	45,337	25	45,312
Undressed	25,913	..	25,913
Laths—			
For blinds	..	..	..
Other	712	..	712
Doors	74	1,405	−1,331
Wood pulp	399,187	(*b*)	399,187
Veneers	37,714	27,148	10,566
Spokes, rims, felloes, etc.	12	503	−491
Other	3,809	38	3,771
Total	2,597,795	1,024,918	1,572,877

(*a*) Australian currency values. (*b*) 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 four years are as follows :—

SANDALWOOD : EXPORTS FROM AUSTRALIA.

Country to which Exported.	Quantity.				Value.(*a*)			
	1935–36.	1936–37.	1937–38.	1938–39.	1935–36.	1936–37.	1937–38.	1938–39.
	Ton.	Ton.	Ton.	Ton.	£	£	£	£
Hong Kong	1,209	2,120	729	805	32,842	63,344	21,242	18,709
India	75	105	40	26	2,339	3,279	1,280	842
Malaya (British)	99	140	116	97	2,997	4,283	3,578	3,149
Other British Countries	11	20	13	17	351	620	415	545
China	932	1,154	312	686	27,513	34,426	9,357	18,511
Other Foreign Countries	26	16	31	17	803	496	959	574
Total	2,352	3,555	1,241	1,648	66,845	106,448	36,831	42,330

(*a*) Australian currency values.

(iii) *Tan Bark.* Tan bark figures both as an export and an import in the Australian trade returns. The table hereunder refers to exports for the four years ended 1938–39. Later details are not available for publication :—

TAN BARK : EXPORTS FROM AUSTRALIA.

Country to which Exported.	Quantity.				Value.(a)			
	1935–36.	1936–37.	1937–38.	1938–39.	1935–36.	1936–37.	1937–38.	1938–39.
	Cwt.	Cwt.	Cwt.	Cwt.	£	£	£	£
United Kingdom ..	305	..	100	..	162	..	20	..
New Zealand	20,001	10,808	5,779	7,620	9,482	6,024	3,118	3,897
Other British Possessions..	..	..	30	40	..	..	21	27
Germany	1,517	515	3,193	8,251	1,101	228	1,313	3,582
Other Foreign Countries ..	1,941	1,514	6,253	2,309	914	2,155	3,100	1,124
Total	23,764	12,837	15,355	18,220	11,659	8,407	7,572	8,630

(a) Australian currency values.

For a number of years prior to 1927–28 Australia had to import large quantities of tanning bark, but thereafter imports dropped to negligible quantities and exports rose annually to 89,061 cwt. in 1931–32. Since 1931–32 there has been a diminution of exports and by 1939–40 these had reached the low level of less than 4,000 cwt. The quantity imported, however, has not risen appreciably but during the years 1936–37 and 1939–40 imports exceeded exports. The Union of South Africa is the chief source of supply.

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.	1935–36.	1936–37.	1937–38.	1938–39.	1939–40.
QUANTITIES—	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.
Imports	4,362	18,216	7,361	6,199	21,981
Exports	23,764	12,837	15,355	18,220	3,885
Excess of exports over imports	19,402	−5,379	7,994	12,021	−18,096
VALUES (a)—	£	£	£	£	£
Imports	1,395	6,660	3,145	2,548	10,141
Exports	11,659	8,407	7,572	8,630	2,344
Excess of exports over imports	10,264	1,747	4,427	6,082	−7,797

(a) Australian currency values.

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

The imports consist almost exclusively of wattle bark from the plantations in South Africa. One species of Australian wattle, *Acacia mollissima*, 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 in Australian currency of the importations in 1939–40 was £135,466, and was composed as follows :—Wattle bark extract, £51,633 ; quebracho extract, £16,832 ; other extract, £28,468 ; and valonia, myroblans, cutch, etc., £38,533.