

CHAPTER XXV.

FORESTRY.*

§ 1. General.

NOTE.—Values of Australian oversea trade shown throughout this Chapter are expressed in £A. f.o.b., Port of Shipment, except where otherwise indicated.

1. **Objects of Forestry.**—The main object of forestry is to manage the forests of a country in the way that will provide the maximum benefits, both direct and indirect. Direct benefits include the provision of essential commercial commodities such as structural timber, pulpwood, plywood, veneers, firewood, bark products, tars, oils and resins. Indirect benefits include protection of soil and stock from wind and exposure, regulation of stream flow, and aesthetic effects.

Forestry aims to improve existing forests and woodlands by properly controlled exploitation, by protection from destructive agencies such as fire, and by inducing natural regeneration where it is desirable. Forestry also aims to provide a partial tree cover on denuded lands when such cover is necessary for protective purposes, and a complete cover when the land is better under forest than under any other crop.

2. **General Account of Forests and Timbers.**—The area of land in Australia suitable for the production of commercial timber as the primary crop is very small in comparison with the size of the continent. It is concentrated mainly around the wetter coastal belts and the eastern highlands and it includes the bulk of the land suitable for intensive development by agricultural or pastoral undertakings.

The allocation of land for agricultural and pastoral purposes led to the clearing of much of the original forest of Australia, particularly of the more readily accessible parts. In the early period of agricultural and pastoral expansion, only the best timbers found their way into commerce, and species now prized as providing high quality woods were often put to inferior uses. During this period, the forest resources of the country were considered by the majority of the people to be inexhaustible, and relatively little care was taken to prevent the degradation of the remaining forests by fire and uncontrolled grazing. This state of affairs is rapidly changing; it is now recognized that the remaining forest land must be protected and properly managed in the interests of the community.

The trees which make up the forests of Australia are mainly evergreen hardwoods. The characteristic genus is *Eucalyptus*. There are over six hundred different kinds of eucalypts and with few exceptions the natural occurrence of all of them is restricted to Australia. The genus includes such species as the mountain ash (*Eucalyptus regnans*) of Victoria and Tasmania, and karri (*E. diversicolor*) of Western Australia, which are the tallest-growing hardwoods in the world. At the other end of the scale there are many eucalypts which do not grow to tall trees, including the species collectively known as the "mallees". The mallees develop a number of small stems from an underground structure called the "mallee root".

* A specially contributed article dealing with Forestry in Australia appeared as part of Chapter XIX. in Official Year Book No. 19 (see pp. 701–12 therein). See also "The Commercial Timbers of Australia Their Properties and Uses" by I. H. Boas, published by the Council for Scientific and Industrial Research in 1947, "Timbers and Forest Products of Queensland" by E. H. S. Swain, published in 1928 and "Australian Standard Nomenclature of Australian Timbers" published by the Standards Association of Australia.

Less than 100 eucalypts are used for sawmilling and not more than 30 to 40 are exploited extensively. The main commercial eucalypts were listed in Official Year Book No. 39 and earlier issues.

The eucalypts satisfy the Australian requirement for timbers having great strength and durability. They also provide a large proportion of the building timber and some of the wood required for packaging. In recent years, some eucalypts have been used extensively for papermaking and for the manufacture of hardboard and fibreboard. The species most commonly used for pulping are mountain ash (*E. regnans*), alpine ash (*E. gigantea*), and messmate, stringybark or Tasmanian oak (*E. obliqua*).

A large number of other genera represented in the Australian forest flora also produce commercial hardwoods. Among the outstanding furniture cabinet and veneer timbers are red cedar (*Cedrela toona* var. *australis*), Queensland maple (*Flindersia brayleyana*), Southern and Northern silky oak (*Grevillea robusta* and *Cardwellia sublimis*, respectively), Queensland walnut (*Endiandra palmerstoni*), blackwood (*Acacia melanoxylon*), rose mahogany (*Dysoxylum fraserianum*), etc. Turpentine (*Syncarpia laurifolia*) ranks with the world's best as a harbour piling timber. Coachwood (*Ceratopetalum apetalum*) came into prominence for rifle furniture and for aircraft plywood during the 1939-45 War.

The foregoing are but a few examples indicating the range of use of the timbers of the Australian hardwood forests.

The most important indigenous softwood resources of Australia were in the forests of hoop pine (*Araucaria cunninghamii*) of Queensland and New South Wales. These forests occurred on rich land suitable for intensive agriculture. The greater part of the original hoop pine forest has gone but the wood removed made an important contribution to the Australian timber industry. Some areas of the hoop pine forest have been replanted with this species in Queensland and, to a lesser extent in New South Wales.

There are still considerable areas of the useful white-ant resisting cypress pine (*Callitris* spp.) in the inland areas of Queensland and New South Wales. They have been seriously overcut but are gradually being brought under management.

Other native softwoods which have played a useful but minor part in the Australian timber industry include bunya pine (*Araucaria bidwilli*) and kauri (*Agathis* spp.) of Queensland, and huon pine (*Dacrydium franklinii*), celerytop pine (*Phyllocladus rhomboidalis*) and King William pine (*Athrotaxis selaginoides*) of Tasmania.

The savannah woodlands of the interior of Australia yield commercial commodities such as sandalwood, tanbarks and essential oils. They also have an important function in providing fuel and rough timbers for the development of agricultural and pastoral holdings.

3. Extent of Forests.—According to data assembled for the Seventh British Commonwealth Forestry Conference to be held in Australia and New Zealand in 1957, the total area of forest in Australia is estimated at 186,791 square miles, or about 6.3 per cent. of the total land area of the continent. This is an increase of 27,040 square miles over the estimate made for the 1952 Conference, and has resulted from the inclusion of a large area of mallee in South Australia, together with 4,500 square miles of forests, mainly low grade woodlands, in the Northern Territory. The estimated forest area is distributed amongst the States as follows (the proportion of forest land to the total area of each State is shown in parenthesis):—New South Wales and the Australian Capital Territory, 37,942 square miles (12 per cent.); Victoria, 26,222 (30 per cent.); Queensland, 28,000 (4 per cent.); South Australia, 36,000 (including 25,000 square miles of mallee suitable for firewood only) (10 per cent.); Western Australia, 41,826 (4 per cent.); Tasmania, 12,301 (47 per cent.) and the Northern Territory, 4,500 (1 per cent.). The areas given are rough estimates only and are considerably in excess of those which are both suitable for reservation and likely to be maintained for timber production. Considerable areas of low grade forest which, in many cases, are suitable for little more than the production of firewood, are included. It is doubtful if the remaining prime native forest area of Australia exceeds 20,000 square miles. The proportion of Australia carrying commercial forests is therefore very low and apart from forests on the coastal fringe of the continent, the tree density is very low.

The table below shows a classification of the estimated total forest area referred to above:—

CLASSIFICATION OF FOREST AREA(a): AUSTRALIA.

Class of Forest.	Area (Square Miles).				Proportion of Total Forest Area.
	State Forest.	Communal Forest.	Private Forest.	Total.	
<i>Exploitable—</i>					%
Softwood	10,512	5	2,808	13,325	7.1
Mixed wood	754	..	..	754	0.4
Hardwood	41,691	75	13,129	54,895	29.4
<i>Total</i>	<i>52,957</i>	<i>80</i>	<i>15,937</i>	<i>68,974</i>	<i>36.9</i>
<i>Potentially Exploitable—</i>					
Softwood	58	..	100	158	0.1
Mixed wood	100	..	..	100	0.1
Hardwood	13,002	..	12,200	25,202	13.5
<i>Total</i>	<i>13,160</i>	<i>..</i>	<i>12,300</i>	<i>25,460</i>	<i>13.7</i>
<i>Other Lands Classed as Forest</i>	<i>81,023</i>	<i>450</i>	<i>10,884</i>	<i>92,357</i>	<i>49.4</i>
Grand Total ..	147,140	530	39,121	186,791	100.0

(a) Based on the 1955 classification of forests.

State forests accounted for 78.8 per cent. of the total forest area, private forests for 20.9 per cent. and communal forests for 0.3 per cent.

The bulk of the softwood area of approximately 13,325 square miles is in Queensland and New South Wales and consists principally of slow-growing cypress pine (*Callitris spp.*) in low rainfall areas. The total area has been increased in comparison with previous estimates by the inclusion of a large area of crown land carrying scattered cypress pine. The volume of this species per acre is comparatively low.

4. **Forest Reservations.**—The first attempt to determine the forest areas which should be reserved solely for purposes of timber production was made at an Interstate Forestry Conference held at Hobart in 1920. This Conference decided that an area of 24½ million acres of indigenous forest should be permanently reserved. According to statements furnished by State and Commonwealth authorities, reservations of forest areas in Australia at 30th June, 1955, totalled 32,322,042 acres of which 21,703,274 acres were Dedicated State Forests and 10,618,768 acres were Timber and Other Reserves. The area of Dedicated State Forests increased by 725,013 acres during the year 1954–55, although total area remained almost at the same level. The distribution of these areas is shown by States in § 4, para. 2 of this chapter.

In general, the Timber Reserves are temporary and are liable to be alienated after the timber on them has been exploited. Some of these areas contain land of high value for forestry purposes, but the greater part does not justify permanent reservation.

If the permanently reserved areas were all of good quality, accessible, and fully productive forests supplying the class of timber required, they could be regarded as adequate for a much larger population than exists in Australia at the present time. Actually, however, a considerable proportion is in inaccessible mountainous country and many of the forests contain a mixture of species only some of which are at present of commercial value; much

of it consists of inferior forest and a large proportion of the whole has been seriously degraded by recurrent fires. Also, the indigenous forest does not contain adequate supplies of softwoods producing commercial timbers and Australia's requirements of these have to be met largely by imports from other countries.

It is freely acknowledged by Australian forestry authorities that information on forest resources is very imperfect. It is not possible at present to give a reliable estimate of the forest areas needed to meet all future demands because of the number of unknown variables involved; in particular the yield capacity per acre, future consumption of different classes of timber per head, and the future population. It appears, however, that all available potentially good forest country, including adequate areas for plantations of conifers, will need to be reserved, protected and systematically managed, if Australia is to approach the goal of self sufficiency in timber supplies in the future. One of the most urgent requirements in this connexion is a comprehensive estimate of forest resources.

5. Plantations.—Reference has been made to the inadequacy of indigenous softwood supplies, but, as a result of the planned policy of the forest services of the States and the Commonwealth and, to a less extent, of several private commercial organizations, the area of softwood plantations, mainly of exotic species is steadily increasing. It was natural that this aspect of forestry received earliest attention in South Australia as it is the State most poorly endowed with natural forest. This State now has a larger area of planted softwoods than any other State in Australia, and for some years has been exploiting considerable quantities of timber from these plantations. The total production is now over 130,000,000 superficial feet per annum and is expected to be increased substantially during the next decade. Production is also increasing in the other States and first thinnings from their plantations are already supplying a significant portion of the requirements of the case-making industry.

The total net area of Commonwealth and State softwood plantations at 30th June, 1955, was 311,580 acres. In addition, the area of privately owned plantations was about 70,700 acres. Hardwood plantations (mainly *Eucalyptus spp.*) comprise a much smaller area and the total acreage is about 30,000 acres, nearly two-thirds of which is mallet (*Eucalyptus astringens*) which has been established in Western Australia for tan bark production.

6. Fire Protection.—Fire control measures in Australia are the responsibility of the individual State Governments, and the provision of adequate fire protection is one of the main problems facing forest authorities at the present day. The forest services are responsible for fire control measures over a total area of 23.6 million acres of dedicated and reserved forest areas throughout Australia.

The responsibility for the protection of private property outside urban areas rests with volunteer bush fire brigade organizations which are co-ordinated in each State by a committee or board carrying out functions of an advisory or educational nature and fostering the growth and organization of the bush fire brigade movement. Throughout the main agricultural and forest areas of Australia there are over 4,500 registered volunteer bush fire brigades with a membership approaching 200,000. Although both forest and rural fire organizations are entirely separate entities, a high degree of co-operation and liaison is maintained.

In addition to the forest service and rural organizations, various private and semi-Governmental bodies in each State maintain fire protection organizations, which are generally concerned with the protection of private forestry operations and hydro-electric and water catchment areas.

The annual cost of protecting from fire 23.6 million acres of dedicated and reserved forest over the three year period 1952 to 1954 was estimated at £1,150,000 or about 11.7d. per acre annually. The cost of rural fire control as a whole cannot be estimated with any degree of accuracy owing to the fact that by far the greatest contribution comes from the personal efforts of volunteer brigade members.

The Australian fire season is very variable, with an average of a particularly bad fire season every seven years or so. Such years as 1926, 1939, 1944 and 1952 account for a large proportion of the average annual burn which, for the period 1945 to 1955, amounted to 2.16 million acres or 1.8 per cent. of the total forested area of Australia. In disastrous fire seasons, such as 1938-39 and 1951-52, the acreage burnt on protected forest areas may rise to as high as 15 per cent., compared with an average burn of 1.2 per cent. when such seasons are excluded.

During the post-war decade, forest services greatly expanded their fire detection facilities and big advances were made in the use of power pumping equipment. Radio communication is now being used extensively by both forest services and rural organizations, and considerable progress has been made in the provision of legislative power for the rural bush fire movement, although the volunteer movement itself dates back to the turn of the century.

Recognizing that fire prevention is one of the most important aspects of the problem, intensive campaigns have been conducted to reduce the incidence of man-caused fires. A study of fire causes in recent years reveals that human agencies account for 95 per cent. of all fires, and of this figure at least 80 per cent. are preventable. Burning off, much of which is started illegally, accounts for 35 per cent. of all fires, smokers, hunters, fishermen and travellers cause 13 per cent. of all fires, whilst only 5 per cent. of fires in Australia are caused by lightning.

§ 2. Forestry Activities of the Commonwealth.

1. **Prior to 1925.**—When the Commonwealth of Australia was established on the 1st January, 1901, forestry was not included among the matters transferred from the States to the control of the Commonwealth, and Federal jurisdiction was therefore restricted to the then relatively unimportant forests of the Australian Territories. After the 1914–18 War, these Territories (including Papua-New Guinea and Norfolk Island) covered a large area, and in the aggregate contained substantial forest resources. In the early twenties of this century, a professional forester was appointed as forestry adviser to the Commonwealth Government, and he submitted preliminary reports on the forest resources of Papua-New Guinea, Norfolk Island and the Australian Capital Territory, with suggestions for future policy.

2. **Forestry and Timber Bureau.**—In 1925, the Commonwealth Forestry Bureau was instituted, and the Commonwealth Forestry Adviser became the Inspector-General of Forests. By an Act of 1930, the Bureau received statutory powers, and its functions included the advising of the various Territorial Administrations on forestry matters, the management of forests placed under its control, the establishment of experimental forest stations, the training of students in forestry, etc.

At the end of the 1939–45 War, the Commonwealth Government decided to continue certain advisory functions which during the War had been carried out by War-time Timber Control, and such functions were incorporated in the Forestry and Timber Bureau Act 1946, under which the title of the Bureau was altered to Forestry and Timber Bureau. The powers and functions of the Bureau were extended to embrace the collection of statistics and information, and advising the Governments of the Commonwealth and the States or other interested bodies on matters relating to the supply, production, oversea trade and distribution of timber in Australia. The Bureau was placed under the administration of a Director-General.

The activities of the Bureau under its statutory functions are summarized below:—

(a) **Forestry Education.** The Australian Forestry School was opened at Adelaide University in 1926 in continuation of the School of Forestry of that University established in 1911. In 1927, the School was transferred to Canberra. The purpose of the School is to train students as professional officers to manage the forests of Australia. It also accepts students from overseas.

Training at the School covers the third and fourth years of a four-year course. The first two years are spent at an Australian University in a study of prescribed science subjects. Courses at the School lead to Commonwealth Diplomas in Forestry and in Forest Technology, and in the case of the former, can lead further to a Degree in Forestry of an Australian University. Applicants possessing a University Degree granted for approved natural science subjects, or applicants with academic qualifications accepted by the Director-General as equivalent, may also be admitted to this School and proceed to the Diplomas. Graduates or Diploma holders approved by the Director-General may be admitted to the School to take selected subjects or to carry out research work.

The Board of Higher Forestry Education advises regarding pre-requisite University courses leading to the Diploma courses and in regard to the maintenance of the standard of the School Diploma course.

In addition to students nominated by State Governments and other Australian and oversea authorities and organizations, private students are accepted at the School, and the Commonwealth Government offers up to ten forestry scholarships each year. These scholarships provide a salary allowance for the four years of the full Diploma course.

During 1950, the number of students enrolled reached 80, owing to the intake of ex-servicemen taking University courses under the Commonwealth Reconstruction Training Scheme. The normal capacity of the School is 40.

(b) *Silvicultural Research.* Research head-quarters and a Central Experimental Station have been established at Canberra. Other Forest Experimental Stations have been established at Mount Burr in the south-east of South Australia, in Tasmania, and at Dwellingup in Western Australia, on a co-operative basis with the Forest Services of those States. It is proposed to establish similar co-operative Experimental Stations in other States and Territories.

With its present limited staff, the research work of the Bureau has been concentrated largely upon studies of forest and climatic conditions, the genetical relationships and silvicultural requirements of various species, forest nutrition and the improvement of forest yields. A considerable expansion in the research activities is planned for the next few years as suitable trained staff becomes available.

(c) *Forest Management Research.* In the national interest, it is essential that over-cutting of forests should be avoided and in consequence it is a matter of primary importance that reliable information be available as to the country's forest resources and potentialities. To this end, a national forest stocktaking is being carried out by the Bureau in co-operation with the Forest Services of the States and, to assist in the work of forest assessment, special consideration is being given to the development of the use of aerial surveys.

Consideration is also being given, in co-operation with the State Forest Services, to the establishment of increased areas of plantations of exotic pines with a view to providing additional supplies of softwood timber to meet requirements.

The general economics of forest management are also being studied.

(d) *Timber Supply.* The value of reliable statistical data covering availability of timber and timber requirements was so forcibly demonstrated during the 1939-45 War that it was considered essential to maintain at least a skeleton organization against times of future national emergency. Apart from this, it became clear that, for many years to come, shortages of timber on the one hand and heavy post-war reconstruction demands on the other, accentuated by a rapidly increasing population, would necessitate assessment of requirements and availability of supplies being kept constantly under review as a basis for short and long term policies of timber supply and distribution.

Advice is currently provided to Government Departments and the trade in matters pertaining to timber supply, including—(a) the availability of total quantities and quantities of particular grades and specifications required to meet Australia's needs; (b) the quantity of timber that should be imported; (c) the extent to which exports of timber and related products might be allowed without detriment to local needs; and (d) distribution of timber within Australia.

(e) *Management of Forests.* The Bureau manages the forests of the Australian Capital Territory and maintains a forestry officer in the Northern Territory. In addition, it is responsible for advising the administrations of the Northern Territory and the External Territories on the management of the forests under their charge.

3. **Commercial Forests.**—The forest areas under Commonwealth control include the following:—

- (a) *Australian Capital Territory.* The forests of the Australian Capital Territory are administered by a Division of the Forestry and Timber Bureau. Further information is contained in Chapter V.—The Territories of Australia.
- (b) *Northern Territory.* The forests of the Northern Territory are administered under ordinance by the Administrator of that Territory. The native forests of the Territory are very limited, consisting largely of open eucalypt forest in the North, with very restricted patches of rain forest along streams, river-fringing forests of paper bark tea-tree, patches of cypress pine, and elsewhere savannah woodland deteriorating to mallee and mulga in the interior. The Bureau maintains a forestry officer in the Territory for investigation and advisory purposes.
- (c) *Norfolk Island.* The forests of Norfolk Island are administered by the Administrator of that Territory. The area reserved for forest covers 1,037 acres, of which the main species is Norfolk Island pine.
- (d) *Papua and New Guinea.* The forests of the Territory of Papua and New Guinea are managed by a Forestry Department under the control of a Director, and are administered under an ordinance of the Territorial Administration. Forestry in the Territory commenced with the appointment of two officers in 1938. Further information is contained in Chapter V.—The Territories of Australia.

4. **Forest Products Research.**—Fundamental investigations connected with the properties and uses of timber and forest products generally are carried out by the Forest Products Division of the Commonwealth Scientific and Industrial Research Organization. These investigations cover a very wide field, e.g., pulp, paper, seasoning, structure and chemistry of wood, tans, etc.

Details can be obtained from the annual reports and publications of the Forest Products Division.

§ 3. Forest Conferences.

The first British Empire Forestry Conference was held in London in 1920. Subsequent conferences were held in Ottawa in 1923, Australia and New Zealand, 1928, South Africa, 1935 and again in the United Kingdom in 1947. In conformity with the development of the British Commonwealth of Nations, the name of these conferences was changed to British Commonwealth Forestry Conference. The sixth was held in Canada in 1952 and the seventh will be held in Australia and New Zealand during the latter half of 1957.

§ 4. State Forestry Departments.

1. **Functions.**—Except for 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 to control and manage the forests of the State. 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 the existing deficiency in softwoods. Annual reports are issued by each State forest authority. In Queensland, forestry is a sub-department of the Department of Public Lands. Victoria maintains a forestry school at which recruits are trained for the forestry service of that State.

2. **Forest Reservations.**—As mentioned in § 1, para. 4 above, State forest authorities agreed that, in order to secure Australia's future requirements, an area of 24½ million acres should be permanently reserved. At June, 1955, the area of State forests reserved in perpetuity totalled 21,703,274 acres or 89 per cent. of the area recommended as the goal to be attained.

In addition to the work of permanently reserving areas in each 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 Forestry Departments also usually control all timber on open Crown lands as well as over 10 million acres of Timber Reserves, National Parks, etc., but, while these areas contain some land of high value for forestry purposes, the greater part does not justify permanent reservation.

In the following table, details of forest areas as recorded by State Forest Authorities, distinguishing between Dedicated State Forests, Timber Reserves and Other Forest Reserves are shown for each State as at 30th June, 1955. In addition, details of forest reservations in Northern Territory and Australian Capital Territory are shown.

AREA OF FOREST RESERVATIONS, 30th JUNE, 1955.
(Acres.)

State or Territory.	State Forests.	Timber Reserves (Forest Act).	Other Reserves.	Total.
New South Wales	6,202,889	1,364,482	..	7,567,371
Victoria	4,772,204	716,633	(a) 175,155	5,663,992
Queensland	4,698,508	3,212,849	(b) 788,007	8,699,364
South Australia	261,627	..	..	261,627
Western Australia	3,834,207	1,831,870	(a) 952,449	6,618,526
Tasmania	1,926,939	137,028	957,295	3,021,262
Northern Territory	6,900	..	352,000	358,900
Australian Capital Territory .. .. .	..	..	131,000	131,000
Australia	21,703,274	7,262,862	3,355,906	32,322,042

(a) Timber reserves under the Land Act.

(b) National Parks.

3. **Employment.**—In the table below, details are shown of the number of persons employed by State Forestry Departments, and by the Forestry and Timber Bureau in respect of the Australian Capital Territory and the Northern Territory, at 30th June, 1955.

PERSONS EMPLOYED BY FORESTRY DEPARTMENTS, AT 30th JUNE, 1955.

Occupational Group.	N.S.W.	Vic.	Qld.	S.A.	W.A.	Tas.	N.T.	A.C.T.	Aust.
Professional Staff ..	167	176	71	46	37	33	..	6	536
Non-professional Field Staff ..	210	259	88	4	100	87	..	..	748
Clerical Staff ..	336	212	153	71	52	54	..	4	882
Extraction of Timber ..	1,380	107	110	34	9	..	..	..	5,749
Milling of Timber ..		38	..	429	21	..	..	..
Labour (forest workers, etc.) ..		917	1,790	219	431	198	..	66	
Total ..	2,093	1,709	2,212	803	650	372	..	76	7,915

§ 5. Forestry Production.

1. **Timber.**—Particulars of logs treated and the production of rough sawn timber by sawmills and other woodworking establishments are shown in the following table by States for the year 1954–55.

OUTPUT OF NATIVE TIMBER : ALL MILLS, 1954-55.

('000 super. feet.)

Particulars.	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas.	Aust.(a)
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LOGS TREATED, INCLUDING THOSE SAWN ON COMMISSION.(b)

Hardwood ..	460,065	554,011	312,337	8,560	501,128	265,205	2,101,306
Softwood ..	122,711	49,197	120,862	134,827	10,546	6,393	444,536
Total ..	582,776	603,208	433,199	143,387	511,674	271,598	2,545,842

SAWN TIMBER PRODUCED FROM LOGS ABOVE.(c)

Hardwood ..	298,431	335,088	188,363	5,426	220,443	137,241	1,184,992
Softwood ..	74,489	27,246	76,551	77,516	5,351	3,143	264,296
Total ..	372,920	362,334	264,914	82,942	225,794	140,384	1,449,288

(a) Excludes the Australian Capital Territory and the Northern Territory, details for which are not available. (b) Includes logs used for plywood and veneer production. (c) Includes the sawn equivalent of timber peeled or sliced for plywood and veneers.

The following table shows logs used, and the sawn timber produced in Australia for the years 1938–39 and 1950–51 to 1954–55.

OUTPUT OF NATIVE TIMBER : ALL MILLS, AUSTRALIA.(a)

Particulars.	Unit.	1938–39.	1950–51.	1951–52.	1952–53.	1953–54.	1954–55.
Logs used—							
Hardwood ..	'000 super. feet (hoppus measure)	1,015,136	1,797,226	2,000,032	1,970,126	2,047,906	2,101,306
Softwood ..	..	293,680	300,052	363,829	369,881	414,827	444,536
Total ..	..	1,308,816	2,097,278	2,363,861	2,340,007	2,462,733	2,545,842
Sawn Timber Produced—							
Sawn equivalent of Timber Peeled or Sliced for Plywood and Veneers ..	'000 super. feet	21,639	27,322	29,159	21,606	28,492	27,676
Used for other purposes ..	..	695,376	1,234,018	1,363,607	1,318,191	1,371,606	1,421,612
Total Sawn Timber—	..	..	..	..	..	..	..
Hardwood ..	..	526,229	1,068,096	1,166,114	1,115,423	1,157,124	1,184,992
Softwood ..	..	190,786	193,244	226,652	224,374	242,974	264,296
Total ..	..	717,015	1,261,340	1,392,766	1,339,797	1,400,098	1,449,288

(a) Excludes the Australian Capital Territory and the Northern Territory, details for which are not available.

The next table shows the sawn output of native timber in sawmills and other wood-working establishments in each State for the years 1938-39 and 1950-51 to 1954-55.

SAWN OUTPUT (a) OF NATIVE TIMBER : ALL MILLS.
(*000 super feet.)

State.	1938-39.	1950-51.	1951-52.	1952-53.	1953-54.	1954-55.
New South Wales ..	179,350	338,347	380,633	350,792	370,279	372,920
Victoria ..	120,197	329,640	348,478	322,209	338,957	362,334
Queensland ..	193,250	252,378	291,681	285,074	288,380	264,914
South Australia ..	14,537	59,393	67,121	68,500	68,190	82,942
Western Australia ..	125,453	156,810	178,290	203,314	216,021	225,794
Tasmania ..	84,228	124,772	126,563	109,908	118,271	140,384
Australia (b) ..	717,015	1,261,340	1,392,766	1,339,797	1,400,098	1,449,288

(a) Includes the sawn equivalent of timber peeled or sliced for plywood and veneers. (b) Excludes the Australian Capital Territory and the Northern Territory, details for which are not available.

In addition to the sawn timber shown in the preceding 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. The annual reports of the Forest Departments of the States contain particulars of 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 other timber produced from privately owned land, but information regarding output is not available.

2. Wood Pulp and Paper.—(i) *Wood Pulp.* The manufacture of wood pulp from Australian-grown timber was established in Australia in 1939, after years of experimentation with eucalypt hardwoods, production in 1938-39 being 6,165 tons of wood pulp. At the end of 1956, four wood pulp mills were operating in three States and production during 1954-55 was 105,117 tons of chemical pulp and 68,360 tons of mechanical pulp, a total of 173,477 tons.

(a) *Victoria.* In Victoria, Australian Paper Manufacturers Ltd. produce wood pulp at Maryvale in Gippsland by a chemical process known as the kraft or sulphate process. The timber used at this mill consists mainly of eucalypt hardwoods at present unsuitable for other purposes and, in addition, a small quantity of plantation pine thinnings and mill waste and special softwood for production of cellulose. During 1955-56, the wood taken from Crown Lands for the production of pulpwood and cellulose amounted to 4,554,686 cubic feet of which 3,563,368 cubic feet were hardwood and 991,318 cubic feet were softwood. Pine plantations are being established in Gippsland by A.P.M. Forests Pty. Ltd. The initial aim is 20,000 acres to provide a perpetual yield of 20,000 tons of long-fibred pulp per annum. Planting commenced in 1951 and by the end of 1955 it was estimated that 14,000 acres had been planted.

(b) *South Australia.* In South Australia a pulp and paper board mill operates near Millicent. This mill generally uses the mechanical or groundwood method of producing wood pulp but during recent years has adopted a semi-chemical process for part of its production. During 1954-55 and 1955-56, 6,619,104 and 10,565,900 super. feet of pulp wood respectively were produced from forests in the south east of South Australia.

(c) *Tasmania.* In Tasmania two large mills are making pulpwood from indigenous hardwoods. At Burnie, on the north-west coast, Associated Pulp and Paper Mills Ltd. use a chemical method, the soda process, to produce wood pulp for fine writing and printing papers from eucalypt hardwoods. This plant is of the most modern design and pulp and paper manufacture are combined with sawmilling and hardboard production. Offcuts and rejects from the timber mill are used for pulping and the manufacture of hardboard. Utilization of the freehold and concession forest areas held by the company is being extended to logging areas held by other sawmilling firms, who supply logs unsuitable for milling to the pulp mills. A continuous digester has been installed at the Burnie mill, making it the only one in Australia using a continuous pulping process. The forests are managed on a permanent yield basis with regeneration of the eucalypts in all suitable areas. Pine plantations are being established to provide softwoods for pulping.

Australian Newsprint Mills Ltd. at Boyer, 20 miles from Hobart, is the only producer of newsprint in Australia. Wood pulp is produced by mechanical process from hardwoods drawn from State timber concession areas. Eucalypts provide about 80 per cent. of its requirements for wood pulp, the remainder being imported long fibre softwood pulp. To secure more complete bush utilization, the company has established three sawmills to convert understorey species such as myrtle, sassafras, blackwood and celery top pine to sawn timber. The forests are managed on a sustained yield basis. Forest utilization and management are designed to obtain eucalypt regeneration. Experimental work into the problems involved is being carried out by the company and the Tasmanian Forestry Commission.

(ii) *Paper and Paper Board.* Paper and paper board are manufactured in all States but the industry is centred mainly in New South Wales, Victoria and Tasmania. At the end of 1956, seventeen paper mills were operating, six in Victoria, five in New South Wales, three in Tasmania and one each in Queensland; South Australia and Western Australia. A new mill, Shoalhaven Paper Mills Pty. Ltd. commenced production in February, 1956, when the first of two mills to be installed began operating. The mill, situated near Nowra in New South Wales will be the first superfine paper mill to operate in Australia, and is expected to produce 8,000 tons of watermarked, rag-content and other fine writing, printing and industrial papers each year. A wide variety of papers and paper boards is produced in Australian mills, the quantity and value of paper produced in 1954-55 being as follows:—newsprint, 73,608 tons valued at £5,172,037; blotting, 721 tons, £109,588; duplicating, 2,931 tons, £456,763; printing and writing, 37,636 tons, £5,937,109; kraft wrapping, 40,629 tons, £5,376,947; other wrapping, 3,985 tons, £590,639; felt and carpet felt, 4,144 tons, £400,693; and other paper, 34,521 tons, £3,161,845. In addition, 141,444 tons of paper boards valued at £12,342,619 were produced in 1954-55.

3. *Other Forest Products.*—(i) *Veneers, Plywood, etc.* Cutting of timber for the manufacture of veneers, plywood, etc., has been carried out in most States for a number of years. Recently, however, this has been considerably extended, and much greater use has been made of locally-grown timbers, both hardwoods and softwoods. In recent years, special attention has been paid to the selection of logs suitable for peeling.

The following table shows the production of plywood for each of the years 1938-39 and 1950-51 to 1954-55:—

PLYWOOD PRODUCED.
(‘000 square feet $\frac{3}{16}$ in. basis.)

State.	1938-39.	1950-51.	1951-52.	1952-53.	1953-54.	1954-55.
New South Wales	24,194	32,287	31,784	22,557	28,601	35,039
Queensland ..	66,100	104,799	110,028	81,400	114,545	130,330
Other States ..	14,511	16,412	17,341	11,771	18,435	21,235
Australia ..	104,805	153,498	159,153	115,728	161,581	186,604

Of the total plywood produced in 1954-55, 156,843,000 square feet $\frac{3}{16}$ in. basis was classed as “Commercial”, 24,810,000 as “Waterproof” and 4,951,000 as “Case.”

During 1954-55, 485.3 million square feet ($\frac{1}{16}$ in. basis) of veneers were produced by the rotary process for the manufacture of plywood, and 124.7 million square feet ($\frac{1}{16}$ in. basis) were sold or added to stock, the bulk of which would eventually be used in the production of plywood. In addition, 32.2 million square feet of sliced veneers were produced.

(ii) *Hardboard.* The production in Australia from pulped wood, of hardboard for building purposes has increased considerably in recent years. There were three factories producing hardboard in 1955 (two in New South Wales and one in Tasmania) and during the three years ended 30th June, 1955, the following quantities and values were produced:—1952-53, 12,150,000 square yards, £2,472,000; 1953-54, 16,992,000 square yards, £3,284,000; and 1954-55, 19,834,000 square yards, £3,810,000. Preliminary figures for 1955-56 show a recorded total production of 22,616,000 square yards (value not yet available).

Most of this hardboard enters into normal usage in the condition in which it leaves the producing factories but a number of other factories further treat and surface it, mainly to a glossy "tiled" finish, and in 1954-55 this production accounted for 715,000 square yards valued at £392,000.

(iii) *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 New South Wales and Victoria. The value of overseas exports of eucalyptus oil distilled in Australia was £445,206 in 1951-52; £215,283 in 1952-53; £163,763 in 1953-54; and £155,291 in 1954-55. The quantities exported in the years 1951-52 to 1954-55 were, 1,254,618 lb., 721,330 lb., 504,628 lb. and 451,741 lb. respectively.

(iv) *Gums and Resins*. Gums and resins are produced in most States of Australia, the main product being grass tree, or yacca gum. This gum, which is used in the preparation of varnishes and lacquers, comes chiefly from South Australia while small quantities are also produced in New South Wales and Western Australia. The recorded production of gums and resins in 1954-55 was 520 cwt. in New South Wales, 10,380 cwt. in South Australia and 2,515 cwt. in Tasmania, giving a total production of 13,415 cwt. in Australia. Exports of yacca gum from Australia during the same period amounted to 11,457 cwt. valued at £23,202.

(v) *Tanning 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. Scattered distribution however, has resulted in only the richest tan-bearing species being used in Australia. These are:—Golden wattle (*Acacia pycnantha*), black or green wattle (*Acacia decurrens* or *mollissima*), and mallet (*Eucalyptus astringens*). Mallet (*E. astringens*), of Western Australia, is not extensively used in Australian tanneries, but is exported to Europe and other countries. Reference to overseas trade in tanning barks is made in § 6, para. 3.

The production of extract from the bark of karri (*E. 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 (*E. calophylla*) bark is not yet complete. The total factory production of tanning bark in Australia approximated 25,000 tons per annum in the years prior to 1939, but since then production has declined and in 1954-55 was only 4,248 tons. However, this decrease is offset by the increased use of vegetable tanning extracts and synthetic tanning agents.

4. Value of Production.—(i) *Gross and Local Values, 1954-55*. The values of forestry production on a gross and local basis are shown in the following table for the year 1954-55.

GROSS AND LOCAL VALUE OF FORESTRY PRODUCTION, 1954-55.

(£'000.)

State.	Gross Production Valued at Principal Markets.	Marketing Costs.	Gross Production Valued at Place of Production.
New South Wales	14,166	480	13,686
Victoria	10,721	734	9,987
Queensland	8,717	822	7,895
South Australia	4,603	176	4,427
Western Australia	4,058	208	3,850
Tasmania	4,573	536	4,037
Australia(a)	47,016	2,969	44,047

(a) Includes details for the Northern Territory and the Australian Capital Territory.

No information is available on the value of materials used in the process of production or of depreciation and maintenance charges for 1954-55 and hence it is not possible to calculate net value of forestry production.

(ii) *Local Values, 1934-35 to 1938-39 and 1950-51 to 1954-55.* In the following table, the local value of forestry production and the local value per head of population are shown by States for the years 1950-51 to 1954-55 in comparison with the average for the five years ended 1938-39. Local value is gross value less marketing costs and is the value at place of production.

LOCAL VALUE OF FORESTRY PRODUCTION.

Year.	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas.	Aust.(a)
LOCAL VALUE. (£'000.)							
Average, 1934-35 to 1938-39(b) ..	2,094	837	2,226	547	1,176	394	7,274
1950-51	8,966	6,437	5,029	2,656	2,908	2,432	28,428
1951-52	12,461	8,479	7,040	3,179	3,689	3,057	37,905
1952-53	13,692	8,904	7,102	3,790	3,328	3,248	40,064
1953-54	12,905	9,475	7,797	4,373	3,615	3,555	41,720
1954-55	13,686	9,987	7,895	4,427	3,850	4,037	44,047

LOCAL VALUE PER HEAD OF POPULATION. (£ s. d.)

Average, 1934-35 to 1938-39(b) ..	0 15 7	0 9 1	2 5 2	0 18 7	2 11 8	1 13 9	1 1 4
1950-51	2 15 5	2 17 5	4 3 4	3 13 7	5 2 0	8 11 7	3 8 10
1951-52	3 15 3	3 13 5	5 13 7	4 5 0	6 5 1	10 8 5	4 9 3
1952-53	4 1 4	3 15 1	5 11 8	4 18 11	5 8 11	10 14 8	4 12 2
1953-54	3 15 10	3 18 3	5 19 11	5 11 3	5 14 7	11 9 10	4 14 3
1954-55	3 19 1	4 0 3	5 19 2	5 9 8	5 18 8	12 17 11	4 16 11

(a) Details for the Australian Capital Territory and the Northern Territory are excluded for years prior to 1954-55. (b) Net value of production (i.e. local value less value of materials used in the course of production) has been included for certain years for Victoria and Western Australia.

5. *Employment.*—(i) *Forestry Operations.* The estimated number of persons employed in forestry operations at 30th June, 1954, including working proprietors, but excluding those employed in the sawmilling industry, as recorded at the 1954 Census, was 15,300.

(ii) *Milling Operations.* Details of the average number of persons employed, including working proprietors, in the milling operations of sawmills during the year 1954-55 are shown in the next table. Further details regarding the operations of these mills are shown in Chapter VII.—Manufacturing Industry.

SAWMILLS : AVERAGE NUMBER OF PERSONS EMPLOYED, 1954-55.

Sex.	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas.	Australia. (a)
Males	9,526	7,481	6,853	2,038	4,511	2,386	32,795
Females	366	192	323	152	34	37	1,104
Total	9,892	7,673	7,176	2,190	4,545	2,423	33,899

(a) Excludes Northern Territory and Australian Capital Territory, details for which are not available.

§ 6. Imports and Exports of Timber and Tanning Substances.

1. Imports of Timber, Veneers and Plywood.—The quantities of timber imported into Australia during the year 1954-55 are shown in the following table according to countries of origin:—

 IMPORTS OF TIMBER, VENEERS AND PLYWOOD INTO AUSTRALIA :
 COUNTRIES OF ORIGIN, 1954-55.

Country of Origin.	Logs (including desapped). (‘000 super ft.)		Undressed timber.(a) (‘000 super ft.)		Box shooks.	Dressed timber.	Veneers.	Ply-wood.
	Soft-wood.	Hard-wood.	Soft-wood.	Hard-wood.	(‘000 super ft.)	(‘000 super ft.)	(‘000 sq. ft.)	(‘000 sq. ft.)
United Kingdom ..	..	156	..	68	1	11	2,664	22
Australian Territories—								
New Guinea ..	1,340	1,575	1,921	9	125	..	5,054	8,468
Borneo ..	261	29,920	29	8,469	..	..	..	..
Canada ..	3	..	133,160	38	..	1	625	..
New Zealand ..	4	..	35,904	68	567	406	..	4
Pacific Is. (British)—Solomon Is. ..	2,387	1,773	..	..	..	..	..	..
Other British Countries ..	146	632	440	18,611	753	55	6	..
Brazil ..	..	..	4,561	396	..	..	..	..
Finland ..	..	..	318	..	232	8,680	34	..
Norway ..	..	..	..	..	14	5,118	..	..
Sweden ..	..	..	2,499	763	185	18,850	308	10
United States of America ..	4	10	81,760	763	..	..	847	..
Other Foreign Countries ..	..	32	3,559	529	172	427	4,494	5,326
Total ..	4,145	34,098	264,151	28,951	2,049	33,548	14,032	13,830

(a) Excluding railway sleepers.

Most of the logs imported are hardwoods from Borneo, the value of all logs imported being £899,000 during 1954-55. In the same year, the value of undressed timber imported totalled £12,366,000, of which more than 90 per cent. was softwood. The principal undressed timber imported was oregon pine from North America. The balance was mainly hemlock also from North America, pines from New Zealand, Indonesia and the United States of America and hickory from the United States of America. The bulk of the imports of dressed timber now comes from Finland, Sweden, Norway and New Zealand and consists mainly of tongued and grooved timber, weatherboards, etc. The total value of dressed timber shown in the table above amounted to £2,254,000 during 1954-55. New Guinea was the largest supplier of both veneers and plywood, imports of which were valued at £184,000 and £335,000 respectively.

2. Exports of Timber, Railway Sleepers, Veneers and Plywood.—The quantities of timber, railway sleepers, veneers and plywood exported during the year 1954-55 are shown below, together with the countries of consignment.

 EXPORTS OF TIMBER, RAILWAY SLEEPERS, VENEERS AND PLYWOOD FROM
 AUSTRALIA : COUNTRIES OF CONSIGNMENT.

Country of Consignment.	Logs (including desapped). (‘000 super ft.)		Undressed timber. (‘000 super ft.)		Railway sleepers.	Dressed timber.	Veneers.	Ply-wood.
	Soft-wood.	Hard-wood.	Soft-wood.	Hard-wood.	(‘000 super ft.)	(‘000 super ft.)	(‘000 sq. ft.)	(‘000 sq. ft.)
United Kingdom ..	..	4	..	3,276	131	568	2,374	130
Australian Territories—								
New Guinea ..	..	185	13	548	..	104	4	92
Papua ..	..	..	16	1,246	..	64	..	95
Other ..	..	5	63	200	..	..	..	35
New Zealand ..	132	2,990	34	12,502	5,849	18	381	244
Pacific Islands (British)—								
Fiji ..	3	104	1	578	168	..	..	13
Gilbert and Ellice Is. ..	..	10	131	272	..	1	..	5
Other ..	..	3	20	129	..	44	1	32
Other British Countries ..	..	1	..	1,241	805	12	75	3
Foreign Countries ..	..	24	..	776	..	46	111	19
<i>Australian Produce</i> ..	135	3,326	279	20,768	6,953	857	2,946	668
<i>Re-exports</i> ..	1	..	877	27	..	43	139	3
Total ..	136	3,326	1,156	20,795	6,953	900	3,085	671

Exports of timber were consigned mainly to 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 harbour works and wood paving, etc. The total value of exports of undressed timber, excluding railway sleepers, during 1954-55 was £1,218,000 (hardwood £1,132,000, softwood £86,000). Railway sleepers exported were valued at £308,000.

3. **Classification of Imports and Exports.**—(i) *General.* The quantities and values of timber, according to items, imported and exported during the year 1954-55 are shown in the following table:—

TIMBER: IMPORTS AND EXPORTS, AUSTRALIA, 1954-55.

Item.	Imports.		Exports.	
	Quantity.	Value.	Quantity.	Value.
	'000 super. ft.	£A. f.o.b.	'000 super. ft.	£A. f.o.b.
Logs, not sawn—				
Softwoods	4,145	105,896	136	7,151
Hardwoods	34,098	793,125	3,326	184,086
Timber, undressed (including railway sleepers)—				
Softwoods	264,151	10,715,028	1,156	86,074
Hardwoods	29,729	1,651,219	27,748	1,440,643
Timber for boxmaking	2,049	128,858	(a)	(a)
Timber, dressed—				
Flooring, lining and weatherboards ..	32,801	2,206,261	} 900	96,855
Other	747	47,296		
	'000 sq. ft.		'000 sq. ft.	
Veneers	14,032	184,296	3,085	60,160
Plywood	13,830	334,793	671	44,085
Other Timber (b) .. .. .	..	74,616	..	..
Total .. .. .	..	16,241,388	..	1,919,054

(a) Not recorded separately.

(b) Includes dunnage and timber for which quantity data no available.

(ii) *Tanning Substances.* The imports of tanning substances of natural origin in 1954-55 amounted to 199,096 cwt. valued at £648,769 (bark, 2,499 cwt., £5,163; extracts, 154,390 cwt., £592,414; and other tanning substances including valonia, myrabolans, cutch, etc., 42,207 cwt., £51,192) compared with 176,440 cwt. valued at £574,060 (bark, 2,634 cwt., £5,245; extracts, 127,556 cwt., £506,378; and other tanning substances 46,250 cwt., £62,437) in 1953-54. Exports during the same periods were 96,965 cwt. valued at £350,801 (extracts, 92,262 cwt., £335,438; and other tanning substances, 4,703 cwt., £15,363) and 163,764 cwt. valued at £549,718 (extracts, 121,497 cwt., £451,324; and other tanning substances, 42,267 cwt., £98,394) respectively.

The imports of tanning bark 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, most of the seed being 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) The suitability of the treeless, grassy highlands of Natal; and (b) the availability of native labour.