

CHAPTER XXIV

FORESTRY

NOTE.—For further details on subjects dealt with in this chapter see the annual bulletins *Non-Rural Primary Industries and Value of Production*, and *Secondary Industries* (for saw-mills, etc., operations).

§ 1. Source of Statistics

Statistics relating to forestry are, in general, provided by the various authorities concerned with forestry administration. Particulars of forest reservations contained in this chapter have been collected by the Statisticians of the various States, mainly from information provided by the State forestry authorities. Other information on forested areas has been provided by the Commonwealth Forestry and Timber Bureau, which has also supplied certain other data.

Statistics of timber and by-products have been compiled from the annual factory collections undertaken by the Statisticians in the several States. Figures of production of gums, resins and tanning barks have been provided by the State forestry authorities.

Data of imports and exports of forest products and timber and timber products have been compiled in the Commonwealth Bureau of Census and Statistics as part of the statistics of oversea trade.

The figures shown relate, in general, to years ended 30th June.

§ 2. Forestry in Australia

1. **Objects of Forestry.**—The main object of forestry authorities is to manage the forests of the country in a manner 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, oil and resins. Indirect benefits include protection of soil and stock from wind and exposure, regulation of stream flow, provision of recreational facilities, and aesthetic effects. Forestry also aims at improving existing forests and woodlands by properly controlled exploitation, by protection from such destructive agencies as fire and insect attack, and by inducing regeneration where it is desirable. The provision of a partial tree cover on denuded lands where this cover is necessary for protective purposes, and a complete cover when the land is better under forest than under any other land use, are further aims of forestry.

2. **General Account of Forests and Timbers.**—The area of land in Australia suitable for the production of commercial timber as a primary crop is very small in comparison with the size of the continent. Broadleaved forests (hardwoods) cover 97 per cent. of the total forested area, and approximately 94 per cent. of the broadleaved forests area is occupied by eucalypts.

(i) *Eucalypts.* The genus *Eucalyptus* is remarkable in that it includes over 600 species ranging in size from the mighty forest giants, mountain ash (*E. regnans*) of Victoria and karri (*E. diversicolor*) of Western Australia, down to the small mallee species which inhabit vast areas of the inland. The habitats range from the dry inland areas to the high mountain areas in the Australian Alps, from areas with the annual rainfall as low as 10 inches to those where it is 150 inches. Of the 600 species, only about 100 are used for sawmilling, and not more than 40 of these are exploited extensively.

The better class of eucalypt forest is concentrated mainly in the higher rainfall areas such as the east coast, the highlands of southern New South Wales, Victoria and Tasmania and the south-western corner of Western Australia. The more important species include blackbutt (*E. pilularis*), tallowwood (*E. microcorys*), flooded gum (*E. grandis*) and red mahogany (*E. resinifera*) of New South Wales and Queensland, alpine ash (*E. delegatensis*) of New South Wales, Victoria and Tasmania, mountain ash (*E. regnans*), messmate (*E. obliqua*) and blue gum (*E. bicostata*) of Victoria and Tasmania, and karri (*E. diversicolor*) of Western Australia. For height and grandeur, mountain ash and karri are unequalled among the broadleaved trees of the world, and are excelled only by a few North American coniferous (softwood) species.

In the coastal regions with lower rainfall the eucalypt forests contain many durable species such as the ironbarks, grey gums and bloodwoods of the east coast and jarrah (*E. marginata*) and tuart (*E. gomphocephala*) of Western Australia. The spotted gum (*E. maculata*) occurring in New South Wales and Queensland is another example.

Along most of the inland streams and adjacent flood-plains there are riverain forests consisting mainly of river red gum (*E. camaldulensis*), a very durable broadleaved tree which has supplied large quantities of sawn timber, railway sleepers and fence posts.

Eucalypts also occur in open forest and savannah woodland formations in areas receiving a reliable rainfall of about 10 to 20 inches per annum, as on the goldfields of Western Australia where salmon gum (*E. salmonophloia*), brown mallet (*E. astringens*) and wandoo (*E. wandoo*) occur. These forests are of considerable value for firewood, as mining timbers, and for fencing. Minor forest products such as sandalwood, tan bark, essential oils, etc., also come from isolated areas in this type of country, and in the more arid areas.

In 1963-64 the volume of eucalypt timber sawn was 974.7 million super. feet.

(ii) *Other Broadleaved Timbers (Hardwoods)*. Broadleaved genera other than *Eucalyptus* cover a comparatively small portion of the forested land in Australia (some 6 per cent.), but these areas provide a great variety of timbers suitable for a multitude of uses. There are two basic types of forest containing supplies of broadleaved timbers other than eucalypts, namely, the tropical and sub-tropical rainforests of coastal New South Wales and Queensland, and the temperate rainforests of southern Victoria and Tasmania, both of which yield species known collectively as rainforest or brushwood species. The total volume of brushwood species produced in 1963-64 was estimated at 70 million super. feet, i.e. less than 7 per cent. of the total broadleaved timber cut in Australia.

The tropical and subtropical rainforest along the eastern coast of Australia contains a large number of different species. Tropical rainforest occurs in northern Queensland in the vicinity of Cairns and on the Atherton Tableland, providing such well-known cabinet woods as Queensland maple (*Flindersia brayleana*), Queensland walnut (*Endiandra palmerstonii*) and the silky oaks. The subtropical rainforest found in southern Queensland and northern New South Wales yields the tulip oak, crab apple (*Shizomeria ovata*) and white beech (*Gmelina leichhardtii*). Coachwood (*Ceratopetalum apetalum*) and sassafras (*Doryphora sassafras*) occur in regions to the south near Dorriggo and have yielded valuable timber produce for many years.

Turpentine (*Syncarpia glomulifera*), an excellent harbour pile timber resistant to marine borer attack, and brush box (*Tristania conferta*), a superior structural and decking timber, are found in association with some eucalypts in the wetter rainfall areas on the north coast of New South Wales and in southern Queensland.

Temperate rainforest which is to be seen in southern parts of Victoria and western Tasmania consists mainly of myrtle beech (*Nothofagus cunninghamii*), but produces also southern sassafras (*Atherosperma moschata*) and blackwood (*Acacia melanoxylon*).

(iii) *Conifers (Softwoods)*. One of the most important species of native conifers is white cypress pine (*Callitris hugelii*). The main cypress pine forests of commercial value occur in New South Wales and southern Queensland west of the Great Dividing Range. The trees are comparatively smaller, but the timber has particular value owing to its durability and resistance to termites. It is suitable for use as scantlings, flooring, linings, weatherboards, poles and posts. As much of the area originally covered by cypress pine has been cleared for wheat farming and grazing, the production from the remaining State forests is now strictly regulated to ensure a continuous supply. The volume of cypress pine cut in 1963-64 was approximately 68.5 million super. feet.

Another important native conifer is hoop pine (*Araucaria cunninghamii*), which occurs naturally in the sub-tropical rain forest of southern Queensland and northern New South Wales associated with tulip oak, crab apple, white beech, coachwood and sassafras. The greater part of the original hoop pine forests has been exploited, but considerable areas have been replanted to this species in Queensland and, to a lesser extent, in New South Wales.

Other native conifers which have played a useful but minor part in the Australian timber industry include bunya and kauri pines (*Araucaria bidwillii* and *Agathis palmerstonii*) of Queensland, and celery top, Huon and King William pines (*Phyllocladus asplenifolius*, *Dacrydium franklinii* and *Athrotaxis selaginoides*) of Tasmania. Kauri pine is found in the tropical rainforest of northern Queensland in association with non-eucalypt broadleaved trees while bunya pine occurs in the subtropical rainforests. In the temperate rainforests of Tasmania, celery-top, Huon and King William pines are found in association with myrtle beech, southern sassafras and blackwood.

3. Forested Areas.—(i) *Extent of Forests.* Estimates prepared for the Eighth British Commonwealth Forestry Conference held in Kenya in 1962 show the total area of forest in Australia as 512.2 million acres, or about 27 per cent. of the total land area of the continent. In making these estimates, the F.A.O. definition of "forest" (published in *World Forest Inventory*, 1958, p. 123) was used. This definition includes areas of sparse or stunted tree growth, and in the case of Australia some four-fifths of the total forest area falls into this category.

CLASSIFICATION OF FOREST AREA(a): AUSTRALIA

(Source: Forestry and Timber Bureau)

('000 acres)

Type of forest	Area
LANDS	
Accessible forests—	
Productive forests in use—	
Coniferous (softwood)	492
Non-coniferous (broadleaved)	24,352
Mixed woods	5,636
Open areas	245
Total, Productive Forests in Use	30,725
Productive forests not in use	(b) 31,961
Unproductive accessible forests	(c) 257,687
Total, Accessible Forests	(d) 320,373
Inaccessible forests	191,795
Total, Forested Area	512,168

(a) Based on the 1960 classification of forests. (b) Includes approximately 25 million acres capable of producing fuelwood only. (c) This area carries only sparse, stunted trees. (d) Includes approximately 258 million acres of land carrying only stunted trees classified as unproductive accessible forests.

CLASSIFICATION OF FOREST AREA(a): AUSTRALIA—continued

(Source: Forestry and Timber Bureau)

('000 acres)

Type of forest							Area
OWNERSHIP OF ACCESSIBLE FORESTS							
Publicly-owned forests—							
State forests	..	..	..	..	..	..	23,534
Other forests	..	..	..	..	..	..	150,329
<i>Total, Publicly-owned Forests</i>							<i>173,863</i>
Privately-owned forests	..	..	..	..	..	..	145,537
Ownership not yet determined	..	..	..	..	..	..	973
Total, Accessible Forests							320,373

(ii) *Forest Reservations.* Statements furnished by State and Commonwealth authorities show reservations of forest areas in Australia at 31st March, 1964, totalling 36.8 million acres, of which 24.2 million acres were dedicated State forests and 12.6 million acres were timber and other reserves. The distribution of those areas is shown by States in the following table. Detailed comparisons between States are not possible because of the lack of uniform definitions.

AREA OF FOREST RESERVATIONS, 31ST MARCH, 1964(a)

(Source: Forestry and Timber Bureau)

('000 acres)

State or Territory	State forests	Timber reserves	Other reserves of forestry value	Total
New South Wales	6,724	1,371	..	8,095
Victoria	4,870	861	368	6,099
Queensland	5,528	2,527	1,041	9,096
South Australia	286	..	n.a.	286
Western Australia	4,459	1,845	(b) 777	7,081
Tasmania	2,287	138	1,217	3,642
Northern Territory	..	9	(c) 2,394	2,403
Australian Capital Territory	..	..	(d) 131	131
Australia	24,154	6,751	5,928	36,833

(a) Includes figures for previous year for some States. (b) Timber reserves under the Land Act. (c) Includes fauna and flora reserve, Coburg Peninsula (473,600 acres), land within welfare reserves (1,100,000 acres), land covered by pastoral lease (820,000 acres). (d) Forest land not specifically reserved.

A considerable proportion of the permanently reserved areas 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 the area consists of inferior forest, and a large proportion of the whole has been seriously degraded by recurrent fires.

(iii) *Plantations.* The indigenous forest of Australia does not contain adequate supplies of coniferous timber, and Australia's requirements have had to be met largely by imports. As a result of the planned policy of the forest services and of several private commercial organizations, the area of conifer plantations, mainly of exotic species, is steadily increasing. It was natural that this aspect of forestry should receive earliest attention in South Australia, as this is the State most poorly endowed with natural forest. South Australia now has a larger area of planted conifers than any other State in Australia, and for some years has been exploiting considerable quantities of timber from these plantations. Production is also increasing in the other States, and the thinnings from their plantations are already supplying a significant volume of timber.

The total production of roundwood from Australia's coniferous plantations is now more than 50 million cubic feet per annum and is expected to increase substantially during the next decade.

The following table shows the areas of coniferous and broadleaved plantations at 31st March, 1964.

**AREA OF CONIFEROUS AND BROADLEAVED PLANTATIONS,
31ST MARCH, 1964(a)**

(Source: Forestry and Timber Bureau)

(Acres)

State or Territory	Coniferous						Total	Broad-leaved
	Government			Private				
	Pinus radiata	Other species	Total	Pinus radiata	Other species	Total		
New South Wales	79,458	(b)20,091	99,549	10,657	(c)14,791	25,448	124,997	n.a.
Victoria	44,640	10,011	54,651	n.a.	n.a.	(d)75,000	129,651	6,668
Queensland	2,319	103,800	106,119	n.a.	n.a.	(d) 9,800	115,919	1,434
South Australia	118,638	10,964	129,602	n.a.	n.a.	41,104	170,706	3,479
Western Australia	14,713	24,205	38,918	1,226	175	1,401	40,319	19,111
Tasmania	17,917	431	18,348	7,108	..	7,108	25,456	..
Northern Territory	..	(e) 620	620	..	23	23	643	n.a.
Aust. Cap. Terr.	24,894	2,106	27,000	..	..	..	27,000	..
Australia	302,579	172,228	474,807	n.a.	n.a.	159,884	634,691	n.a.

(a) Provisional. Includes figures for previous year for some States. (b) Includes 3,791 acres of hoop, bunya and kauri pine. (c) Chiefly *Pinus elliotti*. (d) Estimated. (e) Cypress pine (*Callitris intratropica*).

A special article prepared by the Forestry and Timber Bureau giving a detailed account of the history and development of coniferous plantations and of the characteristics of individual species, is included in Year Book No. 44, page 975.

Broadleaved plantations (mainly *Eucalyptus spp.*) comprise a much smaller area, and the total acreage at 31st March, 1964, was 36,000 acres, about two-thirds of which was mallet. Plantations of this species have been established in Western Australia for tan bark production.

4. Forest Administration and Research.—(i) *Forestry Activities of the Commonwealth Government.* (a) *Commonwealth Forestry and Timber Bureau.* The functions of the Commonwealth Forestry and Timber Bureau are laid down in the Forestry and Timber Bureau Act and include forestry research and education, the study of timber supply and advice to the Government on forestry matters. The administering department is the Department of National Development.

In 1961 the Commonwealth Government decided to expand its activities in forestry research in Australia. The existing Divisions of Silvicultural Research and Forest Management Research were combined to form the Forest Research Institute. The purpose of the Institute is to provide complete coverage in forestry research, ensuring that all problems of primary importance to the practice and development of forestry in Australia are investigated. In developing a programme with this aim, the Institute takes account of the research activities and potential of the State forest services and other organizations. The research work carried out by the existing sections of the Forest Research Institute covers a wide range of studies, including the following: factors affecting tree growth, tree breeding, introduction of exotic species, forest nutrition, forest botany, forest entomology and pathology, fire protection, watershed management, forest mensuration, forest management and management economics, and aerial inventory. The Forest Research Institute maintains five regional establishments in the Commonwealth, two of which have an outstation in addition to the regional headquarters. These regional stations are run on a co-operative basis with State forest services and private forest companies or other government instrumentalities.

The Forestry and Timber Bureau also maintains a Timber Supply Economics Branch concerned with the compilation and analysis of statistics of production, consumption and trade in timber and other forest products. This Branch also carries out studies in forest economics and research into logging methods and machines. Advice on timber supply matters is currently made available to government departments and private enterprise. Research is also undertaken on matters associated with the marketing of timber products.

(b) *Commonwealth Scientific and Industrial Research Organization, Division of Forest Products.* The Division of Forest Products was formed in 1928 to carry out investigations into Australian forest products, assist in the effective use of such products, reduce waste, reduce losses from decay and insect attack, and conduct research into the fundamental chemical, physical and mechanical properties of Australian timbers.

The research work of the Division is carried out by eight separate sections: wood and fibre structure, wood chemistry, timber physics, timber mechanics, timber preservation, timber seasoning, plywood and glueing, and timber utilization. In addition, the Division provides assistance to individuals and local industry, administers courses of instruction on timber properties and usage, and maintains co-operative projects with several oversea authorities operating in the same field.

(c) *Forestry in the Territories.* Forestry activities in the Territory of Papua and New Guinea are controlled by the Administration through its Department of Forests. The management of forests in the Australian Capital Territory is the responsibility of the Forestry Section of the Department of the Interior.

The Forestry and Timber Bureau advises the Administrations of the Australian External Territories on the management of the forests in those territories, while the Northern Regional Station of the Forest Research Institute advises the Northern Territory Administration on forestry matters affecting the Northern Territory.

(ii) *Forestry Activities of the States.* Forestry on State-owned lands in the various States is the responsibility of the respective State Governments, but they do not exercise any control over forestry activities on private property. The powers and functions of State forest authorities are laid down under forest Acts and Regulations. In each State there is a department or commission to control and manage State forests, etc. Its functions include the introduction of proper measures for the control and management of forest land; the protection of forest land; the conversion, marketing and economic utilization of forest products; the securing of an adequate and permanent reservation of State forests; the establishment and maintenance of coniferous forests to remedy the existing deficiency of conifers in Australia. All State forest services are actively engaged on research programmes. Annual reports are issued by each State forest authority.

In addition to developing permanent forest reserves in each State foresters are surveying all forested crown lands with a view to obtaining dedications of new State forests to add to the permanent forest estate or to release for other uses areas unsuitable for forestry. State forest authorities also usually control all timber on unoccupied Crown lands as well as over 10 million acres of timber reserves, national parks, etc.

(iii) *Private Forestry.* Privately owned lands contribute considerably to the total production from Australian forests. The most important areas of managed native forest in private ownership are the forests owned by pulp and paper companies.

The area of privately owned coniferous plantations is rapidly increasing, and here again the pulp and paper companies are very active. In step with the increase in afforestation programmes the number of professional foresters employed in private forestry enterprise is increasing, while several are engaged on research.

An estimate of the area of coniferous plantations established by private companies and individuals is included in the table on page 1097.

5. *Forestry Education.*—The functions of the Australian Forestry School at Canberra, previously a division of the Forestry and Timber Bureau, were taken over by the Australian National University at the beginning of the 1965 academic year. The School has been absorbed into the University School of General Studies as a Department of Forestry. This department will provide a full four-year training leading to the degree of B.Sc. in forestry. The University of Melbourne also maintains a School of Forestry which gives training leading to a B.Sc. degree in Forestry. The universities in all States provide facilities for post-graduate studies in forestry, leading to higher degrees.

The Victorian Forestry Commission maintains a Forestry School at Creswick where recruits are trained mainly for employment in the Commission.

6. *The Australian Forestry Council.*—Following extensive discussions, the Commonwealth Government and the Governments of the six Australian States agreed in 1964 to establish an Australian Forestry Council, comprising the Ministers responsible for forestry in the seven Governments and the Commonwealth Minister for Territories.

The Council is intended to provide the means for the mutual exchange between the State and Commonwealth Governments of information and views on forestry. It will co-ordinate research into problems affecting the establishment, development, management and fire protection of all forests, and the utilization of forest products. It will assist in co-ordinating the work of State and Commonwealth Governments and also private enterprise in the development of Australian forestry.

The Council is supported by a Standing Committee, consisting of the Director-General of the Forestry and Timber Bureau, the heads of each of the six State Forest Services, the Chief of the Division of Forest Products, C.S.I.R.O., and the Secretary of the Department of Territories.

7. *Fire Protection.*—The provision of adequate fire protection is one of the main problems facing forest and rural authorities. The commercial forest area is estimated at 63 million acres, and of this area the forest services maintain a high degree of protection over a relatively accessible area of about 20 million acres, in the more inaccessible areas about 17 million acres receive a lesser degree of protection, and about 15 million acres are at present not protected. The remaining area of 11 million acres is mostly privately owned or leased, and under some degree of fire protection from the rural volunteer fire-fighting organizations.

Very intensive fire protection is afforded the coniferous plantation area of Australia. During the 1962–63 fire season 475 acres were burnt from a total area of 492,000 acres for which fire statistics are available. This represents an annual burn percentage of 0.1 which compares very favourably with the 0.53 per cent. experienced in the eucalypt forest areas. The area burnt in 1963–64 was 273 acres or 0.06 per cent. of the area for which statistics are available.

Protection of private property outside urban areas is undertaken by 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 5,000 registered volunteer bush fire brigades with a membership approaching 250,000. Although 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.

Over the five-year period 1960 to 1964 the annual cost of protecting from fire the 37 million acres of forest land for which State forest services provide protection is estimated at £2,300,000 or about 1s. 3d. an acre. The cost of rural fire control as a whole cannot be estimated with any degree of accuracy, because by far the greatest contribution comes from the personal efforts of volunteer brigade members.

The Australian fire season is very variable, especially in the eastern and southern States. On the average, damaging fires can occur over a period of four months in all climatic zones. Occasionally this occurrence can extend one month either side of the main fire period. Individual fire seasons are generally of much shorter duration than four months and the severity of a season is judged more on the number of "blow-up" days than on its length. On the average, four years in ten are classified as of average severity and two years in ten as severe, the remaining four years being of below-average severity. During severe seasons in the past as much as 5-15 per cent. of the forest area has been burnt. However, with improving fire control services, it can be expected that the area burnt in severe fire seasons will in future be significantly reduced. The number of forest fires and the forest area burnt during recent years is shown in the following table.

NUMBER OF FIRES AND FOREST AREAS BURNT: AUSTRALIA

(Source: Forestry and Timber Bureau)

Year				Number of fires	Forest areas burnt	Burnt areas as a proportion of area receiving protection ^(a)
				No.	'000 acres	Per cent.
1959-60	..	..	..	1,504	1,314	3.6
1960-61	..	..	..	2,667	1,294	3.5
1961-62	..	..	..	1,761	297	0.8
1962-63	..	..	..	1,299	275	0.7
1963-64	..	..	..	1,494	549	1.5

(a) For this table the area receiving protection has been taken as the 37 million acres for which State forest services provide protection.

Intensive research work is being undertaken on fire problems, and several governmental groups are working on such projects as the study of fire behaviour and associated fuel and meteorological conditions, the use of chemical aids in fire suppression, the development of protective clothing and devices to aid fire-fighters, and the development of more efficient fire-fighting equipment.

Since fire prevention is one of the most important aspects of the problem, intensive campaigns are being conducted to reduce the incidence of man-caused fires. A study of fire causes in recent years reveals that human agencies account for approximately 90 per cent. of all fires, and of this figure at least 80 per cent. are preventable. It is estimated that "burning-off" (much of which is started illegally) accounts for 30 per cent. of all fires. Lightning accounts for a little over 10 per cent. of all fires in Australia, although the incidence of fires caused by lightning is much higher in certain areas, especially the Southern Highlands regions in New South Wales and Victoria. Although lightning is a relatively small numerical cause of fire, the percentage area burnt from this cause is estimated at about 20 per cent. This higher figure is due to the occurrence of multiple fire outbreaks which cause fire fighting difficulties and to the inaccessibility of the areas in which such fires generally occur.

The damage resulting from bushfires in Australia is difficult to estimate. Eucalypts, which comprise the main forest species, are seldom killed by fire, and damage estimates frequently involve the complicated question of loss of increment and degradation of timber quality. It may be conservatively estimated that damage to forest values lies between £1 to £2 per acre burnt per year and that over the last ten years the average value of forest fire damage is of the order of £2 million per year. In very severe fire seasons such as 1925-26, 1938-39 and 1951-52, which affected large areas of the continent, fire loss may have been as high as £100 million.

§ 3. Employment in Forestry

1. *Persons Engaged in Forestry Activities.*—In the following table, which shows particulars collected in the Population Censuses of Australia of 30th June, 1947, 1954 and 1961, the numbers of persons whose industry statements were classified to "forestry (excluding sawmilling)" are shown, together with the numbers engaged in all primary industries and the total work force.

PERSONS ENGAGED IN FORESTRY: AUSTRALIA

Particulars	Census, 30th June—		
	1947	1954	1961
Persons engaged in—			
Forestry (excluding sawmilling)	24,793	15,468	13,847
All primary industries	563,607	560,100	513,286
Total work force	3,196,431	3,702,022	4,225,096
Persons employed in forestry (excluding sawmilling) as a proportion of—			
All primary industries %	4.4	2.8	2.7
Total work force %	0.8	0.4	0.3

NOTE.—An adjustment was made to the 1947 and 1954 industry data by distributing over the range of recorded industry the number of persons whose industry was not stated. No such adjustment was made to the 1961 figures.

2. *Employment by Forestry Departments.*—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 the Australian Capital Territory and the Northern Territory, at 30th June, 1964.

PERSONS EMPLOYED BY FORESTRY DEPARTMENTS, 30th JUNE, 1964

Occupational group	N.S.W.	Vic.	Q'land	S. Aust.	W. Aust.	Tas.	N.T.	A.C.T.	Aust.
Professional staff	247	222	113	76	59	39	5	8	769
Non-professional field staff ..	246	248	93	7	183	94	11	2	884
Clerical staff ..	302	273	197	97	63	85	6	7	1,030
Extraction of timber ..	1,293	40 18 816	111 .. 1,491	.. 731 275	33 35 521	20 .. 379	12 .. 181	.. .. 65	6,021
Milling of timber									
Labour (forest workers, etc.)									
Total ..	2,088	1,617	2,005	1,186	894	617	215	82	8,704

3. **Employment in Milling Operations.**—Details of the average number of persons employed, including working proprietors, in sawmills during the year 1963-64 are shown in the next table. Further details regarding the operations of sawmills in 1962-63 are shown in Chapter VI. Manufacturing Industry.

NUMBER OF SAWMILLS AND NUMBER OF PERSONS EMPLOYED, 1963-64

Particulars	N.S.W.	Vic.	Q'land	S. Aust.	W. Aust.	Tas.	Aust. (a)
Number of sawmills	757	447	538	91	207	305	2,345
Average number of persons employed during year—							
Males	7,651	5,806	5,449	2,300	3,361	2,701	27,268
Females	341	232	274	185	62	53	1,147
Persons	7,992	6,038	5,723	2,485	3,423	2,754	28,415

(a) Excludes Northern Territory and Australian Capital Territory.

§ 4. Forest Production

1. **Forest Products.**—The table below shows details of production of forest products in each State and Territory in 1963-64.

FOREST PRODUCTION(a), 1963-64

Product	N.S.W.	Vic.	Qld	S.A.	W.A.	Tas.	N.T.	A.C.T.	Aust.
Logs for sawing, peeling, slicing or pulping— '000									
Forest broadleaved	54,814	67,371	22,602	625	48,000	52,122	43	97	245,674
Brushwoods and scrubwoods	4,306	..	8,434	..	..	..	1	..	12,741
Coniferous—									
Indigenous forest "pines"—									
Cypress	7,270	13	5,634	..	..	..	153	..	13,070
Other	400	..	3,275	1	..	274	..	..	3,950
Plantation grown "pines"	6,239	10,853	3,568	25,537	1,902	1,700	..	1,084	50,883
Total, logs	73,029	78,237	43,513	26,163	49,902	54,096	197	1,181	326,318
Value of logs £'000	10,590	9,771	7,189	2,627	3,685	5,729	64	133	39,788
Hewn and other timber (not included above)—									
Firewood(b) (weight)	243	883	114	515	550	410	2	3	2,720
Other(c) (value)	3,887	1,245	952	..	(d) 599	199	65	3	6,950
Value of hewn and other timber	4,510	5,421	1,491	1,453	(d) 1,861	1,114	70	16	15,936
Other forest products (e) (total value)	135	104	24	30	(f) 10	6	..	..	309
Total Value of Forest Products	15,235	15,296	8,704	4,110	(g) 5,731	6,849	(a) 134	(f) 149	56,208

(a) Excludes some production from private land thought to be relatively small, details of which are not available.
 (b) Includes mill waste used as firewood. (c) Includes sleepers, transoms, girders, bridge timbers, mining timber, poles, piles, etc. (d) Excludes timber used for tannin extract, details of which are not available for publication.
 (e) Includes charcoal (forest production only), tannin bark, essential oils, eucalyptus leaves, crude rutin, etc.
 (f) Excludes value of sandalwood and substitutes, details of which are not available for publication. (g) Includes timber used for tannin extract and sandalwood and substitutes.

The following table gives particulars of the production of forest products in Australia.

FOREST PRODUCTION(a): AUSTRALIA

Product		1959-60	1960-61	1961-62	1962-63	1963-64
Logs for sawing, peeling, slicing or pulping—						
Forest broadleaved	'000 cub. ft.	243,940	242,142	223,389	230,401	245,674
Brushwoods and scrubwoods	"	14,287	14,689	11,890	12,657	12,741
Coniferous—						
Indigenous forest " pines "—						
Cypress	"	14,457	13,483	12,351	12,489	13,070
Other	"	4,716	4,726	3,676	3,799	3,950
Plantation grown " pines "	"	42,859	39,850	42,245	49,569	50,883
Total logs	"	320,259	314,890	293,551	308,915	326,318
Value of logs	£'000	38,972	38,475	35,588	37,477	39,788
Hewn and other timber (not included above)—						
Firewood(b)(weight)	'000 tons	3,189	3,090	2,742	2,702	2,720
Other (value)(c)	£'000	8,066	8,320	7,779	6,802	6,950
Value of hewn and other timber(d)	"	16,257	17,077	15,592	14,472	15,936
Other forest products(e) (total value)	"	345	372	421	294	309
Total Value of Forest Products(f)	"	55,762	56,296	51,843	52,410	56,208

(a) Excludes some production from private land thought to be relatively small, details of which are not available. (b) See footnote (b) to previous table. (c) See footnotes (c) and (d) to previous table. (d) Incomplete, see footnote (d) to previous table. (e) See footnotes (e) and (f) to previous table. (f) Includes timber used for tannin extract and sandalwood and substitutes in Western Australia.

2. Value of Production.—While statistics of both the gross value (at principal markets) and local value (at place of production) of the forestry industry are available, particulars of the value of materials used in the process of production are not available for all States. For this reason values cannot be stated on a net basis, as has been done with most other industries.

(i) *Gross and Local Values, 1963-64.* The following table shows gross and local values of forestry production for each State in 1963-64. A more detailed reference to the value of production of forestry and other industries in Australia, as well as a brief explanation of the terms used, will be found in Chapter XXX. Miscellaneous.

GROSS AND LOCAL VALUE OF FORESTRY PRODUCTION, 1963-64

(£'000)

State or Territory	Gross value(a)	Marketing costs	Local value(b)
New South Wales	15,235	426	14,809
Victoria	15,296	836	14,460
Queensland	8,704	2,214	6,490
South Australia	4,110	26	4,084
Western Australia	5,731	364	5,367
Tasmania	6,849	1,030	5,819
Northern Territory	134	n.a.	134
Australian Capital Territory	149	n.a.	149
Australia	56,208	4,896	51,312

(a) Gross production valued at principal markets. (b) Gross production valued at place of production.

(ii) *Local Values, 1959-60 to 1963-64.* 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 1959-60 to 1963-64.

LOCAL VALUE OF FORESTRY PRODUCTION

Year	N.S.W.	Vic. r	Qld	S.A.	W.A.	Tas.	Aust.(a)
LOCAL VALUE (£'000)							
1959-60	15,169	14,353	8,469	3,929	5,085	5,556	52,736
1960-61	15,300	13,940	7,149	3,729	5,167	5,735	51,202
1961-62	14,431	13,130	5,895	3,733	5,191	5,090	47,618
1962-63	13,988	13,100	5,988	4,058	5,081	5,657	48,051
1963-64	14,809	14,460	6,490	4,084	5,367	5,819	51,312

LOCAL VALUE PER HEAD OF POPULATION (£)

1959-60	4.0	5.1	5.7	4.2	7.1	16.1	5.2
1960-61	3.9	4.8	4.8	3.9	7.1	16.4	4.9
1961-62	3.7	4.4	3.9	3.8	7.0	14.3	4.5
1962-63	3.5	4.3	3.9	4.1	6.7	15.6	4.4
1963-64	3.6	4.6	4.1	4.0	6.9	15.9	4.7

(a) Includes Northern Territory and Australian Capital Territory.

§ 5. Timber and Timber Products

1. *Mill Production of Timber.*—Particulars of logs treated and the production of sawn, peeled and sliced timber by sawmills and other woodworking establishments are shown in the following table. These figures have been compiled from the annual factory collections in each State, which cover virtually all sawmills. The only omissions are some small portable mills operated by itinerants, e.g. sleeper cutters.

OUTPUT OF AUSTRALIAN-GROWN TIMBER: ALL MILLS, 1963-64

('000 super. feet)

Particulars	N.S.W.	Vic.	Q'land	S.A.	W.A.	Tas.	Aust.(a)
LOGS TREATED (TRUE VOLUME)							
Broadleaved ..	650,839	642,981	376,234	10,842	575,683	424,986	2,681,565
Coniferous ..	157,671	82,712	150,709	275,286	22,814	15,104	704,296
Total ..	808,510	725,692	526,943	286,128	598,497	440,090	3,385,861

SAWN, PEELLED OR SLICED TIMBER PRODUCED FROM LOGS ABOVE

Broadleaved ..	339,044	289,491	177,024	5,363	188,018	165,028	1,163,968
Coniferous ..	76,265	32,487	69,307	137,072	9,578	6,195	330,904
Total ..	415,309	321,978	246,331	142,435	197,596	171,223	1,494,872

(a) Excludes Australian Capital Territory and Northern Territory.

The following table shows logs used, and sawn, peeled, and sliced timber produced, in Australia.

OUTPUT OF AUSTRALIAN-GROWN TIMBER, ALL MILLS: AUSTRALIA(a)
(⁰000 super. feet)

Particulars	1959-60	1960-61	1961-62	1962-63	1963-64
LOGS TREATED (TRUE VOLUME)					
Broadleaved	2,793,399	2,672,080	2,524,528	2,552,552	2,681,565
Coniferous	705,772	646,801	640,833	778,674	704,296
Total	3,499,171	3,318,881	3,165,361	3,331,226	3,385,861

SAWN, PEELLED OR SLICED TIMBER PRODUCED FROM LOGS ABOVE

Broadleaved	1,208,595	1,152,995	1,063,086	1,088,197	1,163,968
Coniferous	312,450	264,838	289,116	322,370	330,904
Total	1,521,045	1,417,833	1,352,202	1,410,567	1,494,872

(a) Excludes Australian Capital Territory and Northern Territory.

In addition to the mill production of timber shown in the preceding tables, a large amount of hewn and round timber, e.g. sleepers, piles, poles, fencing timber, timber used in mining, and fuel, is obtained directly from forest and other areas. Complete information in respect of the volume of this output is not available.

2. 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. In recent years this has been considerably extended, since plywood manufacture has allowed the use of some species unsuitable for sawing. Special attention has been paid to ensure that logs suitable for peeling are diverted to ply factories.

The following table shows the production of plywood.

PLYWOOD PRODUCED
(⁰000 square feet: $\frac{3}{8}$ -in. basis)

State	1959-60	1960-61	1961-62	1962-63	1963-64
New South Wales	62,701	64,930	56,184	56,766	58,880
Queensland	134,825	112,414	98,086	85,746	97,252
Other States	44,574	46,045	48,537	52,751	60,150
Australia	242,100	223,389	202,807	195,263	216,282

Of the total plywood produced in 1963-64, 154,398,000 square feet ($\frac{3}{16}$ -in. basis) were classed as "Commercial", 38,803,000 as "Waterproof", 2,440,000 as "Case", and 20,640,000 as "Sliced Fancy".

During 1963-64, 561.3 million square feet ($\frac{1}{16}$ -in. basis) of veneers were produced by the rotary process for the manufacture of plywood, and 237.8 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, 52.6 million square feet of sliced veneers were produced.

3. **Manufactured Boards.**—(i) *Hardboard.* There were five factories producing hardboard in Australia during 1963-64 (two in New South Wales, and one in each of Victoria, Queensland and Tasmania), and during the three years ended 30th June, 1964, the following quantities were produced:—1961-62, 28,772,000 square yards; 1962-63, 33,317,000 square yards; and 1963-64, 39,799,000 square yards.

(ii) *Resin-bonded Boards.* Production of resin-bonded boards (made from wood chips, wood wool, sawdust, etc.) amounted to 2,921,508 square yards during 1963-64.

4. **Wood Pulp and Paper.**—(i) *Wood Pulp.* During 1963-64 seven wood pulp mills were operating in three States, and production was 215,019 tons of chemical pulp and 70,989 tons of mechanical pulp, a total of 286,008 tons. During the previous year production was 190,782 tons of chemical pulp and 68,062 tons of mechanical pulp.

Detailed information relating to the types and methods of production of wood pulp in the various States was published in Year Book No. 50, 1964, page 1110.

(ii) *Paper and Paper Board.* Paper and paper board are manufactured in all States, but the greater part of the industry is in New South Wales, Victoria and Tasmania. During 1963-64 twenty-six paper mills were operating, thirteen in Victoria, four in New South Wales, four in Tasmania, two each in Queensland and South Australia and one in Western Australia. A wide variety of paper and paper board is produced in Australian mills. The table below gives details of the production of some of the principal items.

PRODUCTION OF PAPER PRODUCTS: AUSTRALIA

Type of paper	Quantity (tons)			Value (£'000)		
	1961-62	1962-63	1963-64	1961-62	1962-63	1963-64
Newsprint	89,758	90,245	92,039	6,445	6,434	6,427
Blotting	487	558	553	84	83	82
Duplicating	5,156	6,794	7,008	834	1,073	1,185
Printing and writing ..	58,647	85,711	94,473	9,751	13,378	14,531
Wrapping—						
Kraft	108,313	118,018	141,006	13,228	14,308	16,567
Other	12,151	9,942	12,127	2,152	1,760	2,147
Felt and carpet felt ..	2,356	1,889	1,917	248	200	205
Paper boards	207,700	242,019	258,374	16,453	19,033	20,483

§ 6. Oversea Trade in Forest Products, Timber and Timber Products

1. Imports.—Quantities and values of forest products, timber and timber products imported into Australia during the years 1961–62 to 1963–64 are shown in the following table.

IMPORTS OF FOREST PRODUCTS, TIMBER AND TIMBER PRODUCTS: AUSTRALIA

Particulars	Quantity			Value (£A.'000 f.o.b.)		
	1961–62	1962–63	1963–64	1961–62	1962–63	1963–64
Logs not sawn—						
Softwoods(a) .. '000 sup. ft.	2,024	3,226	2,220	68	119	76
Hardwoods(b)	33,650	47,312	41,223	985	1,357	1,261
Undressed timber—						
Dunnage .. ..	..	..	..	4	4	5
Softwoods(a), n.e.i.—						
Douglas fir .. '000 sup. ft.	168,436	154,457	193,291	6,606	6,759	8,849
Radiata pine	24,913	24,388	25,086	900	860	882
Other	17,702	26,465	41,565	1,006	1,542	2,405
Hardwoods(b), n.e.i.	53,450	64,300	67,987	2,669	3,419	3,780
Box shooks, n.e.i.	641	561	567	48	39	47
Dressed timber	7,250	8,997	6,187	532	634	452
Veneers '000 sq. ft.	15,978	25,063	23,742	190	311	310
Plywood	31,390	26,428	30,993	1,069	925	1,193
Tanning substances .. cwt.	145,329	161,209	151,243	380	370	448
Sandalwood oil .. lb.	1,568	2,516	1,811	14	9	5

(a) Non-pored woods.

(b) Pored woods.

Imports of softwood logs in recent years have come largely from the Solomon Islands and Sarawak, and approximately two-thirds of the imports of hardwood logs have come from Sabah. Imports of undressed softwood timber comprise mainly Douglas fir (Oregon pine) from Canada and the United States of America, and Radiata pine from New Zealand. Imports of undressed hardwood timber come mainly from Malaya and Sarawak. Timbers from Scandinavian countries provide most of the dressed timber imports.

Imports of timber products are mainly veneers and plywoods. New Guinea and Japan provide most of the plywood imports, and the United Kingdom and New Guinea supply nearly half of Australia's imports of veneers.

Tanning substances are the only other forest products imported in significant quantities. The most important of these is wattle bark produced in South Africa.

2. Exports.—Details of exports of Australian forest and timber products in the years 1961–62 to 1963–64 are given in the following table.

EXPORTS OF AUSTRALIAN FOREST PRODUCTS, TIMBER AND TIMBER PRODUCTS(a)

Particulars	Quantity			Value (£A.'000 f.o.b.)		
	1961-62	1962-63	1963-64	1961-62	1962-63	1963-64
Logs not sawn .. '000 sup. ft.	8,190	4,392	4,070	309	161	186
Undressed timber(b)—						
Sleepers	27,464	22,998	21,578	1,518	1,285	1,045
Fence posts, girders and pole blocks	879	373	650	51	20	40
Softwoods(c), n.e.i.	74	112	117	8	11	11
Hardwoods(d), n.e.i.	16,966	13,917	13,499	1,169	959	928
Dressed timber	1,330	1,419	1,907	184	207	268
Veneers	1,589	1,474	2,453	38	33	51
Plywood	898	751	735	107	95	87
Tanning substances	88,659	88,317	101,023	256	237	305
Charcoal	6,831	6,602	5,793	25	31	26
Eucalyptus oil	310	475	304	104	156	115
Acaroid resin, grass tree and yacca gum	15,714	10,934	6,583	32	20	13

(a) Excludes re-exports. (b) Excludes stumps and the like. (c) Non-pored woods.
 (d) Pored woods.

Of the exports of logs in 1963-64, 95 per cent. were consigned to New Zealand; of the sleepers exported, 56 per cent. were consigned to South Africa, 22 per cent. to Pakistan and 18 per cent. to New Zealand; while of all undressed timber exported, 43 per cent. were consigned to South Africa, 28 per cent. to New Zealand and 17 per cent. to Pakistan. Consignments to the United States of America accounted for 78 per cent. of the exports of tanning substances in 1963-64.