

CHAPTER 23

FORESTRY

For further details on subjects dealt with in this chapter *see* the annual bulletins *Non-Rural Primary Industries* and (for sawmills, etc. operations) *Manufacturing Industry*.

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, together with certain other data, has been provided by the Commonwealth Forestry and Timber Bureau. 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 overseas trade. The figures shown relate, in general, to years ended 30 June.

Forestry in Australia

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.

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 forest area is occupied by eucalypts.

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 Tasmania, 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 mallett (*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 1966-67 the volume of eucalypt sawn wood produced was 945 million super feet.

Other broadleaved timbers (hardwoods). Broadleaved genera other than *Eucalyptus* cover a comparatively small portion of the forested land in Australia; however, the areas concerned 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 1966-67 was estimated at 64 million super feet, i.e. less than 7 per cent of the total broadleaved timber cut in Australia.

The tropical and sub-tropical 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 sub-tropical 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 Dorrigo and have yielded valuable timber 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 of myrtle beech (*Nothofagus cunninghamii*), but produces also southern sassafras (*Atherosperma moschata*) and blackwood (*Acacia melanoxylon*).

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 small, 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 1966-67 was approximately 57.9 million super feet.

Another important native conifer is hoop pine (*Araucaria cunninghamii*), which occurs naturally in the sub-tropical rainforest 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 sub-tropical 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.

Extent of forested areas

Estimates prepared for the Ninth British Commonwealth Forestry Conference held in India in 1968 show the total area of forest in Australia as 599.7 million acres, or about 32 per cent of the total land area of the continent. In making these estimates the Food and Agriculture Organization definition of 'forest' (published in *World Forest Inventory*, 1958, page 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)

<i>Type of forest</i>	<i>Area</i>
LANDS	
Economically exploitable forest land—	
Productive forests—	
Coniferous (softwood)(b)	3,021
Other(c)	34,166
<i>Total, productive forests</i>	<i>37,187</i>
Non-productive areas—unstocked(d)	11,455
Not economically exploitable forest land	39,038
Woodlands(e)	512,010
<i>Total, forested area</i>	<i>599,690</i>

OWNERSHIP OF ACCESSIBLE FORESTS

Publicly-owned forests—	
State forests	29,699
Other forests	22,472
<i>Total, publicly-owned forests</i>	<i>52,171</i>
Privately-owned forests	29,191
Ownership not yet determined	290,166
<i>Total, accessible forests</i>	<i>371,528</i>

(a) Date of inventory 30 June 1965. (b) Includes exotics, cypress, and other indigenous pines. (c) Includes broadleaved and mixed woods. (d) Areas enclosed or within or adjacent to forest land, but which are kept cleared of tree cover for management reasons or 'are temporarily free' of tree cover. (e) All lands dominated by trees which for ecological and botanical reasons are not now capable of producing economic forest products.

Forest reserves

The distribution of forest reserves is shown by States in the following table. Detailed comparisons between States are not possible because of the lack of uniform definitions.

**LEGALLY ESTABLISHED PERMANENT FOREST RESERVES: STATES AND TERRITORIES
31 MARCH 1967**

(Source: Forestry and Timber Bureau)

('000 acres)

	N.S.W.	Vic.	Qld (a)	S.A.	W.A.	Tas.	N.T.	A.C.T.	Aust.
Production reserves(b)—									
Productive	5,000	4,108	8,664	248	4,083	1,917	11	29	24,060
Unproductive	3,020	1,382	..	23	..	1,389	..	..	5,814
Unstocked . . . . .	..	114	..	..	708	..	..	20	842
<i>Total, production reserves</i>	<i>8,020</i>	<i>5,604</i>	<i>8,664</i>	<i>271</i>	<i>4,791</i>	<i>3,306</i>	<i>11</i>	<i>49</i>	<i>30,716</i>
Protection reserves(c)—									
Productive . . . . .	..	..	..	..	33	233	..	13	279
Unproductive	1,870	500	(d)2,268	17	..	..	..	97	4,752
Unstocked . . . . .	..	..	..	..	28	1	..	..	29
<i>Total, protection reserves</i>	<i>1,870</i>	<i>500</i>	<i>2,268</i>	<i>17</i>	<i>61</i>	<i>234</i>	<i>..</i>	<i>110</i>	<i>5,060</i>
All other reserves—									
Productive . . . . .	..	..	..	..	..	..	2,394	..	2,545
Unproductive and unstocked . . . . .	..	151	..	..	..	..	..	..	..
<i>Total, all other reserves</i>	<i>..</i>	<i>151</i>	<i>..</i>	<i>..</i>	<i>..</i>	<i>..</i>	<i>2,394</i>	<i>..</i>	<i>2,545</i>
Total area, all reserves	9,890	6,255	(e)10,932	288	4,852	3,540	2,405	159	38,321

(a) 30 June 1967. (b) Forest lands reserved by law for the production of logs, pulpwood, pit props, poles, posts, and fuelwood for commercial purposes. (c) Reserved lands, the management of which is principally aimed at the protection of natural resources, of fauna and flora, or at other purposes not directly related to the production of wood (e.g. parks, watersheds, soil conservation, etc.). Industrial cutting may or may not be allowed in these protection reserves. (d) National Parks. (e) Excludes scenic areas of 39,000 acres.

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.

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 organisations, the area of coniferous 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 70 million cubic feet per annum and is expected to increase substantially during the next decade.

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 31 March 1967 was about 35,000 acres, about two-thirds of which was mallet. Plantations of this species have been established in Western Australia for tan bark production.

AREA OF CONIFEROUS PLANTATIONS: STATES AND TERRITORIES, 31 MARCH 1967

(Source: Forestry and Timber Bureau)

(Acres)

State or Territory	Government			Private			Grand total
	<i>Pinus radiata</i>	Other species	Total	<i>Pinus radiata</i>	Other species	Total	
New South Wales . . .	100,264	21,239	121,503	6,505	15,610	22,115	143,618
Victoria	61,079	9,667	70,746	87,846	2,717	90,563	161,309
Queensland	3,103	120,777	123,880	840	21,860	22,700	146,580
South Australia	131,432	12,822	144,254	38,598	..	38,598	182,852
Western Australia(a) . .	19,949	27,750	47,699	1,781	175	1,956	49,655
Tasmania	26,464	414	26,878	11,483	3	11,486	38,364
Northern Territory . . .	..	1,368	1,368	..	50	50	1,418
Australian Capital Territory	26,306	2,527	28,833	..	..	..	28,833
Australia	368,597	196,564	565,161	147,053	40,415	187,468	752,629

(a) South-west zone only.

Forest administration and research

Commonwealth Forestry and Timber Bureau. The functions of the Commonwealth Forestry and Timber Bureau are laid down in the *Forestry and Timber Bureau Act 1930-1953* 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 Forestry and Timber Bureau Divisions of Silvicultural Research and Forest Management Research were combined to form the Forest Research Institute as a separate branch of the Bureau. 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 objective, the Institute takes account of the research activities and potential of the State forest services and other organisations. 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, aerial inventory, biometrics, and tree seed. The Forest Research Institute maintains six 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.

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 utilisation. 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 overseas authorities operating in the same field.

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. Forests in the Northern Territory are under the control of the Territory Branch of the Northern Territory Administration.

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. 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 utilisation of forest products; the securing of an adequate and permanent reservation of State forests; and 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 control over 10 million acres of timber reserves, national parks, etc. They also usually control all timber on unoccupied Crown lands.

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. Schemes of financial assistance to individual land owners—designed primarily to encourage establishment and management of coniferous plantations—have been recently introduced by the Governments of New South Wales and Victoria.

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 1001.

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 was absorbed into the University's School of General Studies as the Department of Forestry. This department provides 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 Forests Commission maintains a Forestry School at Creswick where recruits are trained, mainly for employment in the Commission.

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 utilisation 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 External Territories.

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 23 million acres, about 17 million acres in the more inaccessible area receive a lesser degree of protection, and about 8 million acres are at present not protected. The remaining area of 15 million acres is mainly privately owned or leased, and under some degree of fire protection from the rural volunteer fire-fighting organisations or Government-financed fire protection associations.

Very intensive fire protection is afforded the coniferous plantation area of Australia. During the severe 1964-65 season 3,130 acres of coniferous plantations were burnt. This represents 0.56 per cent of total plantation area, which was 556,000 acres at that date. This was the largest area of coniferous plantations burnt since 1952. The area burnt in 1966-67 was 461 acres, or 0.07 per cent of the total plantation area, which was then 660,835 acres.

Protection of private property outside urban areas is undertaken by volunteer bush fire brigade organisations 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 organisation 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 organisations are entirely separate entities, a high degree of co-operation and liaison is maintained.

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

Over the five-year period 1962 to 1966 the annual cost of protecting from fire the 40 million acres of forest land for which State forest services, semi-governmental bodies and private companies provide protection is estimated at \$5,000,000, or about twelve cents an acre. The cost of fire protection during the severe 1964-65 fire season was \$5,500,000. 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 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, 1962-63 TO 1966-67

(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
1962-63	1,299	275	0.7
1963-64	1,494	549	1.5
1964-65	2,307	1,626	4.1
1965-66	1,865	465	1.2
1966-67	1,422	388	1.0

(a) For this table the area receiving protection has been taken as the 40 million acres for which State forest services provide protection.

Intensive research work is being undertaken on fire problems, and several government 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, including aerial methods of attacking fire and infra-red scanning devices.

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 about 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.

An increasing number of fires are starting from roadsides, and smoking materials account for a high proportion of these fires. The fire proofing of roadsides by chemical and mechanical means should reduce this incidence, which has accounted for over 25 per cent of all fires in some regions.

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 \$2 and \$4 per acre burnt per year and that over the last ten years the average value of forest fire damage is of the order of \$4 million a 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 \$200 million.

Commonwealth loans to expand softwood plantations

In February 1965 the Australian Forestry Council recommended that the rate of expansion of softwood timber planting in Australia should be increased from their existing level of about 40,000 acres a year to 75,000 acres a year for the next thirty-five years. The recommendation envisaged a phased increase in the rate of Government plantings by the various State Governments up to a level of some 65,000 acres per annum, and an average of at least 10,000 acres per annum by private forest owners. This programme would make a major contribution towards meeting Australia's future requirements for softwood products.

In February 1966 the Commonwealth Government endorsed this recommendation and agreed, as a first step towards achieving the proposed annual target of 75,000 acres, to provide financial assistance to each State, over a five-year period commencing 1 July 1966, to enable them to accelerate their rate of softwood plantings. The assistance, which will be provided to the States under section 96 of the Constitution, will take the form of long-term loans repayable over twenty-five years with repayments of principal and the payment of interest to commence ten years after the date of each advance. The *Softwood Forestry Agreements Act 1967* authorised the Commonwealth to enter into agreements with each of the States to provide financial assistance by way of loans during the financial years 1966-67 to 1970-71 inclusive. Payments under the Act by the Commonwealth to all States in 1966-67 amounted to \$291,000, and in 1967-68 to \$3,456,000. It is estimated that \$3,882,000 will be provided in 1968-69.

Employment in forestry

Persons engaged in forestry activities, 1966 census

The number of persons whose industry statements were classified to 'forestry' (excluding saw-milling) at the 1966 population census was 13,492 out of a total of 512,994 in all primary industries and 4,856,455 in the total work force. For further information see the chapter Employment and Unemployment, also 1966 Census Bulletin No. 9.6, *Population: by Industry and Occupational Status, Australia*.

Employment by Forestry Departments

In the table following 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 30 June 1967.

**PERSONS EMPLOYED BY FORESTRY DEPARTMENTS
STATES AND TERRITORIES, 30 JUNE 1967**

Occupational group	N.S.W.	Vic.	Qld	S.A.	W.A.	Tas.	N.T.	A.C.T.	Aust.
Professional staff	292	230	150	67	67	41	5	10	862
Non-professional field staff	273	209	96	9	216	120	17	2	942
Clerical staff	284	281	214	114	59	88	10	6	1,056
Extraction of timber	1,391	832	114	587	39	6	20	..	6,073
Milling of timber			254	47	..	..	..
Labour (forest workers, etc.) }			1,677	254	554	360	122	70	
Total	2,240	1,552	2,251	1,031	982	615	174	88	8,933

Employment in milling operations

Details of the average number of persons employed, including working proprietors, in sawmills during the year 1966-67 are shown in the next table. Further details regarding the operations of sawmills in 1966-67 are shown in the chapter Manufacturing Industry.

**NUMBER OF SAWMILLS AND NUMBER OF PERSONS EMPLOYED
STATES AND TERRITORIES, 1966-67**

	N.S.W.	Vic.	Qld	S.A.	W.A.	Tas.	N.T.	A.C.T.	Aust.
Number of sawmills	721	445	481	89	192	279	1	7	2,215
Average number of persons employed during year—									
Males	7,834	5,666	5,232	2,172	3,199	2,834	(a)	(a)	27,006
Females	398	286	293	198	173	58			
Persons	8,232	5,952	5,525	2,370	3,372	2,892				1,412	28,418

(a) Not available for publication; included in Australian total.

Forest production**Forest products**

FOREST PRODUCTION(a): STATES AND TERRITORIES, 1966-67

Product	N.S.W.	Vic.	Qld	S.A.	W.A.	Tas.	N.T.	A.C.T.	Aust.
Logs for sawing, peeling, slicing, or pulping—									
Forest broadleaved '000 cu ft	53,087	68,880	21,644	420	48,373	57,529	10	42	249,985
Brushwoods and scrubwoods " "	3,876	..	8,254	..	..	..	1	..	12,131
Coniferous—									
Indigenous forest 'pines'—									
Cypress " "	6,059	..	5,222	..	..	..	121	..	11,402
Other " "	522	..	2,717	..	..	328	..	..	3,568
Plantation grown 'pines' " "	8,971	15,325	4,405	27,843	2,057	1,968	..	1,423	61,992
Total logs " "	72,515	84,205	42,241	28,263	50,431	59,826	132	1,465	339,078
Value of logs \$'000	21,768	23,798	14,230	5,967	8,919	13,109	274	340	88,405
Hewn and other timber (not included above)—									
Firewood(b) (weight) '000 tons	235	671	92	444	552	444	1	..	2,440
Other(c) (value) \$'000	1,324	6,836	513	2,514	(d)2,525	2,557	8	2	16,280
Value of hewn and other timber " "	9,583	9,353	2,657	2,856	(d)3,748	3,494	29	11	31,731
Other forest products(e) (total value) " "	280	168	312	27	(f)9	25	..	..	820
Total value of forest products " "	31,632	33,319	17,199	8,888	(g)13,300	16,627	303	351(g)	121,620

(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), tanning 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.

FOREST PRODUCTION(a): AUSTRALIA, 1962-63 TO 1966-67

Product		1962-63	1963-64	1964-65	1965-66	1966-67
Logs for sawing, peeling, slicing, or pulping—						
Forest broadleaved	'000 cu ft	230,401	245,674	251,753	252,587	249,985
Brushwoods and scrubwoods	" "	12,657	12,741	13,549	14,027	12,131
Coniferous—						
Indigenous forest 'pines'—						
Cypress	" "	12,489	13,070	13,795	12,487	11,402
Other	" "	3,799	3,950	3,766	3,706	3,568
Plantation grown 'pines'	" "	49,569	50,883	56,255	59,894	61,992
Total logs	" "	308,915	326,318	339,117	342,701	339,078
Value of logs	\$'000	74,954	79,576	86,494	87,804	88,405
Hewn and other timber (not included above)—						
Firewood (b) (weight)	'000 tons	2,702	2,720	2,690	2,668	2,440
Other (c) (value)	\$'000	13,604	13,900	15,256	17,290	16,280
Value of hewn and other timber(d)	"	28,944	31,872	32,998	35,632	31,731
Other forest products(e) (total value)	"	588	618	739	782	820
Total value of forest products(f)	"	104,820	112,416	120,801	125,044	121,620

(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.

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. 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 the chapter Miscellaneous.

GROSS AND LOCAL VALUE OF FORESTRY PRODUCTION
STATES AND TERRITORIES, 1966-67
(\$'000)

State or Territory	Gross value(a)	Marketing costs	Local value(b)
New South Wales	31,632	665	30,967
Victoria	33,319	1,337	31,982
Queensland	17,199	4,569	12,631
South Australia	8,888	35	8,853
Western Australia	13,300	827	12,473
Tasmania	16,627	2,295	14,332
Northern Territory	303	n.a.	303
Australian Capital Territory	351	n.a.	351
Australia	121,620	9,728	111,892

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

**LOCAL VALUE OF FORESTRY PRODUCTION: STATES AND TERRITORIES
1962-63 TO 1966-67**

<i>Year</i>	<i>N.S.W.</i>	<i>Vic.</i>	<i>Qld</i>	<i>S.A.</i>	<i>W.A.</i>	<i>Tas.</i>	<i>N.T.</i>	<i>A.C.T.</i>	<i>Aust.</i>
LOCAL VALUE (\$'000)									
1962-63 . . .	27,976	26,200	11,976	8,116	10,162	11,314	100	258	96,102
1963-64 . . .	29,618	28,920	12,980	8,168	10,734	11,638	268	298	102,624
1964-65 . . .	31,586	32,076	13,482	8,801	11,334	13,270	276	314	111,139
1965-66 . . .	32,342	32,434	13,590	9,693	11,965	13,837	358	384	114,603
1966-67 . . .	30,967	31,982	12,631	8,853	12,473	14,332	303	351	111,892
LOCAL VALUE PER HEAD OF POPULATION (\$)									
1962-63 . . .	6.96	8.70	7.66	8.13	13.07	31.59	2.13	3.71	8.86
1963-64 . . .	7.26	9.41	8.14	7.98	13.44	32.08	5.36	3.87	9.28
1964-65 . . .	7.62	10.23	8.29	8.37	13.87	36.22	5.23	3.72	9.85
1965-66 . . .	7.68	10.15	8.19	8.96	14.29	37.44	6.46	4.15	9.96
1966-67 . . .	7.25	9.84	7.48	8.02	14.47	38.33	5.22	3.51	9.56

Timber and timber products

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 annual factory collections, 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
STATES AND TERRITORIES, 1966-67**
(*000 super ft)

	<i>N.S.W.</i>	<i>Vic.</i>	<i>Qld</i>	<i>S.A.</i>	<i>W.A.</i>	<i>Tas.</i>	<i>Total(a)</i>
Logs treated (gross hoppus)(b)—							
Broadleaved . . .	679,095	503,637	322,825	6,543	455,125	346,031	2,313,256
Coniferous . . .	121,423	80,136	113,453	213,918	16,900	9,007	554,838
<i>Total, logs treated .</i>	<i>800,519</i>	<i>583,774</i>	<i>436,278</i>	<i>220,460</i>	<i>472,025</i>	<i>355,038</i>	<i>2,868,093</i>
Sawn, peeled or sliced timber produced from logs above—							
Broadleaved . . .	347,558	282,080	152,588	3,882	195,185	170,077	1,151,369
Coniferous . . .	69,606	40,219	64,174	130,236	8,993	4,363	317,591
<i>Total, timber pro- duced . . .</i>	<i>417,164</i>	<i>322,299</i>	<i>216,762</i>	<i>134,118</i>	<i>204,178</i>	<i>174,440</i>	<i>1,468,960</i>

(a) Excludes Australian Capital Territory and Northern Territory.
78.5 per cent of the true volume.

(b) Gross hoppus measure is approximately

OUTPUT OF AUSTRALIAN-GROWN TIMBER, ALL MILLS: AUSTRALIA(a)
1962-63 TO 1966-67
 ('000 super ft)

	1962-63	1963-64	1964-65	1965-66	1966-67
Logs treated—					
Broadleaved	2,552,553	2,681,691	2,767,843	(b)2,371,263	(b)2,313,256
Coniferous	771,318	696,831	728,691	(b)569,521	(b)554,838
<i>Total, logs treated</i>	<i>3,323,871</i>	<i>3,378,522</i>	<i>3,496,535</i>	<i>(b)2,940,784</i>	<i>(b)2,868,093</i>
Sawn, peeled or sliced timber produced from logs above—					
Broadleaved	1,092,143	1,157,175	1,203,705	1,185,831	1,151,369
Coniferous	323,743	330,014	329,508	331,709	317,591
<i>Total, timber produced</i>	<i>1,415,886</i>	<i>1,487,189</i>	<i>1,533,213</i>	<i>1,517,540</i>	<i>1,468,960</i>

(a) Excludes Australian Capital Territory and Northern Territory. (b) Gross hoppus basis: not necessarily comparable with details for previous years, which are generally on a true volume basis.

In addition to the mill production of timber shown in the preceding tables, a large quantity 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.

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.

PLYWOOD PRODUCED: STATES, 1962-63 TO 1966-67
 ('000 square feet: $\frac{3}{8}$ -in basis)

State	1962-63	1963-64	1964-65	1965-66	1966-67
New South Wales	56,766	58,880	59,045	54,201	58,791
Queensland	85,746	97,252	94,766	80,761	81,313
Other States	52,751	60,150	63,249	52,296	60,348
Australia	195,263	216,282	217,059	187,258	200,451

Of the total plywood produced in 1966-67, 119,765,565 square feet ($\frac{3}{8}$ -in basis) were classed as 'Commercial', 55,752,370 as 'Waterproof', 2,897,484 as 'Case', and 22,036,069 as 'Sliced fancy'.

During 1966-67, 749.2 million square feet ($\frac{3}{8}$ -in basis) of veneers were produced by the rotary process for the manufacture of plywood, including 227.9 million square feet ($\frac{3}{8}$ -in basis) sold or added to stock, the bulk of which would eventually be used in the production of plywood. In addition, 51.7 million square feet of sliced veneers were produced.

Manufactured boards

Particle board, resin or cement bonded of acoustic and other composition, amounted to 92,134,853 square feet surface measurement during 1966-67.

Wood pulp and paper

Wood pulp. During 1966-67 wood pulp production was 357,665 tons of chemical, mechanical and other pulp. During the previous year production was 330,625 tons.

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.

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 1966-67 twenty-three paper mills were operating, ten 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, 1964-65 TO 1966-67

Type of paper	Quantity (tons)			Value (\$'000)		
	1964-65	1965-66	1966-67	1964-65	1965-66	1966-67
Newsprint	93,142	93,211	97,255	12,948	12,106	13,365
Blotting	488	601	508	124	161	149
Duplicating	7,386	9,721	8,291	2,618	3,758	3,467
Printing and writing	101,222	120,540	114,992	28,948	35,818	35,704
Wrapping—						
Kraft	160,807	149,331	184,561	37,403	34,568	40,637
Other	16,158	11,114	13,942	5,269	3,850	4,960
Paper felts	1,868	1,700	1,905	407	366	415
Paper boards	296,387	317,553	329,496	47,670	51,465	53,726

Overseas trade in forest products, timber and timber products**Imports****IMPORTS OF FOREST PRODUCTS, TIMBER AND TIMBER PRODUCTS
AUSTRALIA, 1965-66 AND 1966-67**

	Quantity		Value (\$'000 f.o.b.)	
	1965-66	1966-67	1965-66	1966-67
Wood in the rough or roughly squared . . . '000 sup ft	34,371	44,763	2,163	2,896
Wood shaped or simply worked—				
Timber sawn lengthwise, sliced or peeled, but not further prepared, of a thickness exceeding 5 mm—				
Conifer—				
Douglas fir	177,453	177,183	16,860	16,366
Hemlock and balsam	13,629	15,395	882	1,003
Radiata pine	25,945	26,531	1,955	2,004
Redwood and western cedar	16,597	22,414	2,015	2,728
Non-conifer . . . . .	..	..	7,780	6,981
Tanning extracts of vegetable origin . . . cwt	67,688	79,601	490	550
Wood and cork manufactures (except furniture)—				
Veneers, plywood boards, 'improved' or reconstituted wood and other wood, worked, n.e.s. . . . .	..	..	5,617	6,357
Wood, worked, n.e.s. . . . .	..	..	2,683	2,725
Cork manufactures . . . . .	..	..	1,200	1,188

Owing to the adoption of the new Australian Import Commodity Classification from July 1965 (see page 339) completely comparable figures for years prior to 1965-66 are not available.

Imports of coniferous timbers, shaped or simply worked, came mainly from Canada and the United States of America in 1966-67. Malaysia was the source of by far the greater proportion

of non-coniferous timber imports. Papua and New Guinea and the United Kingdom supplied most of Australia's imports of veneers, while plywood imports came mainly from Japan and Papua and New Guinea.

Exports

EXPORTS OF AUSTRALIAN FOREST PRODUCTS, TIMBER AND TIMBER PRODUCTS(a): AUSTRALIA, 1966-67

	<i>Quantity</i>	<i>Value (\$'000 f.o.b.)</i>
Wood in the rough or roughly squared . . . '000 sup ft	..	666
Wood, shaped or simply worked—		
Railway or tramway sleepers	26,023	3,279
Timber sawn lengthwise exceeding 5 mm—		
Conifer	393	95
Non-conifer	11,541	1,790
Timber, planed or tongued—		
Conifer	830	232
Non-conifer	468	114
Cork, raw and waste cwt	131	13
Plants used in dyeing and tanning	2,590	8
Natural gums, resins, etc.	9,180	63
Eucalyptus oil '000 lb	308	221
Veneer wood '000 sq ft	3,207	133
Plywood, blockboards, etc.	3,611	444
Improved wood . . . . .	..	24
Reconstituted wood '000 sq ft	1,153	151
Wooden beadings and mouldings . . . . .	..	120
Wood simply shaped or worked, n.e.i. . . . .	..	33
Wood manufactures, n.e.i. . . . .	..	894
Cork manufactures . . . . .	..	31

(a) Excludes re-exports.

Owing to the adoption of the new Australian Export Commodity Classification from July 1966 (see page 339) completely comparable figures for years prior to 1966-67 are not available.