CHAPTER 24

FORESTRY

For further details on subjects dealt with in this chapter *see* the annual bulletins *Non-Rural Primary Industries* (10.23) and (for sawmills, etc. operations) *Manufacturing Establishments and Electricity and Gas Establishments* (12.23) and *Forests and Forest Products* (10.47).

Source of statistics

Statistics relating to forestry are, in general, provided by the various authorities concerned with forestry administration. Particulars of forestry activities contained in this chapter have been collected by the Statisticians of the various States, mainly from information provided by the States forestry authorities. Other information on forested areas 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 harvesting, by protection from such destructive agencies as fire and insect attack, and by inducing regeneration. 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 76 per cent of the total forested area, and approximately 95 per cent of the broadleaved forest area is occupied by eucalypts.

Eucalypts. The genus *Eucalyptus* is remarkable in that it includes some 500 known 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 inland plains to the high mountain areas in the Australian Alps, and from areas with the annual rainfall as low as 10 inches to those where it is 150 inches. Of the 500 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 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 trees 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.

Other broadleaved timbers (hardwoods). Broadleaved genera other than *Eucalpytus* 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 Queensland and New South Wales and the temperate rainforests of southern Victoria and Tasmania, both of which yield species known collectively as rainforest or brushwood species.

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.

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*).

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.

Conifers (Softwoods). One of the most important species of native conifers is white cypress pine (*Callitris columellaris*). 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 including 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.

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 (*Auracaria 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 Food and Agriculture Organisation World Forest Inventory 1970, show the total area of forests plus other wooded areas as 340.4 million acres in 1970. This represents a smaller figure than the previously published result of a similar survey taken in 1965 for the Food and Agriculture Organisation which showed the total area of forests and woodlands as 599.7 million acres. The difference is largely explained by the fact that the definition of 'woodland' was changed considerably between the two reference dates.

CLASSIFICATION OF FOREST AREA(*a*): AUSTRALIA

(*Source:* Forestry and Timber Bureau)

('000 acres)

Types of forest	*rea*
FORESTS AND OTHER WOODED AREAS	
Forests under exploitation	65,269
Forests not under exploitation(*b*)—	
Excluded from exploitation by law	4,978
Other	23,498
Total forests	*93,745*
Other wooded areas(*c*)	246,625
Total forests and other wooded areas	**340,370**
OWNERSHIP OF FORESTS	
Publicly-owned forests—	
State forests	41,355
Other forests	30,270
Total publicly-owned forests	*71,625*
Privately-owned forests	19,412
Ownership not yet determined	2,708
Total forests	**93,745**

(*a*) Date of inventory 31 March 1970. (*b*) Areas of lowgrowing mallee and similar associations of woody vegetation are not included. (*c*) Includes woodlands, scrublands, etc., not regarded as forests.

Forest reserves

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

FOREST RESERVES: STATES AND TERRITORIES, 31 MARCH 1971

(*Source:* Forestry and Timber Bureau)

('000 acres)

	N.S.W.	*Vic.*	*Qld*	*S.A.*	*W.A.*	*Tas.*	*N.T.(a)*	*A.C.T.*	*Aust.*
Production reserves(*b*)—									
Productive	5,750	4,190	9,332	220	4,076	3,035	2	31	26,636
Unproductive	718	1,351	..	28	..	1,168	73	..	3,338
Unstocked	695	116	..	..	708	467	1	..	1,987
Total production reserves	*7,163*	*5,657*	*9,332*	*248*	*4,784*	*4,670*	*76*	*31*	*31,961*
Protection reserves(*c*)—									
Productive	..	..	..	3	33	425	..	13	474
Unproductive	30	514	2,471	45	93	..	1,200	97	4,450
Unstocked	..	..	..	..	28	..	314	..	342
Total protection reserves	*30*	*514*	*2,471*	*48*	*154*	*425*	*1,514*	*110*	*5,266*
All other reserves, productive, unproductive and unstocked(*d*)	1,029	151	..	..	..	..	..	..	1,180
Total area all reserves	**8,222**	**6,322**	**11,803**	**296**	**4,938**	**5,095**	**1,590**	**141**	**38,407**

(*a*) At 31 March 1970. (*b*) Land permanently dedicated to timber production. In the case of the A.C.T. these are 'Managed forests'. (*c*) Includes flora and fauna reserves, scenic reserves, state and national parks, and water catchment areas. (*d*) Includes other timber reserves, land reserved for fuel supply, and vacant forested crown land. Excludes Aboriginal reserves in the N.T. totalling 29,286,000 acres which are estimated to be 90 per cent forest.

Categories of forest reserves

(i) *Production reserves* consist of forest lands 'permanently' reserved—by law whether Federal, State or local—for the production of logs, pulpwood, pit props, poles, posts or fuelwood for commercial purposes.

(ii) *Protection reserves* consist of 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 areas, etc.). Industrial cutting may or may not be allowed in these protection reserves. Industrial cutting includes the cutting of logs, pulpwood, pit props, poles, posts, fuelwood for commercial purposes. The production of logs for the production of sawnwood for local consumption is considered as industrial cutting; however, the cutting of poles and fuelwood for personal consumption on a casual or occasional basis is not considered as an industrial cutting.

(iii) *All other reserves* consist of reserved forest lands not included above.

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 most other States 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 85 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 1971 was 88,089 acres, about one-quarter of which was brown mallet (*E. astringens*). Plantations of this species have been established in Western Australia for tan bark production.

AREA OF CONIFEROUS PLANTATIONS, BY TYPE OF PLANTATION 31 MARCH 1967 TO 1971

(*Source:* Forestry and Timber Bureau)

(Acres net)

	Government			*Private*			
State or Territory	*Pinus radiata*	*Other species*	*Total*	*Pinus radiata*	*Other species*	*Total*	*Grand total*
31 March 1971—							
New South Wales	165,557	25,265	190,822	16,460	16,619	33,079	223,901
Victoria	101,547	9,482	111,029	121,985	7,589	129,574	240,603
Queensland	4,149	169,018	173,167	852	41,679	42,531	215,698
South Australia	151,265	16,187	167,452	39,144	18	39,162	206,614
Western Australia(*a*)	28,819	42,696	71,515	7,505	296	7,801	79,316
Tasmania	42,730	478	43,208	17,578	10	17,588	60,796
Northern Territory	..	5,561	5,561	..	..	..	5,561
Australian Capital Territory	28,237	2,748	30,985	..	..	..	30,985
Australia, 31 March 1971	**522,304**	**271,435**	**793,739**	**203,524**	**66,211**	**269,735**	**1,063,474**
31 March—							
1970	483,080	248,529	731,609	190,986	55,964	246,950	978,559
1969	438,097	228,291	666,388	187,035	52,865	239,900	906,288
1968	395,215	207,176	602,391	161,326	47,224	208,550	810,941
1967	368,597	196,564	565,161	147,053	40,415	187,468	752,629

(*a*) Estimated.

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 administrating department is the Department of National Development.

In 1961 the Commonwealth Government expanded 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 research 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. The Divisions of Building Research and Applied Chemistry carry out a wide range of investigations relating to the properties of wood and the uses of wood and wood products. These activities were formerly carried out by the Division of Forest Products which, in May 1971, ceased to be a separate entity within C.S.I.R.O. following a reorganisation of C.S.I.R.O. research effort in the field of forest products. That part of the Division of Forest Products concerned with wood as a structural material was integrated with the Division of Building Research, and the remaining part, which was concerned with research for the paper and pulp industry, was integrated with the Division of Applied Chemistry. Most of the present forest products activities of both Divisions are conducted at premises in South Melbourne now known as the C.S.I.R.O. Forest Products Laboratory.

At the Forest Products Laboratory research work administered by the Division of Building Research is carried out by six separate Sections: Timber Physics, Timber Structures, Timber Engineering Science, Forest Conversion Engineering and Forest Conversion Science. In addition, the Division provides assistance to individuals and industry, administers courses of instruction on timber properties and usage, and maintains co-operative projects with overseas authorities operating in the same fields. The research sections working at the Laboratory as units of the Division of Applied Chemistry are Paper Science, and Wood and Forest Science.

Forestry in the Territories. Forestry activities in Papua 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 Branch 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 Forestry 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 15 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 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.

The area of coniferous plantations established by private companies and individuals is included in the table on page 868.

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 leading to higher degrees for forestry graduates.

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

The Australian Forestry Council

The Australian Forestry Council comprises the Ministers responsible for forestry in the six State Governments and the Commonwealth Ministers for National Development, Interior, and External 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 co-ordinates research into problems affecting the establishment, development, management, and fire protection of all forests, and the utilisation of forest products. It assists 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 Building Research, C.S.I.R.O., the Secretary of the Department of the Interior 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. Government and private forestry organisations are responsible for the protection of about 47 million acres of forest land, of which a relatively accessible area of 23 million acres is given a high degree of protection, about 17 million acres in the more inaccessible areas receive a lesser degree of protection, and about 7 million acres are at present not protected. Other extensive forest areas consisting mainly of vacant Crown land, but including land under private ownership or leasehold, are either not protected or are given some degree of fire protection by rural fire-fighting organisations or Government-financed fire protection associations.

During the 1970–71 fire season a total of 1,018 fires were recorded over the area of 40 million acres of forest land afforded either intensive or extensive protection by forest authorities. The area burnt by these fires totalled 176,144 acres or 0.4 per cent of the area protected.

The number of fires and the area of native forest burnt during the last ten years is shown in the following table.

NUMBER OF FIRES AND FOREST AREA BURNT, 1961-62 TO 1970-71

(*Source:* Forestry and Timber Bureau)

Year	*Protected forest areas(a)*		
	Number of fires	*Forest area burnt*	*Percentage of forest area burnt*
		'000 acres	
1961–62	1,761	297	0.8
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
1967–68	1,754	754	1.9
1968–69	2,165	1,885	4.7
1969–70	905	130	0.3
1970–71	1,018	176	0.4

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

Very intensive fire protection is afforded to the coniferous plantation area of Australia. This area is increasing rapidly and the annual planting programme is now between 60,000 and 70,000 acres. During the 1970–71 fire season a total of 1,404 acres was burnt, representing 0.14 per cent of the area of 1,038,000 acres for which fires statistics are available.

The area of coniferous plantations burnt during the past ten years is shown in the following table.

CONIFEROUS PLANTATIONS AREA BURNT AND TOTAL AREA, 1961-62 TO 1970-71

(*Source:* Forestry and Timber Bureau)

Year	*Number of fires*	*Area burnt*	*Area of coniferous plantations(a)*	*Percentage of coniferous area burnt*
		acres	acres	
1961–62	n.a.	598	472,000	0.13
1962–63		475	492,000	0.10
1963–64		418	515,000	0.08
1964–65		3,130	556,000	0.56
1965–66		1,520	610,000	0.25
1966–67		461	660,835	0.07
1967–68		288	729,928	0.04
1968–69	39	2,247	781,000	0.29
1969–70	51	149	874,000	0.02
1970–71	40	1,404	1,038,000	0.14

(*a*) This area does not include certain privately owned coniferous plantations for which fire statistics are not available. In 1969–70 the area for which no statistics were available was 105,000 acres; in 1970–71, 30,000 acres.

Detailed information on fire protection is given in Year Book No. 55, 1969, pages 966–7.

Commonwealth loans to expand softwood plantations

In February 1965 the Australian Forestry Council recommended that the rate of expansion of softwood timber plantings 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 recommendations envisaged a phased increase in the rate of Government plantings by the various State Governments up to a level of some 63,000 acres per annum together with plantings by the Commonwealth in the Territories of 2,000 acres per annum, and an average of at least 10,000 acres per annum by private forest owners. The Council considered that such a 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 is provided to the States under Section 96 of the Constitution, took the form of long-term loans repayable over twenty-five years with repayments of principal and the payment of interest commencing 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, in 1967–68 to $3,456,000, in 1968–69 to $3,872,000, in 1969–70 to $4,814,000, in 1970–71 to $4,784,000, and in 1971–72 to $389,338.

In February 1969 the Australian Forestry Council recommended a continuation of Commonwealth financial assistance to the States for softwood timber planting for a further five-year period. The Commonwealth Government agreed in principle to the Australian Forestry Council's recommendations and following negotiations with the States it was agreed that the Commonwealth would assist towards a State planting programme of 54,680 acres per annum on the same terms and conditions as in the first five-year programme. At the end of 1971–72 the *Softwood Forestry Agreements Bill* 1972 was introduced in the Commonwealth Parliament. Subject to the passage of this legislation, it is estimated that payments to all States would be $9.1 million in 1972–73, of which $4.1 million would be made available to cover expenditure incurred in 1971–72 and $5 million in 1972–73.

Employment in forestry

Persons engaged in forestry activities, 1966 census

The number of persons whose industry statements were classified to 'forestry' (excluding sawmilling) 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 following table details are shown of the number of persons employed by State forestry departments, the Northern Territory Administration, and by the Forestry and Timber Bureau in the Australian Capital Territory at 30 June 1971.

PERSONS EMPLOYED BY FORESTRY DEPARTMENTS
STATES AND TERRITORIES, 30 JUNE 1971

Occupational group	*N.S.W.*	*Vic.*	*Qld*	*S.A.*	*W.A.*	*Tas.*	*N.T.*	*A.C.T.*	*Aust.*
Professional staff	316	259	187	85	66	45	7	16	981
Non-professional field staff	306	272	94	30	263	140	28	2	1,135
Clerical staff	293	283	241	115	56	81	17	7	1,093
Extraction of timber	(a)1,461	..	..	..	17	..	14	..	5,921
Milling of timber		..	..	576	41	..	22	..	
Labour (forest workers, etc.)		828	1,696	285	481	333	94	73	
Total	**2,376**	**1,642**	**2,218**	**1,091**	**924**	**599**	**182**	**98**	**9,130**

(*a*) Excludes milling of timber.

Log sawmilling and veneer and plywood, etc., manufacturing activities

Selected details of the operations of establishments engaged in log sawmilling and the manufacture of plywood, etc., are set out in the tables below. These details were compiled from the annual censuses of Manufacturing for 1968–69 and 1969–70. For further details of the Manufacturing Census *see* Chapter 21, Manufacturing Industry.

MANUFACTURING ESTABLISHMENTS—LOG SAWMILLING (A.S.I.C. CLASS 2511)(a) SUMMARY OF OPERATIONS, 1968–69 AND 1969–70

		N.S.W.	Vic.	Qld	S.A.	W.A.	Tas.	N.T.	A.C.T.	Aust.
1968–69										
Establishments in operation during the year	No.	454	302	343	46	136	222	..	3	1,506
Employment(b)	,,	5,502	3,385	3,540	(c)	2,845	1,678	..	(c)	17,710
Turnover	$'000	53,101	32,849	28,812	(c)	25,850	15,029	..	(c)	164,325
Value added	,,	29,153	19,194	14,474	(c)	15,885	7,819	..	(c)	90,535
Fixed capital expenditure (outlay on fixed tangible assets less disposals)	,,	1,999	1,317	1,059	(c)	1,717	715	..	(c)	6,955
1969–70										
Establishments in operation during the year	No.	452	292	326	45	121	202	..	3	1,441
Employment(b)	,,	5,227	3,344	3,500	(c)	2,377	1,640	..	(c)	16,868
Turnover	$'000	55,501	35,029	32,220	(c)	23,871	13,481	..	(c)	171,881
Value added	,,	31,046	20,529	18,236	(c)	15,907	7,145	..	(c)	98,622
Fixed capital expenditure (outlay on fixed tangible assets less disposals)	,,	1,979	1,441	1,137	(c)	526	523	..	(c)	5,688

(a) Australian Standard Industrial Classification. *See* page 720. (b) As at 30 June; includes working proprietors. (c) Not available for publication.

MANUFACTURING ESTABLISHMENTS—PLYWOOD, VENEER AND MANUFACTURED BOARDS OF WOOD (A.S.I.C. CLASS 2513)(a): SUMMARY OF OPERATIONS, 1968–69 AND 1969–70

		N.S.W.	Vic.	Qld	S.A.	W.A.	Tas.	N.T.	A.C.T.	Aust.
1968–69										
Establishments in operation during the year	No.	37	12	28	7	5	3	..	..	92
Employment(b)	,,	2,670	683	2,643	548	(c)	(c)	..	..	7,498
Turnover	$'000	29,507	10,342	26,611	6,742	(c)	(c)	..	..	86,003
Value added	,,	13,626	4,859	11,728	2,845	(c)	(c)	..	..	38,611
Fixed capital expenditure (outlay on fixed tangible assets less disposals)	,,	2,199	297	626	2,040	(c)	(c)	..	..	5,590
1969–70										
Establishments in operation during the year	No.	38	12	25	7	4	3	..	..	89
Employment(b)	,,	2,879	769	2,305	590	(c)	(c)	..	..	7,499
Turnover	$'000	35,093	11,825	27,936	9,166	(c)	(c)	..	..	98,554
Value added	,,	16,588	5,058	11,086	4,912	(c)	(c)	..	..	43,766
Fixed capital expenditure (outlay on fixed tangible assets less disposals)	,,	783	687	926	506	(c)	(c)	..	..	3,345

(a) Australian Standard Industrial Classification. *See* page 720. (b) As at 30 June; includes working proprietors. (c) Not available for publication.

Forest production

Forest products

FOREST PRODUCTION(*a*): STATES AND TERRITORIES, 1970–71

Product		*N.S.W.*	*Vic.*	*Qld*	*S.A.*	*W.A.*	*Tas.*	*N.T.*	*A.C.T.*	*Aust.*
Logs for sawing, peeling, slicing, or pulping—										
Broadleaved—										
Eucalypt and related species	'000 cu ft	57,209	73,155	18,582	686	43,055	62,258	29	..	254,974
Rain forest species(*b*)	,,	4,570	..	8,259	..	..	..	..	..	12,829
Coniferous—										
Indigenous forest 'pines'—										
Cypress	,,	5,329	..	6,283	..	..	..	39	..	11,651
Other	,,	..	..	2,016	..	..	301	..	..	2,317
Plantation grown 'pines'	,,	12,249	19,558	5,323	31,461	3,102	2,010	..	1,960	75,662
Total logs	,,	*79,357*	*92,713*	*40,463*	*32,147*	*46,156*	*64,569*	*68*	*1,960*	*357,434*
Value of logs(*c*)	$'000	*25,204*	*32,659*	*14,741*	*7,763*	*9,479*	*14,037*	*21*	*459*	*104,363*
Hewn and other timber (not included above)—										
Firewood(*d*) (weight)	'000 tons	156	233	55	455	624	412	2	..	1,937
Other(*e*) (value)	$'000	11,471	2,619	3,928	532	(*f*)1,504	(*g*)263	5	107	(*h*)20,429
Value of hewn and other timber	,,	12,571	4,620	4,258	3,204	(*f*)5,871	(*g*)3,046	16	107	(*h*)33,692
Other forest products(*i*) (total value)	,,	341	88	592	53	(*j*)5	(*k*)	..	..	(*h*)1,079
Total value of forest products	,,	38,116	37,366	19,590	11,019	(*l*)16,176	17,083	37	567	139,955

(*a*) Excludes some production from private land, thought to be relatively small, details of which are not available. (*b*) Brushwoods and scrubwoods. (*c*) *See footnote (c) to the table Forest Production: Australia, 1966–67 to 1970–71, below.* (*d*) Excludes mill waste used as firewood. (*e*) Includes sleepers, transoms, girders, bridge timbers, mining timber, poles, piles, etc. (*f*) Excludes value of timber used for tannin extract, details of which are not available for publication. (*g*) Includes value of "Other forest products". (*h*) Incomplete: *see* individual States. (*i*) Includes charcoal (forest production only), tanning bark, essential oils, eucalyptus leaves, crude rutin, etc. (*j*) Excludes value of sandalwood and substitutes, details of which are not available for publication. (*k*) Not available for publication. (*l*) Includes value of timber used for tanning extract and sandalwood and substitutes.

FOREST PRODUCTION(*a*): AUSTRALIA, 1966–67 TO 1970–71

Product		*1966–67*	*1967–68*	*1968–69*	*1969–70*	*1970–71*
Logs for sawing, peeling, slicing, or pulping—						
Broadleaved—						
Eucalypt and related species	'000 cu ft	249,985	253,723	254,717	255,466	254,974
Rain forest species(*b*)	,,	12,131	12,755	13,272	13,333	12,829
Coniferous—						
Indigenous forest 'pines'—						
Cypress	,,	11,402	12,179	11,374	12,131	11,651
Other	,,	3,568	3,475	3,696	3,251	2,317
Plantation grown 'pines'	,,	61,385	59,134	65,669	72,317	75,662
Total logs	,,	*338,471*	*341,266*	*348,727*	*356,498*	*357,434*
Value of logs	$'000	*88,169*	*89,552*	(*c*)*90,340*	(*c*)*96,607*	(*c*)*104,363*
Hewn and other timber (not included above)—						
Firewood(*d*) (weight)	'000 tons	2,143	1,914	1,847	1,950	1,937
Other(*e*) (value)	$'000	15,477	16,926	(*f*)17,344	(*f*)18,055	(*f*)20,429
Value of hewn and other timber(*g*)	,,	28,112	27,702	(*f*)28,070	(*f*)29,623	(*f*)33,692
Other forest products(*h*) (total value)	,,	801	851	(*i*)774	(*i*)843	(*i*)1,079
Total value of forest products(*j*)	,,	117,746	118,769	119,717	127,669	139,955

(*a*) Excludes some production from private land, thought to be relatively small, details of which are not available. (*b*) Brushwoods and scrubwoods. (*c*) Included in this category are amounts attributable to sawmillers who carry out their own logging activities as a secondary part of their operations. As such, the values are attributable to the sawmilling industry which is part of manufacturing industry. However, the amount has been included in this table so that the overall value of forest products might be shown. The amount in question is estimated to be $26.1 million for 1968–69, or 28.9 per cent of the Australian total of $90.3 million; and $29.5 million in 1969–70, or 30.5 per cent of the total of $96.6 million. An estimate of the amount for 1970–71 is not available. (*d*) *See* footnote (*d*) to previous table. (*e*) *See* footnotes (*e*) and (*f*) to previous table. (*f*) Includes "other forest products" for Tasmania. (*g*) Incomplete; *see* footnote (*f*) to previous table. (*h*) *See* footnotes (*i*) and (*j*) to previous table. (*i*) Incomplete: figure for Tasmania included in 'Value of hewn and other timber'. (*j*) Includes value of 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 TO 1970-71
($'000)

Year	N.S.W.	Vic.	Qld	S.A.	W.A.	Tas.	N.T.	A.C.T.	Aust.
				GROSS VALUE(a)					
1966–67	31,631	29,675	17,199	8,888	13,301	16,627	73	351	117,746
1967–68	35,140	27,845	17,683	8,128	14,077	15,488	42	365	118,769
1968–69	34,369	28,517	18,411	8,528	13,465	16,015	42	371	119,717
1969–70	37,677	28,254	18,162	10,530	13,632	18,898	52	465	127,669
1970–71	38,116	37,366	19,590	11,019	16,176	17,083	37	567	139,955
				LOCAL VALUE(b)					
1966–67	30,967	29,036	12,631	8,853	12,473	14,332	73	351	108,716
1967–68	34,162	27,448	12,948	8,100	13,274	13,420	42	365	109,759
1968–69	33,649	28,174	13,472	8,499	12,591	13,546	42	371	110,344
1969–70	36,832	27,939	13,081	10,501	12,795	16,132	52	465	117,797
1970–71	37,293	36,966	14,059	10,989	14,847	14,201	37	567	128,960

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

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. The figures prior to 1968–69 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. Figures for 1968–69 have been compiled from the Manufacturing Census of the Integrated Economic Censuses and are not strictly comparable with previous years because of changes in the census units and scope.

OUTPUT OF AUSTRALIAN-GROWN TIMBER: ALL MILLS
STATES AND TERRITORIES, 1968-69(a)
('000 super ft)

	N.S.W.	Vic.	Qld	S.A.	W.A.	Tas.	A.C.T.	Aust.(b)
Sawn, peeled or sliced timber produced from logs—								
Broadleaved	338,831	280,091	132,650	3,741	179,250	166,001	..	1,100,564
Coniferous	60,918	35,275	65,965	104,367	8,802	1,337	6,313	282,977
Total timber produced	**399,748**	**315,366**	**198,615**	**108,108**	**188,052**	**167,338**	**6,313**	**1,383,540**

(a) Statistics for 1969–70 are not yet available, *see* page 719. (b) Nil production was recorded in the Northern Territory.

OUTPUT OF AUSTRALIAN-GROWN TIMBER, ALL MILLS: AUSTRALIA(a)
1964-65 TO 1968-69(b)
('000 super ft)

	1964–65	1965–66	1966–67	1967–68	1968–69
Logs treated—					
Broadleaved	2,767,843	(c)2,371,263	(c)2,313,256	(c)2,341,895	
Coniferous	728,691	(c)569,521	(c)554,838	(c)532,965	n.a.
Total logs treated	**3,496,535**	**(c)2,940,784**	**(c)2,868,093**	**(c)2,874,860**	
Sawn, peeled or sliced timber produced from logs above—					
Broadleaved	1,202,924	1,178,473	1,143,814	1,165,376	1,100,564
Coniferous	329,508	329,532	317,591	307,684	282,976
Total timber produced	**1,532,433**	**1,508,005**	**1,461,405**	**1,473,059**	**1,383,540**

(a) Excludes Australian Capital Territory and Northern Territory for years prior to 1968–69. (b) Statistics for 1969–70 are not yet available, *see* page 719. (c) Gross hoppus basis: not necessarily comparable with details for years prior to 1965–66, which are generally on a true volume basis. Gross hoppus measure is approximately 78.5 per cent of the true volume.

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. Information in respect of the value of this output may be found in the tables dealing with forest production on page 874.

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: AUSTRALIA, 1964-65 TO 1968-69(*a*)

('000 square feet: $\frac{3}{16}$-in basis)

State	*1964–65*	*1965–66*	*1966–67*	*1967–68*	*1968–69(b)*
New South Wales . .	59,045	(*c*)	58,791	64,903	71,087
Queensland . . .	(*c*)	(*c*)	(*c*)	(*c*)	83,961
Other States . . .	(*c*)	52,296	(*c*)	(*c*)	74,743
Australia . .	**217,059**	**187,258**	**200,451**	**230,018**	**229,791**

(*a*) Statistics for 1969–70 are not yet available, *see* page 719. Excludes Australian Capital Territory and Northern Territory before 1968–69. (*b*) Includes Australian Capital Territory and Northern Territory. (*c*) Not available for publication.

Of the total plywood produced in 1968–69, 125,033,000 square feet ($\frac{3}{16}$-in. basis) were classed as 'Commercial', 80,580,000 as 'Waterproof', 2,743,000 as 'Case', and 21,435,000 as 'Sliced fancy'.

During 1968–69, 709.6 million square feet ($\frac{1}{16}$-in. basis) of veneers were produced by the rotary process for the manufacture of plywood. In addition, 58.8 million square feet of sliced veneers were produced.

Manufactured boards

Particle board, resin or cement bonded of acoustic and other composition, amounted to 134,516,000 square feet during 1968–69.

Woodchips

Woodchips are manufactured from sawmill waste and other timber otherwise of little or no commercial value. Their primary use is the production of wood pulp. The recently established woodchip industry in Australia at present produces only for export to Japan, although there are long-term plans for the Australian production and export of wood pulp made from woodchips.

There are four companies, three in Tasmania and one in New South Wales, which operate chipping mills and which have entered into agreements to export woodchips to Japanese pulp mills. These agreements, covering periods ranging from 5 to 18 years, have committed for export more than 30 million tons of woodchips valued at about $460 million. It is expected that by 1975 Australia will be exporting annually about 2.8 million tons of woodchips valued at nearly $43 million. The first shipment of woodchips took place in January 1971 from Eden on the south coast of New South Wales to Japan. Two of the Tasmanian companies have already commenced shipments and by the first half of 1973 the other is expected to have commenced. Supplies of timber for chipping will come from State and privately owned forest lands, and from sawmill residues.

Wood pulp and paper

Wood pulp. During 1969–70 wood pulp production was 513,039 tons of chemical, mechanical and other pulp. During the previous year production was 410,933 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 1969–70 twenty-one paper mills were operating, nine in Victoria, three 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, 1967-68 TO 1969-70

Type of paper	Quantity (tons)			Value ($'000)		
	1967–68(a)	1968–69	1969–70	1967–68(a)	1968–69	1969–70
Newsprint	92,648	123,935	170,576	12,688	Not yet available *See* page 719	
Blotting	569	521	494	161		
Duplicating	10,212	10,898	9,564	3,876		
Printing and writing	112,780	121,013	124,271	35,922		
Wrapping—						
Kraft	183,591	230,444	268,433	43,344		
Other						
Paper felts	1,164	1,356	1,535	243		
Paper boards	334,660	342,403	378,894	57,093		

(a) Excludes Australian Capital Territory and Northern Territory.

Overseas trade in forest products, timber and timber products

Imports

IMPORTS OF FOREST PRODUCTS, TIMBER AND TIMBER PRODUCTS AUSTRALIA, 1968-69 TO 1970-71

		Quantity			Value ($'000 f.o.b.)		
		1968–69	1969–70	1970–71	1968–69	1969–70	1970–71
Crude wood, timber and cork—							
Wood waste and charcoal		..	..	..	16	18	16
Wood in the rough or roughly squared	'000 sup ft	49,033	54,871	45,460	3,322	3,671	3,165
Wood shaped or simply worked—							
Timber, sawn lengthwise, sliced or peeled, but not further prepared, of a thickness exceeding 5 mm—							
Conifer—							
Douglas fir	,,	195,132	165,323	176,129	21,785	21,479	19,970
Hemlock and balsam	,,	12,562	19,733	24,803	1,175	1,791	2,040
Radiata pine	,,	29,474	28,384	29,841	2,108	2,214	2,423
Redwood	,,	30,065	2,225	2,328	4,455	487	510
Western red cedar	,,		31,855	27,800		5,963	4,963
Other	,,	17,693	15,570	..	2,600	2,609	(a)3,405
Total conifer	,,	*284,926*	*263,090*	..	*32,123*	*34,543*	*(a)33,310*
Non-conifer		..	..	..	10,707	13,089	13,964
Timber (including blocks, strips, etc.), planed, tongued, grooved, rebated, etc., but not further manufactured—							
Conifer	'000 sup ft	5,028	4,470	5,356	802	844	1,050
Non-conifer	,,	1,756	3,125	4,337	336	618	862
Cork, raw and waste		..	..	..	282	294	426
Selected items of forest origin, other than crude wood, timber and cork—							
Tanning extracts of vegetable origin	cwt	96,015	63,524	56,824	565	570	543
Wood and cork manufactures (except furniture)—							
Veneers, plywoods, 'improved' or reconstituted wood and other wood, worked, n.e.s.		..	..	..	8,580	9,022	10,331
Wood manufactures n.e.s. (household utensils, domestic utensils, building carpentry, etc.)		..	..	..	4,417	4,966	5,274
Cork manufactures		..	..	..	1,372	1,398	1,667

(a) Includes a value of $38,373 for which no quantity has been included.

Imports of coniferous timbers, shaped or simply worked, came mainly from Canada, the United States of America and New Zealand in 1970–71. Malaysia was the source of by far the greater proportion of non-coniferous timber imports. Malaysia, the Federal Republic of Germany and the United Kingdom supplied most of Australia's imports of veneers, while plywood imports came mainly from Papua New Guinea and the Republic of China (Taiwan).

Exports

EXPORTS OF AUSTRALIAN FOREST PRODUCTS, TIMBER AND TIMBER PRODUCTS(a) AUSTRALIA, 1968-69 TO 1970-71

		Quantity			*Value ($'000 f.o.b.)*		
		1968–69	*1969–70*	*1970–71*	*1968–69*	*1969–70*	*1970–71*
Crude wood, timber and cork—							
Wood waste and charcoal (including shell and nut charcoal)		..	..	..	86	23	13
Wood in the rough or roughly squared		..	3,218	6,048	286	476	612
Wood, shaped or simply worked—							
Railway or tramway sleepers	'000 sup ft	3,312	8,214	8,883	522	1,279	1,541
Timber, sawn lengthwise, sliced or peeled, but not further prepared, of a thickness exceeding 5 mm—							
Conifer	,,	143	169	617	37	46	136
Non-conifer—Jarrah	,,	6,723	5,672	2,114	1,169	940	363
Other	,,	6,281	6,546	6,370	1,123	1,248	1,258
Timber (including blocks, strips, and friezes for parquet or wood block flooring, not assembled), planed, tongued, etc.—							
Conifer	,,	540	562	803	146	130	211
Non-conifer	,,	624	453	145	114	121	47
Cork, raw and waste	cwt	101	40	..	5	1	..
Selected items of forest origin other than crude wood, timber and cork—							
Natural gums, resins, gum-resins, balsam and lacs	,,	7,569	7,839	7,233	60	61	51
Eucalyptus oil	'000 lb	205	304	244	149	180	153
Wood and cork manufactures (except furniture)—							
Veneers, plywood boards, etc.—							
Wood sawn lengthwise, sliced or peeled, not further prepared, veneer sheets and sheets for plywood, of a thickness not exceeding 5 *mm*	'000 sq ft	3,604	9,228	7,156	162	383	303
Plywood, blockboard, laminated wood products, inlaid wood and marquetry, cellular wood panels—							
Plywood	,,	1,710	2,090	2,181	319	400	533
Other	,,	1,928	633	1,548	162	57	107
Reconstituted wood, in panels, sheets or strips	,,	1,262	1,844	2,358	191	311	351
Wooden beadings and mouldings	,,	..	..	..	176	143	103
Improved wood, and wood simply shaped or worked, n.e.s.		..	..	..	25	12	30
Wood manufactures n.e.s., and plants and parts of plants used in dyeing and tanning		..	..	..	1,245	622	1,122
Cork manufactures n.e.s.		..	..	..	78	118	159

(a) Excludes re-exports.