

CHAPTER 24

FORESTRY

Source of statistics

Statistics relating to the forest resource have been derived from data presented to the Forestry and Wood-based Industries Development Conference, Canberra, 1974 by various authorities concerned with forestry administration and by private forestry companies. Other information on forested areas has been provided by the 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 products have been compiled by the Commonwealth Statistician 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 maximum benefits, both direct and indirect, for the community. The authorities aim to promote the multiple use concept in management under which forests remain in perpetuity as sources of valuable raw material, areas of natural beauty, sanctuaries for fauna and flora, and areas for scientific investigation and watershed protection. The provision of special protected areas such as forest parks for recreational use and for the conservation of plants and animals is an objective. Forestry also aims at improving existing forests and woodlands by properly controlled harvesting, by protection from such destructive agencies as fire, insects and diseases, 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 more suited under forest than under 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. Productive, or potentially productive, forests cover 42.5 million hectares, and of these 99 per cent are natural forests. 35 million hectares of the natural forests are dominated 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 250 mm to those where it is 4,000 mm. 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 250 to 500 mm per annum, as on the goldfields of Western Australia where salmon gum (*E. salmonphloia*), 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 *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 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 glauca*). 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 (*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 Food and Agriculture Organisation World Forestry Inventory, 1970 gave the total area of forests plus other wooded areas as 137.7 million hectares. Resource data prepared for the Forestry and Wood-based Industries Conference, 1974 show the total area of forest as 42.5 million hectares based on a definition of forest which included plantations, native forest with an existing or potential mature height of 20 metres or more, and cypress pine forest in commercial use, regardless of height. The difference between the areas revealed by the two surveys is largely explained by the fact that the definition of 'forest' was changed considerably between the two reference dates. The following tables show classifications of total forest area in Australia by forest type and by ownership.

CLASSIFICATION OF FOREST AREAS BY FOREST TYPE, 30 JUNE 1971

(Source: Forwood Conference, 1974)(a)

('000 hectares)

Forest type	N.S.W.	Vic.	Qld	S.A.	W.A.	Tas.	N.T.	A.C.T.	Aust.
Rain forest	300	..	1,068	..	..	456	37	..	1,861
Eucalypt—									
Productivity(b) I	1,183	644	212	..	213	457	..	..	2,709
" " II	(c)3,678	4,582	1,361	..	2,777	1,838	..	(c)	14,237
" " III	8,348	559	3,382	..	36	..	..	..	12,325
Tropical eucalypt and paper bark . . . . .	..	..	4,078	..	..	..	2,450	..	6,528
Cypress pine	1,908	..	1,673	..	..	..	777	..	4,358
Plantations(d)	107	109	99	88	40	26	1	13	484
Total forest area	15,524	5,895	11,874	88	3,066	2,778	3,266	13	42,503

(a) For further information on data contained in this table, see the Report of Panel 2 (Forest Resources) of the Forestry and Wood-based Industries Development Conference, 1974. (b) Eucalypt forest types have been grouped into three classes in descending order of productivity. (c) Eucalypt forest (probably of Productivity Class II) in the A.C.T. has not been separated from eucalypt forest in N.S.W. (d) As at 31 March 1972

CLASSIFICATION OF FOREST AREAS BY OWNERSHIP, 30 JUNE 1971

(Source: Forwood Conference 1974)

('000 hectares)

Ownership	N.S.W.	Vic.	Qld	S.A.	W.A.	Tas.	N.T.	A.C.T.	Aust.
State(a)	2,884	2,412	3,182	70	1,925	926	312	13	11,725
Other public(b)	(c)6,487	2,755	6,895	..	416	721	2,639	(d)	19,912
National parks(e)	(c)864	128	366	1	34	122	314	(d)	1,830
Private(f)	5,288	600	1,431	17	691	1,009	..	..	9,036
Total	15,524	5,895	11,874	88	3,066	2,778	3,266	13	42,503

(a) Publicly owned land, permanently reserved or dedicated primarily to timber production. (b) Publicly owned land, vacant or occupied under lease, not specifically secured for permanent timber production, but on which control of timber rests with the Crown. (c) Includes the A.C.T. (d) Areas in this category in the A.C.T. have been included in the New South Wales total. (e) Publicly owned land, permanently reserved for purposes other than timber production. (f) Privately owned land, and leasehold land, where the Crown has no control over timber rights.

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 large area of planted conifers, and for some years has been obtaining considerable quantities of timber from these plantations. Production is also increasing in 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 2.6 million cubic metres per annum and is expected to increase substantially during the next decade.

A special article 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. 59, page 880.

Broadleaved plantations (mainly *Eucalyptus ssp.*) comprise 27,800 hectares, a much smaller area than for the coniferous plantations. Plantations of ash eucalypts (including *E. delegatensis* and *E. regnans*) for pulpwood in Victoria, and brown mallet (*E. astringens*) for tan bark production in Western Australia make up a substantial proportion of the total broadleaved plantation area. The following tables show total area of plantations in Australia classified by species and by ownership.

AREA OF PLANTATIONS CLASSIFIED BY SPECIES, 31 MARCH 1972

(Source: Forwood Conference 1974)

(Hectares)

	N.S.W.(a)	Vic.	Qld	S.A.	W.A.	Tas.	N.T.	A.C.T.	Aust.
Coniferous plantations—									
Pinus radiata	83,500	96,200	2,400	79,600	14,900	26,200	..	11 700	314,500
Pinus pinaster . . . . .	..	500	..	5,900	17,700	..	..	..	24,100
Pinus elliptii	(b)11,700	..	51,400	..	..	..	..	..	63,100
Pinus caribaea . . . . .	..	..	5,800	..	..	..	100	..	5,900
Araucaria species	1,200	..	32,600	..	..	..	..	..	33,800
Callitris intratropica . . . . .	..	..	..	..	..	..	1,400	..	1,400
Other coniferous species	4,900	3,400	3,500	800	..	200	..	1,000	13,800
<i>Total</i>	101,300	100,100	95,700	86,300	32,600	26,400	1,500	12,700	456,600
Broadleaved plantations—									
Eucalyptus species	5,100	9,000	(c)3,100	1,400	7,800	..	..	..	26,400
Populus species	1,100	300	..	..	..	..	..	..	1,400
<i>Total</i>	6,200	9,300	3,100	1,400	7,800	..	..	..	27,800
Grand total	107,500	109,400	98,800	87,700	40,400	26,400	1,500	12,700	484,400

(a) Private woodlots of less than 40 hectares are not included. (b) Includes some *Pinus taeda*. (c) Includes approximately 400 hectares of native cabinet wood species.

AREA OF PLANTATIONS CLASSIFIED BY OWNERSHIP, 31 MARCH 1972

(Source: Forwood Conference 1974)

(Hectares)

Ownership(a)	N.S.W.	Vic.	Qld	S.A.	W.A.	Tas.	N.T.	A.C.T.	Aust.
Coniferous plantations—									
State	85,600	50,100	76,700	68,700	30,100	18,600	12,700	1,500	344,000
Other public	600	3,500	..	1,000	..	200	..	..	5,300
Private	(b)15,100	46,500	19,000	16,600	2,500	7,600	..	..	107,300
<i>Total</i>	101,300	100,100	95,700	86,300	32,600	26,400	12,700	1,500	456,600
Broadleaved plantations—									
State	1,600	4,200	2,200	1,400	7,800	..	..	..	17,200
Other public	500	1,200	..	..	..	..	..	..	1,700
Private	(b)4,100	3,900	900	..	..	..	..	..	8,900
<i>Total</i>	6,200	9,300	3,100	1,400	7,800	..	..	..	27,800
Grand total	107,500	109,400	98,800	87,700	40,400	26,400	12,700	1,500	484,400

(a) For definitions of the terms 'State', 'other public' and 'private', see footnotes (a), (b) and (f) to the table Classification of Forest Areas by Ownership on page 901. (b) Private woodlots of less than 40 hectares are not included.

Australian Government loans to expand softwood plantations

The first steps in the creation of government plantations in Australia were taken in 1870 in South Australia. Planting commenced in 1876 and has continued without interruption ever since. Small plantations were later established in other States, notably Victoria. Planting progressed at a steady rate between the two World Wars. After the Second World War, planting programs were recommenced, but at a rate insufficient to provide Australia's future requirements for softwood.

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 16,000 hectares a year to 30,000 hectares 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 26,000 hectares per annum together with plantings by the Australian Government in the Territories of 1,000 hectares per annum, and an average of at least 4,000 hectares per annum by private forest owners. The Council considered that such a program would make a major contribution towards meeting Australia's future requirements for softwood products.

In February 1966 the Australian Government endorsed this recommendation and agreed, as a first step towards achieving the proposed annual target of 30,000 hectares, 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 was 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 *Softwoods Forestry Agreements Act 1967* authorised the Australian Government 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.

In February 1969 the Australian Forestry Council recommended a continuation of Federal financial assistance to the States for softwood timber planting for a further five-year period. The resulting *Softwood Forestry Agreements Act 1972* authorised the Australian Government to provide financial assistance to the States, by way of loans, during the financial years 1971-72 to 1975-76 inclusive. These loan funds are to be provided on the same terms and conditions as for the first program.

Payments under the two Acts to all States have been as follows: 1966-67, \$291,000; 1967-68, \$3,456,000; 1968-69, \$3,872,000; 1969-70, \$4,814,000; 1970-71, \$4,784,000; 1971-72, \$389,338; 1972-73, \$9,459,000; 1973-74 (estimated), \$5,378,000; 1974-75, (estimated) \$5,350,000; 1975-76 (estimated), \$5,750,000. Of the 1972-73 payment of \$9.5 million, \$4.3 million was made available to cover expenditure incurred in 1971-72.

Forest administration and research

Forestry and Timber Bureau. The functions of the 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 Australian Government on forestry matters. The administrating department is the Department of Agriculture.

In 1961 the Australian Government expanded its activities in forestry research when the Forest Research Institute was formed as a separate branch of the Forestry and Timber 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 program 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: forest genetics, controlled environment, forest nutrition, forest botany, tree seeds, forest ecology, forest entomology and pathology, fire protection and watershed management. The Forest Research Institute maintains six regional establishments in the States and Northern Territory. 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 Forest Resources Development 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 and is concerned with the application of aerial photography and remote sensing techniques to resource assessments.

Commonwealth Scientific and Industrial Research Organization. The Divisions of Building Research and Chemical Technology carry out a wide range of investigations relating to the properties of wood and the uses of wood and wood products. Research on processing logs and timber, solid and composite wood products, timber engineering, and the applications of wood in building is undertaken by the Division of Building Research. The Division of Chemical Technology was created in February 1974 following a reorganisation of the C.S.I.R.O. research effort in which the previous Division of Applied Chemistry ceased to exist as a separate entity. The research program of the new Division of Chemical Technology is directed towards the recycling of resources, utilisation of renewable resources, and the protection and conservation of natural resources. Problems of the pulp and paper industry, and bushfire research are receiving particular attention.

Most of the present forest products activities of both Divisions are conducted at the C.S.I.R.O. Forest Products Laboratory in South Melbourne. The Divisions provide assistance to individuals and industry, administer courses of instruction on timber properties and usage, and maintain co-operative projects with overseas authorities operating in the same fields.

Forestry in the Territories. The management of forests in the Australian Capital Territory is the responsibility of the Forests Branch of the Department of the Capital Territory. Forests in the Northern Territory are under the control of the Forestry Section of the Department of the Northern Territory.

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 programs. 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. In the States publicly owned land permanently reserved or dedicated primarily for timber production amounts to 11.4 million hectares, the timber on a further 17.3 million hectares not specifically reserved for permanent timber production being under the control of the Crown.

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 programs, the number of professional foresters employed in private forestry enterprise is increasing, while several are engaged on research.

The area of plantations established by private companies and individuals is included in the table on page 902.

Forestry education

The Australian National University's Department of Forestry in Canberra and the School of Forestry of the University of Melbourne offer undergraduate courses leading to a Bachelor of Science degree in forestry. Universities in all States have facilities for post-graduate studies for forestry graduates. Foresters for the Forests Commission of Victoria are trained at a departmental Forestry School at Creswick, Victoria. States other than Victoria offer traineeships to students selected for university training in forestry. These traineeships support the students and meet their expenses throughout the four year university course. Successful graduates are appointed as forestry officers in the State Forest Services. The Australian Government also offers forestry scholarships to cover the cost of university training in forestry for those selected.

The Australian Forestry Council

The Australian Forestry Council comprises the Ministers responsible for forestry in the six State Governments and the Australian Government.

The Council is intended to provide the means for the mutual exchange between the State and Australian 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 Australian 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., and the secretaries of the Australian Government Departments responsible for forestry.

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 19 million hectares of forest land, of which a relatively accessible area of 9 million hectares is given a high degree of protection, about 7 million hectares in the more inaccessible areas receive a lesser degree of protection, and about 3 million hectares are at present not protected. Other extensive forest areas consisting mainly of vacant Crown land, but including land under private ownership of 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 1972-73 fire season a total of 1,816 fires were recorded over the area of 16 million hectares of forest land afforded either intensive or extensive protection by forest authorities. The area burnt by these fires totalled 348,000 hectares or 2.2 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 AREA BURNT
IN PROTECTED FORESTS(a)**

(Source: Forestry and Timber Bureau)

Year	Number of fires	Forest area burnt	Percentage of forest area burnt
		'000 hectares	
1963-64	1,494	222	1.5
1964-65	2,307	658	4.1
1965-66	1,865	188	1.2
1966-67	1,422	157	1.0
1967-68	1,754	305	1.9
1968-69	2,165	763	4.7
1969-70	905	53	0.3
1970-71	1,018	71	0.4
1971-72	1,195	185	1.1
1972-73	1,816	348	2.2

(a) The area receiving protection has been taken as the 16 million hectares 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 program is now between 25,000 and 30,000 hectares. During the 1972-73 fire season a total of 326 hectares was burnt, representing 0.07 per cent of the area of 451,000 hectares for which fire 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**

(Source: Forestry and Timber Bureau)

Year	Number of fires	Area burnt	Area of coniferous plantations(a)	Percentage of coniferous area burnt
		hectares	'000 hectares	
1963-64	} n.a.	169	208	0.08
1964-65		1,267	225	0.56
1965-66		615	247	0.25
1966-67		187	267	0.07
1967-68		117	295	0.04
1968-69	39	909	316	0.29
1969-70	51	60	354	0.02
1970-71	40	568	402	0.14
1971-72	113	127	429	0.03
1972-73	138	326	451	0.07

(a) This area does not include certain privately owned coniferous plantations for which fire statistics are not available.

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

Employment in forestry

In the following table details are shown of the number of persons employed by State forestry departments, the Department of the Capital Territory, the Department of the Northern Territory, the Forestry and Timber Bureau in the relevant States and Territories, and the private sector of the forestry industry at 30 June 1973. The table excludes staff of forestry training establishments.

PERSONS EMPLOYED IN FORESTRY^(a), 30 JUNE 1973

Occupational group	N.S.W.	Vic.	Qld	S.A.	W.A.	Tas.	N.T.	A.C.T.	Aust.
Professional staff—									
Foresters	226	265	121	61	59	60	15	45	852
Others	78	30	93	33	17	24	..	10	285
Field and other technical staff	287	329	120	53	269	251	37	43	1,389
Clerical staff	298	317	250	132	67	145	19	63	1,291
Labour ^(b)	1,119	1,422	1,858	319	548	709	86	113	6,174
Extraction ^(c)	3,319	1,211	2,500	191	805	3,208	19	37	11,290
Total	5,327	3,574	4,942	789	1,765	4,397	176	311	21,281

(a) The Forestry and Timber Bureau has provided figures for employment within its own organisation. (b) Staff engaged in silvicultural forest works, etc. (c) Staff engaged in felling, carting, etc. Includes direct employees only.

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 census of Manufacturing for 1972-73. 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, 1972-73

	N.S.W.	Vic.	Qld	S.A.	W.A.	Tas.	N.T.	A.C.T.	Aust.
Establishments in operation at 30 June	No. 419	237	301	39	97	159	2	4	1,258
Employment ^(b)	5,114	3,190	3,219	591	2,053	1,501	(c)	(c)	15,844
Turnover	\$'000 72,725	45,742	38,278	12,660	23,617	20,349	(c)	(c)	215,303
Value added	42,005	27,599	23,279	3,784	16,060	10,429	(c)	(c)	124,013
Fixed capital expenditure (outlay on fixed tangible assets less disposals)	2,697	4,045	1,994	218	1,257	346	(c)	(c)	11,253

(a) Australian Standard Industrial Classification. See page 730. (b) Average over whole year; 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, 1972-73

	N.S.W.	Vic.	Qld	S.A.	W.A.	Tas.	N.T.	A.C.T.	Aust.
Establishments in operation at 30 June	No. 32	12	30	8	3	3	..	..	88
Employment ^(b)	2,631	830	2,319	724	(c)	(c)	..	..	7,313
Turnover	\$'000 44,826	17,662	37,168	14,492	(c)	(c)	..	..	132,166
Value added	21,294	7,872	18,389	7,080	(c)	(c)	..	..	62,495
Fixed capital expenditure (outlay on fixed tangible assets less disposals)	1,171	1,581	-257	3,737	(c)	(c)	..	..	6,596

(a) Australian Standard Industrial Classification. See page 730. (b) Average over whole year; includes working proprietors. (c) Not available for publication.

Forest production

FOREST PRODUCTION(a), 1972-73

	N.S.W.	Vic.	Qld	S.A.	W.A.	Tas.	N.T.	A.C.T.	Aust.	
Production of logs for sawing, peeling, slicing or pulping—										
Broadleaved—										
Eucalypt and related species	'000 m ³	1,955	1,702	494	6	1,062	3,160	1	..	8,381
Rain forest species	..	137	..	258	..	..	..	..	..	396
Coniferous—										
Indigenous forest conifers—										
Cypress	..	154	..	195	..	..	..	1	..	350
Other	71	..	..	8	..	..	80
Plantation grown conifers										
Total	..	230	689	172	919	101	56	..	104	2,272
Total	..	2,478	2,391	1,191	925	1,163	3,224	2	104	11,478
Gross value of forest products(b)—										
Logs(c)										
Hewn and other timber (incl. firewood)(d)	\$'000	31,971	31,583	16,698	8,048	7,968	27,897	25	932	125,122
Other forest products(f)	..	11,254	5,119	5,208	2,514	(e)7,028	3,025	10	56	(e)34,212
Total	..	306	90	809	121	(g)	..	..	4	(g)1,331
Total	..	43,531	36,792	22,715	10,683	14,996	30,922	35	992	160,665
Local value of forest products(k)—										
Total	..	43,491	36,445	14,458	10,656	13,574	25,360	35	992	145,011

(a) Excludes some production from private land thought to be relatively small, details of which are not available. (b) Gross production valued at principal markets. See the chapter Miscellaneous for a more detailed reference to the value of production of forestry, as well as a brief explanation of the terms used. (c) See footnote (c) to the table Forest Production: Australia, below. (d) Includes also sleepers, transoms, girders, bridge timbers, mining timber, poles, piles, etc. (e) Includes value of 'Other forest products' in Western Australia, which is not available for publication. (f) Includes charcoal (forest production only), tanning bark, essential oils, eucalyptus leaves, crude rutin, etc. (g) Value of 'Other forest products' in Western Australia has been included with 'Hewn and other timber'.

FOREST PRODUCTION(a): AUSTRALIA

	1968-69	1969-70	1970-71	1971-72	1972-73	
Production of logs for sawing, peeling, slicing or pulping—						
Broadleaved—						
Eucalypt and related species	'000 m ³	7,096	7,073	7,088	7,606	8,381
Rain forest species	..	376	378	363	370	396
Coniferous—						
Indigenous forest conifers—						
Cypress	..	322	344	330	333	350
Other	..	105	92	66	71	80
Plantation grown conifers						
Total	..	1,812	1,963	2,058	2,057	2,272
Total	..	9,710	9,849	9,905	10,436	11,478
Gross value of forest products(b)—						
Logs(c)						
Hewn and other timber (including firewood)(d)	\$'000	90,166	93,964	101,645	112,086	125,122
Other forest products(h)	..	(ef)28,070	(ef)29,623	(ef)33,624	(e)33,581	(g)34,212
Total	..	(i)774	(i)843	(i)1,079	1,522	(j)1,331
Total	..	(k)119,543	(k)125,026	(k)137,168	(k)147,852	160,665
Local value of forest products(l)—						
Total	..	110,170	115,155	126,173	135,484	145,011

(a) Excludes some production from private land, thought to be relatively small, details of which are not available. (b) See footnote (b) to the table Forest Production, 1972-73, above. (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 subsequent years is not available. (d) Includes also sleepers, transoms, girders, bridge timbers, mining timber, poles, piles, etc. (e) Excludes value of timber used for tannin extract in Western Australia, which is not available for publication. (f) Includes value of 'Other forest products' for Tasmania. (g) Includes value of 'Other forest products' in Western Australia, which is not available for publication. (h) Includes charcoal (forest production only), tanning bark, essential oils, eucalyptus leaves, crude rutin, etc. Excludes value of sandalwood and substitutes in Western Australia, which is not available for publication. (i) Incomplete; figure for Tasmania included in value of 'Hewn and other timber'. (j) Value of 'Other forest products' in Western Australia has been included with 'Hewn and other timber'. (k) Includes value of timber used for tanning extract and sandalwood and substitutes in Western Australia. (l) Gross production valued at place of production. See footnote (b) to the table above.

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 and later years are not strictly comparable with previous years because of changes in the census units and scope.

OUTPUT OF AUSTRALIAN-GROWN TIMBER: ALL MILLS(a), 1972-73 (^{'000} cubic metres gross hoppus)

	<i>N.S.W.</i>	<i>Vic.</i>	<i>Qld</i>	<i>S.A.</i>	<i>W.A.</i>	<i>Tas.</i>	<i>A.C.T.</i>	<i>Aust.(a)</i>
Sawn, peeled or sliced timber produced from logs—								
Broadleaved	845	651	285	10(a)	378	392	..	2,561
Coniferous	175	115	168	326(a)	22	8	35	848
Total timber produced	1,019	766	453	336(a)	400	400	35	3,409

(a) Includes Northern Territory.

AUSTRALIAN-GROWN LOGS TREATED AND TIMBER PRODUCED, ALL MILLS AUSTRALIA(a) (^{'000} cubic metres gross hoppus)

	1967-68	1968-69	1969-70	1971-72	1972-73
Logs treated—					
Broadleaved(b)	5,527	5,335	5,260	5,125	5,375
Coniferous(b)	1,258	1,288	1,304	1,457	1,565
Total logs treated(b)	6,785	6,623	6,564	6,582	6,940
Sawn, peeled or sliced timber produced from logs above—					
Broadleaved	2,750	2,630	2,672	2,584	2,561
Coniferous	726	769	714	782	848
Total timber produced	3,476	3,399	3,386	3,367	3,409

(a) Excludes Australian Capital Territory and Northern Territory for years prior to 1968-69. (b) 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 907.

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 (^{'000} square metres: $\frac{3}{8}$ " basis)

State	1967-68	1968-69	1969-70	1971-72	1972-73
New South Wales	6,030	6,604	7,362	6,736	} 17,141
Queensland	(b)	7,934	9,328	8,632	
Other States	(a)(b)	7,102	7,438	6,500	
Australia	(a)21,369	21,640	24,128	21,868	24,769

(a) Excludes Australian Capital Territory and Northern Territory. (b) Not available for publication.

Of the total plywood produced in 1972-73, 13,225,000 square metres ($\frac{3}{16}$ " basis) were classed as 'Commercial', 9,370,000 as 'Waterproof', 321,000 as 'Case', and 1,852,000 as 'Sliced fancy'.

During 1972-73, 73.0 million square metres ($\frac{1}{8}$ " basis) of veneers were produced by the rotary process for the manufacture of plywood. In addition, 8.2 million square metres of sliced veneers were produced.

Manufactured boards

Particle board, resin bonded, amounted to 21,355,000 square metres during 1972-73.

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. The contract covering the export of woodchips from New South Wales, spanning a 20 year period, allows for an annual export of 610,000 tonnes of chips; the total quantity under contract being 3.4 million tonnes. Exports from Tasmania are covered by four contracts, ranging in length from 5½ to 15 years, and involving a total quantity of 22.2 million tonnes. The Tasmanian contracts involve annual shipments ranging from 310,000 to 710,000 tonnes. It is expected that by 1988, these four projects will export a total of 30 million tonnes of woodchips to Japan valued at about \$460 million. All four companies had commenced exports by 1972. Supplies of timber for chipping will come from State and privately owned forest lands, and from sawmill residues.

In addition to the above projects, a 15 year contract has been concluded between a Western Australian company and Japanese paper makers for the supply of up to 760,000 tonnes of woodchips per annum, valued in total at about \$200 million, from Western Australia.

Wood pulp and paper

Wood pulp. During 1972-73 wood pulp production was 532,492 tonnes of chemical, mechanical and other pulp. During the previous year production was 506,333 tonnes.

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. 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

(tonnes)

Type of paper	1969-70	1970-71	1971-72	1972-73
Newsprint	173,314	178,683	181,477	199,054
Blotting	496	500	443	(a)
Duplicating	9,718	12,395	14,594	(a)
Printing and writing	125,226	128,842	126,367	131,124
Wrapping—				
Kraft	274,048	272,223	283,949	299,891
Other				
Paper felts	1,500	1,569	1,276	989
Paper boards	376,626	385,227	382,033	411,246

(a) Information not available for publication.

Imports

IMPORTS OF FOREST PRODUCTS, TIMBER AND TIMBER PRODUCTS
AUSTRALIA

	Quantity			Value (\$'000 f.o.b.)		
	1970-71	1971-72	1972-73	1970-71	1971-72	1972-73
Crude wood, timber and cork—						
Wood waste and charcoal				16	23	13
Wood in the rough or roughly squared	'000 m ³	109	97	103	3,165	2,806
Wood shaped or simply worked—						
Railway or tramway sleepers	"	13	13	..	860	724
Timber, sawn lengthwise, sliced or peeled, but not further prepared, of a thickness exceeding 5 mm—						
Conifer—						
Douglas fir	"	423	423	467	19,970	20,462
Hemlock and balsam	"	60	72	103	2,040	2,636
Radiata pine	"	72	51	53	2,423	1,858
Redwood	"	6	4	10	510	328
Western red cedar	"	67	71	83	4,963	4,958
Other	"	33	33	34	(a)2,545	2,580
Total conifer	"	661	654	750	(a)32,451	32,822
Non-conifer(b)	"	244	219	460	13,964	12,154
Timber (including blocks, strips, etc.), planed, tongued, grooved, rebated, etc., but not further manufactured—						
Conifer	'000 m ³	13	12	24	1,050	1,087
Non-conifer	"	10	19	55	862	1,678
Cork, raw and waste . . . . .	"	..	..	..	426	503
Selected items of forest origin, other than crude wood, timber and cork—						
Tanning extracts of vegetable origin	tonnes	2,541	2,558	2,262	482	514
Wood and cork manufactures (except furniture)—						
Veneers, plywoods, 'improved' or reconstituted wood and other wood, worked, n.e.s.(c)	'000 m ³	19,146	20,523	n.a.	10,331	10,246
Wood manufactures n.e.s. (house- hold utensils, domestic utensils, building carpentry, etc.) . . . . .	"	..	..	..	5,274	5,852
Cork manufactures . . . . .	"	..	..	..	1,666	1,721

(a) Includes a value of \$38,000 for which no quantity has been included. (b) Total values for this item for 1970-71, 1971-72 and 1972-73 include values of \$94,000, \$184,000, and \$184,000 respectively, for which no quantities have been included. (c) Total values for this item for 1970-71 and 1971-72 include values of \$795,000 and \$1,040,000 respectively, for which no quantities have been included.

Exports

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

	Quantity			Value (\$'000 f.o.b.)		
	1970-71	1971-72	1972-73	1970-71	1971-72	1972-73
Crude wood, timber and cork—						
Wood waste and charcoal (including shell and nut charcoal)	'000 m ³	..	..	..	13	3
Pulpwood	"	5	..	..	62	..
Wood in the rough or roughly squared	"	10	7	7	550	358
Wood, shaped or simply worked—						
Railway sleepers	"	21	38	30	1,541	2,683
Timber, sawn lengthwise, sliced or peeled, but not further prepared, of a thickness exceeding 5 mm—						
Conifer	"	1	1	2	136	120
Non-conifer—Jarrah	"	5	4	5	363	503
Other	"	15	18	26	1,258	1,510
Timber (including blocks, strips and friezes for parquet or wood block flooring, not assembled), planed, tongued, etc.—						
Conifer	"	2	2	7	211	205
Non-conifer	"	348	2,187	10	47	198
Cork, raw and waste	tonnes	..	2	2	..	2
Selected items of forest origin other than crude wood, timber and cork—						
Natural gums, resins, gum-resins, balsam and lacs	"	367	423	611	51	68
Eucalyptus oil	"	111	108	118	153	165
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 m ³	665	413	728	303	244
Plywood, blockboard, laminated wood products, inlaid wood and marquetry, cellular wood panels—						
Plywood	"	203	415	645	533	487
Other	"	144	159	91	107	145
Reconstituted wood, in panels, sheets or strips, and improved wood	"	219	168	347	351	(b)308
Wooden beadings and mouldings . . . . .	"	..	..	..	103	59
Wood simply shaped or worked, n.e.s. . . . .	"	..	..	..	12	18
Wood manufacturers n.e.s., and plants and parts of plants used in dyeing and tanning . . . . .	"	..	..	..	1,122	1,117
Cork manufactures, n.e.s. . . . .	"	..	..	..	159	265
						931
						128

(a) Excludes re-exports. (b) Includes a value of \$3,000 for which no quantity has been included. (c) Includes a value of \$17,000 for which no quantity has been included. (d) Includes woodchips, which were not available for publication prior to 1972-73.

