

CHAPTER 24

FORESTRY

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

Source of statistics

Statistics relating to forestry are, in general, provided by the various authorities concerned with forestry administration. Particulars of forest reservations contained in this chapter have been collected by the Statisticians of the various States, mainly from information provided by the State forestry authorities. Other information on forested areas has been provided by the Commonwealth Forestry and Timber Bureau, which has also supplied certain other data. Statistics of timber and by-products have been compiled from the annual factory collections undertaken by the Statisticians in the several States. Figures of production of gums, resins and tanning barks have been provided by the State forestry authorities. Data of imports and exports of forest products and timber and timber products have been compiled in the Commonwealth Bureau of Census and Statistics as part of the statistics of oversea trade. The figures shown relate, in general, to years ended 30 June.

Forestry in Australia

Objects of forestry

The main object of forestry authorities is to manage the forests of the country in a manner that will provide the maximum benefits, both direct and indirect. Direct benefits include the provision of essential commercial commodities such as structural timber, pulpwood, plywood, veneers, firewood, bark products, tars, oil, and resins. Indirect benefits include protection of soil and stock from wind and exposure, regulation of stream flow, provision of recreational facilities, and aesthetic effects. Forestry also aims at improving existing forests and woodlands by properly controlled exploitation, by protection from such destructive agencies as fire and insect attack, and by inducing regeneration where it is desirable. The provision of a partial tree cover on denuded lands where this cover is necessary for protective purposes and a complete cover when the land is better under forest than under any other land use are further aims of forestry.

General account of forests and timbers

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

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

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

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

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

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

In 1964-65 the volume of eucalypt timber sawn was 1,001 million super. feet.

Other broadleaved timbers (hardwoods). Broadleaved genera other than *Eucalyptus* cover a comparatively small portion of the forested land in Australia (some 6 per cent), but these areas provide a great variety of timbers suitable for a multitude of uses. There are two basic types of forest containing supplies of broadleaved timbers other than eucalypts, namely, the tropical and sub-tropical rainforests of coastal New South Wales and Queensland and the temperate rainforests of southern Victoria and Tasmania, both of which yield species known collectively as rainforest or brushwood species. The total volume of brushwood species produced in 1964-65 was estimated at 78 million super. feet, i.e. less than 7 per cent of the total broadleaved timber cut in Australia.

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

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

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

Conifers (softwoods). One of the most important species of native conifers is white cypress pine (*Callitris hugelii*). The main cypress pine forests of commercial value occur in New South Wales and southern Queensland west of the Great Dividing Range. The trees are comparatively small, but the timber has particular value owing to its durability and resistance to termites. It is suitable for use as scantlings, flooring, linings, weatherboards, poles, and posts. As much of the area originally covered by cypress pine has been cleared for wheat farming and grazing, the production from the remaining State forests is now strictly regulated to ensure a continuous supply. The volume of cypress pine cut in 1964-65 was approximately 74.3 million super. feet.

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

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

Extent of forested areas

Estimates prepared for the Eighth British Commonwealth Forestry Conference held in Kenya in 1962 show the total area of forest in Australia as 512.2 million acres, or about 27 per cent of

the total land area of the continent. In making these estimates the Food and Agriculture Organization definition of 'forest' (published in *World Forest Inventory*, 1958, page 123) was used. This definition includes areas of sparse or stunted tree growth, and in the case of Australia some four-fifths of the total forest area falls into this category.

CLASSIFICATION OF FOREST AREA(a): AUSTRALIA

(Source: Forestry and Timber Bureau)

('000 acres)

Type of forest	Area
LANDS	
Accessible forests—	
Productive forests in use—	
Coniferous (softwood)	492
Non-coniferous (broadleaved)	24,352
Mixed woods	5,636
Open areas	245
Total, productive forests in use	30,725
Productive forests not in use	(b) 31,961
Unproductive accessible forests	(c) 257,687
Total, accessible forests	(d) 320,373
Inaccessible forests	191,795
Total, forested area	512,168
OWNERSHIP OF ACCESSIBLE FORESTS	
Publicly-owned forests—	
State forests	23,534
Other forests	150,329
Total, publicly-owned forests	173,863
Privately-owned forests	145,537
Ownership not yet determined	973
Total, accessible forests	320,373

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

Forest reservations

Statements furnished by State and Commonwealth authorities show reservations of forest areas in Australia at 31 March 1965 totalling 37.6 million acres, of which 25.7 million acres

were dedicated State forests and 11.9 million acres were timber and other reserves. The distribution of those areas is shown by States in the following table. Detailed comparisons between States are not possible because of the lack of uniform definitions.

AREA OF FOREST RESERVATIONS: STATES AND TERRITORIES

31 MARCH 1965

(Source: Forestry and Timber Bureau)

('000 acres)

State or Territory	State forests	Timber reserves	Other reserves of forestry value	Total
New South Wales	6,803	1,303	..	8,106
Victoria	5,604	(a)	368	5,972
Queensland	6,203	2,043	1,046	9,291
South Australia	286	..	663	949
Western Australia	4,459	1,852	737	7,049
Tasmania	2,391	138	(b) 1,217	3,746
Northern Territory . . . . .	..	9	(c) 2,394	2,403
Australian Capital Territory . . . . .	..	..	(d) 131	131
Australia	25,747	5,344	6,556	37,647

(a) Included in State forests. (b) Comprising scenic reserves (forested), pulpwood concessions and exclusive forest permits on crown land. (c) Includes fauna and flora reserve, Coburg Peninsula (473,600 acres), land within welfare reserves (1,100,000 acres), land covered by pastoral lease (820,000 acres). (d) Forest land not specifically reserved but under forestry control.

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 organizations, the area of conifer plantations, mainly of exotic species, is steadily increasing. It was natural that this aspect of forestry should receive earliest attention in South Australia, as this is the State most poorly endowed with natural forest. South Australia now has a larger area of planted conifers than any other State in Australia, and for some years has been exploiting considerable quantities of timber from these plantations. Production is also increasing in the other States, and the thinnings from their plantations are already supplying a significant volume of timber.

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

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 1965 was 36,000 acres, about two-thirds of which was mallet. Plantations of this species have been established in Western Australia for tan bark production.

AREA OF CONIFEROUS AND BROADLEAVED PLANTATIONS: STATES AND TERRITORIES, 31 MARCH 1965

(Source: Forestry and Timber Bureau)

(Acres)

State or Territory	Coniferous						Broad-leaved	
	Government			Private				Total
	Pinus radiata	Other species	Total	Pinus radiata	Other species	Total		
New South Wales . . .	86,879	20,848	107,727	(a) 12,000	(a) 16,000	(a) 28,000	135,727	(a) 1,200
Victoria . . .	49,839	9,875	59,714	73,447	1,075	74,522	134,236	6,655
Queensland . . .	2,625	107,292	109,917	820	11,600	12,420	122,337	4,906
South Australia . . .	122,674	11,609	134,283	46,400	..	46,400	180,683	3,484
Western Australia . . .	16,540	24,779	41,319	1,226	175	1,401	42,720	19,111
Tasmania . . .	19,792	431	20,223	7,677	..	7,677	27,900	937
Australian Capital Territory . . .	24,863	2,108	26,971	..	..	..	26,971	..
Northern Territory . . .	..	505	505	..	50	50	555	60
Australia . . .	323,212	177,447	500,659	141,570	28,900	170,470	671,129	36,353

(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 and include forestry research and education, the study of timber supply, and advice to the Government on forestry matters. The administering department is the Department of National Development.

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

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

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

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

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

The Forestry and Timber Bureau advises the Administrations of the Australian external Territories on the management of the forests in those Territories, while the Northern Regional Station of the Forest Research Institute advises the Northern Territory Administration on forestry matters affecting 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, etc. Its functions include the introduction of proper measures for the control and management of forest land; the protection of forest land; the conversion, marketing and economic utilization of forest products; the securing of an adequate and permanent reservation of State forests; the establishment and maintenance of coniferous forests to remedy the existing deficiency of conifers in Australia. All State forest services are actively engaged on research programmes. Annual reports are issued by each State forest authority.

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

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

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

An estimate of the area of coniferous plantations established by private companies and individuals is included in the table on page 984.

Forestry education

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

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

The Australian Forestry Council

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

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

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

Fire protection

The provision of adequate fire protection is one of the main problems facing forest and rural authorities. The commercial forest area is estimated at 63 million acres, and of this area the forest services maintain a high degree of protection over a relatively accessible area of about 23 million acres, about 17 million acres in the more inaccessible area receive a lesser degree of protection, and about 8 million acres are at present not protected. The remaining area of 15 million acres is mainly privately owned or leased, and under some degree of fire protection from the rural volunteer fire-fighting organizations or Government-financed fire protection associations.

Very intensive fire protection is afforded the coniferous plantation area of Australia. The area burnt in 1963-64 was 273 acres or 0.06 per cent of the area for which statistics are available. During the severe 1964-65 season 3,130 acres of coniferous plantations were burnt. This represents 0.56 per cent of the area of 556,000 acres for which statistics are available. This is the largest area of coniferous plantations burnt since 1952.

Protection of private property outside urban areas is undertaken by volunteer bush fire brigade organizations which are co-ordinated in each State by a committee or board carrying out functions of an advisory or educational nature and fostering the growth and organization of the bush fire brigade movement. Throughout the main agricultural and forest areas of Australia there are over 5,000 registered volunteer bush fire brigades with a membership approaching 250,000. Although forest and rural fire organizations are entirely separate entities, a high degree of co-operation and liaison is maintained.

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

Over the five-year period 1961 to 1965 the annual cost of protecting from fire the 40 million acres of forest land for which State forest services, semi-governmental bodies and private companies provide protection is estimated at \$4,800,000, or about twelve cents an acre. The cost of fire protection during the severe 1964-65 fire season was \$5,500,000. The cost of rural fire control as a whole cannot be estimated with any degree of accuracy, because by far the greatest contribution comes from the personal efforts of volunteer brigade members.

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

**NUMBER OF FIRES AND FOREST AREAS BURNT: AUSTRALIA
1960-61 TO 1964-65**

(Source: Forestry and Timber Bureau)

Year	Number of fires	Forest areas burnt	Burnt areas as a proportion of area receiving protection(a)
	No.	'000 acres	Per cent
1960-61	2,667	1,294	3.5
1961-62	1,761	297	0.8
1962-63	1,299	275	0.7
1963-64	1,494	549	1.5
1964-65	2,307	1,626	4.1

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

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

Since fire prevention is one of the most important aspects of the problem, intensive campaigns are being conducted to reduce the incidence of man-caused fires. A study of fire causes in recent years reveals that human agencies account for about 90 per cent of all fires, and of this figure at least 80 per cent are preventable. It is estimated that 'burning-off' (much of which is started illegally) accounts for 30 per cent of all fires. Lightning accounts for a little over 10 per cent of all fires in Australia, although the incidence of fires caused by lightning is much higher in certain

areas, especially the Southern Highlands regions in New South Wales and Victoria. Although lightning is a relatively small numerical cause of fire, the percentage area burnt from this cause is estimated at about 20 per cent. This higher figure is due to the occurrence of multiple fire outbreaks which cause fire fighting difficulties and to the inaccessibility of the areas in which such fires generally occur.

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

The damage resulting from bushfires in Australia is difficult to estimate. Eucalypts, which comprise the main forest species, are seldom killed by fire, and damage estimates frequently involve the complicated question of loss of increment and degradation of timber quality. It may be conservatively estimated that damage to forest values lies between \$2 and \$4 per acre burnt per year and that over the last ten years the average value of forest fire damage is of the order of \$4 million a year. In very severe fire seasons such as 1925-26, 1938-39 and 1951-52, which affected large areas of the continent, fire loss may have been as high as \$200 million. In 1964-65 fire damage may have reached a value of \$10 million.

Commonwealth loans to expand softwood plantations

The Australian Forestry Council recommended that Australia should increase its rate of softwood planting from the present 40,000 acres a year to 75,000 acres for the next thirty-five years. This proposal envisaged annual plantings of 65,000 acres by the various governments for the next thirty-five years and an average of at least 10,000 acres a year by private forest owners. In February 1966 the Commonwealth Government endorsed these recommendations by offering the States about \$20 million in long term loans over the following five years to help lift the planting rate in State government softwood plantations. The loans would be free of interest and repayment of capital for the first ten years because of the long term nature of forestry and the long period between planting and income-earning production. The loans would cover the additional cost to the States in carrying out their parts of the Australian Forestry Council's recommendation over the next five years and it was expected that the planting rate of softwood plantations in Australia would be raised to 75,000 acres per year. If this rate of planting could be maintained for the next thirty-five years it was estimated that Australia would become substantially self-sufficient in production of softwood timber by the year 2,000.

Employment in forestry

Persons engaged in forestry activities

In the following table, which shows particulars collected in the Population Censuses of Australia of 30 June 1947, 1954 and 1961, the numbers of persons whose industry statements were classified to 'forestry (excluding sawmilling)' are shown, together with the numbers engaged in all primary industries and the total work force. An adjustment was made to the 1947 and 1954 industry data by distributing over the range of recorded industry the number of persons whose industry was not stated. No such adjustment was made to the 1961 figures.

PERSONS ENGAGED IN FORESTRY: AUSTRALIA, CENSUSES, 1947, 1954 AND 1961

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

Employment by Forestry Departments

In the table following details are shown of the number of persons employed by State forestry departments and by the Forestry and Timber Bureau in the Australian Capital Territory and the Northern Territory at 30 June 1965.

**PERSONS EMPLOYED BY FORESTRY DEPARTMENTS
STATES AND TERRITORIES, 30 JUNE 1965**

Occupational group	N.S.W.	Vic.	Qld	S.A.	W.A.	Tas.	N.T.	A.C.T.	Aust.
Professional staff	270	229	126	74	61	41	6	10	817
Non-professional field staff	241	273	96	7	186	96	14	1	914
Clerical staff	298	258	199	103	59	96	7	6	1,026
Extraction of timber	1,359	47	118	646	37	20	10	..	..
Milling of timber									
Labour (forest workers, etc.)		825	1,781	244	509	435	160	65	6,315
Total	2,168	1,651	2,320	1,074	892	688	197	82	9,072

Employment in milling operations

Details of the average number of persons employed, including working proprietors, in sawmills during the year 1964-65 are shown in the next table. Further details regarding the operations of sawmills in 1963-64 are shown in the chapter Manufacturing Industry.

**NUMBER OF SAWMILLS AND NUMBER OF PERSONS EMPLOYED
STATES AND TERRITORIES, 1964-65**

—	N.S.W.	Vic.	Qld	S.A.	W.A.	Tas.	Aust.(a)
Number of sawmills	741	441	520	89	192	308	2,299
Average number of persons employed during year—	7,967	5,652	5,404	2,226	3,341	2,793	27,454
Males	375	246	294	203	90	57	1,271
Females							
<i>Persons</i>	8,342	5,898	5,698	2,429	3,431	2,850	28,725

(a) Includes Northern Territory and Australian Capital Territory.

Forest production

Forest products

The following tables show details of production of forest products.

FOREST PRODUCTION(a): STATES AND TERRITORIES, 1964-65

Product	N.S.W.	Vic.	Qld	S.A.	W.A.	Tas.	N.T.	A.C.T.	Aust.
Logs for sawing, peeling, slicing, or pulping—									
Forest broadleaved cub. ft.	57,775	68,159	21,633	566	49,755	53,810	25	30	251,753
Brushwoods and scrubwoods "	4,815	..	8,719	13	..	..	2	..	13,549
Coniferous—									
Indigenous forest 'pines'—									
Cypress "	7,821	..	5,843	39	..	..	92	..	13,795
Other "	442	2	3,086	1	..	235	..	..	3,766
Plantation grown 'pines' "	7,676	12,398	4,310	26,795	2,095	1,746	..	1,236	56,255
Total logs	78,529	80,559	43,590	27,414	51,849	55,791	119	1,266	339,117
Value of logs \$'000	23,002	22,391	14,645	5,795	7,720	12,431	227	282	86,494
Hewn and other timber (not included above)—									
Firewood(b) (weight) '000 tons	257	833	111	519	536	431	2	2	2,690
Other(c) (value) \$'000	8,067	2,587	2,261	..	(d)1,343	949	34	15	15,256
Value of hewn and other timber "	9,358	11,089	2,814	2,989	(d)3,786	2,883	49	32	32,998
Other forest products(e) (total value) "	179	150	318	62	(f) 19	12	..	..	729
Total value of forest products	32,539	33,629	17,777	8,846	g12,093	15,327	276	314	120,801

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

FOREST PRODUCTION(a): AUSTRALIA, 1960-61 TO 1964-65

Product		1960-61	1961-62	1962-63	1963-64	1964-65
Logs for sawing, peeling, slicing, or pulping—						
Forest broadleaved	'000 cub. ft.	242,142	223,389	230,401	245,674	251,753
Brushwoods and scrubwoods	"	14,689	11,890	12,657	12,741	13,549
Coniferous—						
Indigenous forest 'pines'—						
Cypress	"	13,483	12,351	12,489	13,070	13,795
Other	"	4,726	3,676	3,799	3,950	3,766
Plantation grown 'pines'	"	39,850	42,245	49,569	50,883	56,255
Total logs	"	314,890	293,551	308,915	326,318	339,117
Value of logs	\$'000	76,950	71,176	74,954	79,576	86,494
Hewn and other timber (not included above)—						
Firewood(b)(weight)	'000 tons	3,090	2,742	2,702	2,720	2,690
Other(c)(value)	\$'000	16,640	15,558	13,604	13,900	15,256
Value of hewn and other timber(d)	"	34,154	31,184	28,944	31,872	32,998
Other forest products(e) (total value)	"	744	842	588	618	739
Total value of forest products (f)	"	112,592	103,686	104,820	112,416	120,801

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

Value of production

While statistics of both the gross value (at principal markets) and local value (at place of production) of the forestry industry are available, particulars of the value of materials used in the process of production are not available for all States. For this reason values cannot be stated on a net basis, as has been done with most other industries. A more detailed reference to the value of production of forestry and other industries in Australia, as well as a brief explanation of the terms used, will be found in the chapter Miscellaneous.

**GROSS AND LOCAL VALUE OF FORESTRY PRODUCTION
STATES AND TERRITORIES, 1964-65**
(\$'000)

State or Territory	Gross value(a)	Marketing costs	Local value(b)
New South Wales	32,539	953	31,586
Victoria	33,629	1,553	32,076
Queensland	17,777	4,295	13,482
South Australia	8,846	45	8,801
Western Australia	12,093	770	11,323
Tasmania	15,327	2,057	13,270
Northern Territory	276	n.a.	276
Australian Capital Territory	314	n.a.	314
Australia	120,801	9,673	111,128

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

(b) Gross production

The following table shows, for each State, the local value of forestry production and the local value per head of population for the years 1960-61 to 1964-65.

LOCAL VALUE OF FORESTRY PRODUCTION: STATES, 1960-61 TO 1964-65

Year	N.S.W.	Vic.	Qld	S.A.	W.A.	Tas.	Aust.(a)
LOCAL VALUE (\$'000)							
1960-61 . . .	30,600	27,880	14,298	7,458	10,334	11,470	102,404
1961-62 . . .	28,862	26,260	11,790	7,466	10,382	10,180	95,236
1962-63 . . .	27,976	26,200	11,976	8,116	10,162	11,314	96,102
1963-64 . . .	29,618	28,920	12,980	8,168	10,734	11,638	102,624
1964-65 . . .	31,586	32,076	13,482	8,801	11,323	13,270	111,128

LOCAL VALUE PER HEAD OF POPULATION (\$)

1960-61 . . .	7.8	9.6	9.6	7.8	14.2	32.8	9.8
1961-62 . . .	7.4	8.8	7.8	7.6	14.0	28.6	9.0
1962-63 . . .	7.0	8.6	7.8	8.2	13.4	31.2	8.9
1963-64 . . .	7.3	9.4	8.3	8.0	13.7	31.8	9.3
1964-65 . . .	7.6	10.1	8.5	8.4	14.2	36.1	9.9

(a) Includes Northern Territory and Australian Capital Territory.

Timber and timber products

Mill production of timber

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

OUTPUT OF AUSTRALIAN-GROWN TIMBER: ALL MILLS, STATES, 1964-65

('000 super. feet)

—	N.S.W.	Vic.	Qld	S.A.	W.A.	Tas.	Aust.(a)
Logs treated (true volume)—							
Broadleaved .	694,651	658,400	368,790	10,033	596,731	439,240	2,767,843
Coniferous .	163,786	89,121	160,050	277,713	25,122	12,899	728,691
<i>Total, logs treated .</i>	<i>858,437</i>	<i>747,521</i>	<i>528,840</i>	<i>287,746</i>	<i>621,853</i>	<i>452,139</i>	<i>3,496,535</i>
Sawn, peeled or sliced timber produced from logs above—							
Broadleaved .	359,291	293,319	173,928	5,430	198,941	180,081	1,210,990
Coniferous .	73,825	35,982	72,386	134,015	8,282	4,831	329,322
<i>Total, timber produced .</i>	<i>433,116</i>	<i>329,301</i>	<i>246,314</i>	<i>139,445</i>	<i>207,223</i>	<i>184,913</i>	<i>1,540,312</i>

(a) Excludes Australian Capital Territory and Northern Territory.

OUTPUT OF AUSTRALIAN-GROWN TIMBER, ALL MILLS: AUSTRALIA(a)
1960-61 TO 1964-65
 ('000 super. feet)

—	1960-61	1961-62	1962-63	1963-64	1964-65
Logs treated (true volume)—					
Broadleaved	2,672,080	2,524,528	2,552,552	2,681,565	2,767,843
Coniferous	646,801	640,833	778,674	704,296	728,691
<i>Total, logs treated</i>	<i>3,318,881</i>	<i>3,165,361</i>	<i>3,331,226</i>	<i>3,385,861</i>	<i>3,496,535</i>
Sawn, peeled or sliced timber produced from logs above—					
Broadleaved	1,152,995	1,063,086	1,088,197	1,157,165	1,210,990
Coniferous	264,838	289,117	322,370	330,862	329,322
<i>Total, timber produced</i>	<i>1,417,833</i>	<i>1,352,202</i>	<i>1,410,567</i>	<i>1,488,027</i>	<i>1,540,312</i>

(a) Excludes Australian Capital Territory and Northern Territory.

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

Veneers, plywood, etc.

Cutting of timber for the manufacture of veneers, plywood, etc. has been carried out in most States for a number of years. In recent years this has been considerably extended, since plywood manufacture has allowed the use of some species unsuitable for sawing. Special attention has been paid to ensure that logs suitable for peeling are diverted to ply factories.

PLYWOOD PRODUCED: STATES, 1960-61 TO 1964-65
 ('000 square feet: $\frac{3}{8}$ -in. basis)

State	1960-61	1961-62	1962-63	1963-64	1964-65
New South Wales	64,930	56,184	56,766	58,880	59,045
Queensland	112,414	98,086	85,746	97,252	94,766
Other States	46,045	48,537	52,751	60,150	63,249
Australia	223,389	202,807	195,263	216,282	217,059

Of the total plywood produced in 1964-65, 137,826,000 square feet ($\frac{3}{8}$ -in. basis) were classed as 'Commercial', 52,379,000 as 'Waterproof', 2,873,000 as 'Case', and 23,981,000 as 'Sliced Fancy'.

During 1964-65, 806.4 million square feet ($\frac{1}{8}$ -in. basis) of veneers were produced by the rotary process for the manufacture of plywood, including 252.6 million square feet ($\frac{1}{8}$ -in. basis) sold or added to stock, the bulk of which would eventually be used in the production of plywood. In addition, 59.9 million square feet of sliced veneers were produced.

Manufactured boards

Hardboard. There were five factories producing hardboard in Australia during 1964-65 (two in New South Wales, and one in each of Victoria, Queensland and Tasmania), and during the three years ended 30 June 1965 the following quantities were produced: 1962-63, 300 million square feet; 1963-64, 358 million square feet and 1964-65, 381 million square feet.

Resin-bonded boards. Production of resin-bonded boards (made from wood chips, wood wool, sawdust, etc.) amounted to 5,761,000 square yards during 1964-65.

Wood pulp and paper

Wood pulp. During 1964-65 five wood pulp mills were operating in four States, and production was 317,435 tons of chemical, mechanical and other pulp. During the previous year production was 286,006 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 1964-65 twenty-five paper mills were operating, twelve in Victoria, four in New South Wales, four in Tasmania, two each in Queensland and South Australia, and one in Western Australia. A wide variety of paper and paper board is produced in Australian mills. The table below gives details of the production of some of the principal items.

PRODUCTION OF PAPER PRODUCTS: AUSTRALIA, 1962-63 TO 1964-65

Type of paper	Quantity (tons)			Value (\$'000)		
	1962-63	1963-64	1964-65	1962-63	1963-64	1964-65
Newsprint . . .	90,245	92,039	93,142	12,868	12,854	12,948
Blotting . . .	558	553	488	166	164	124
Duplicating . . .	6,794	7,008	7,386	2,146	2,370	2,618
Printing and writing . . .	85,711	94,473	101,222	26,756	29,062	28,948
Wrapping—						
Kraft . . .	118,018	141,006	160,807	28,616	33,134	37,403
Other . . .	9,942	12,127	16,158	3,520	4,294	5,269
Paper felts . . .	1,889	1,917	1,868	400	410	407
Paper boards . . .	240,965	258,374	296,387	37,955	40,966	47,670

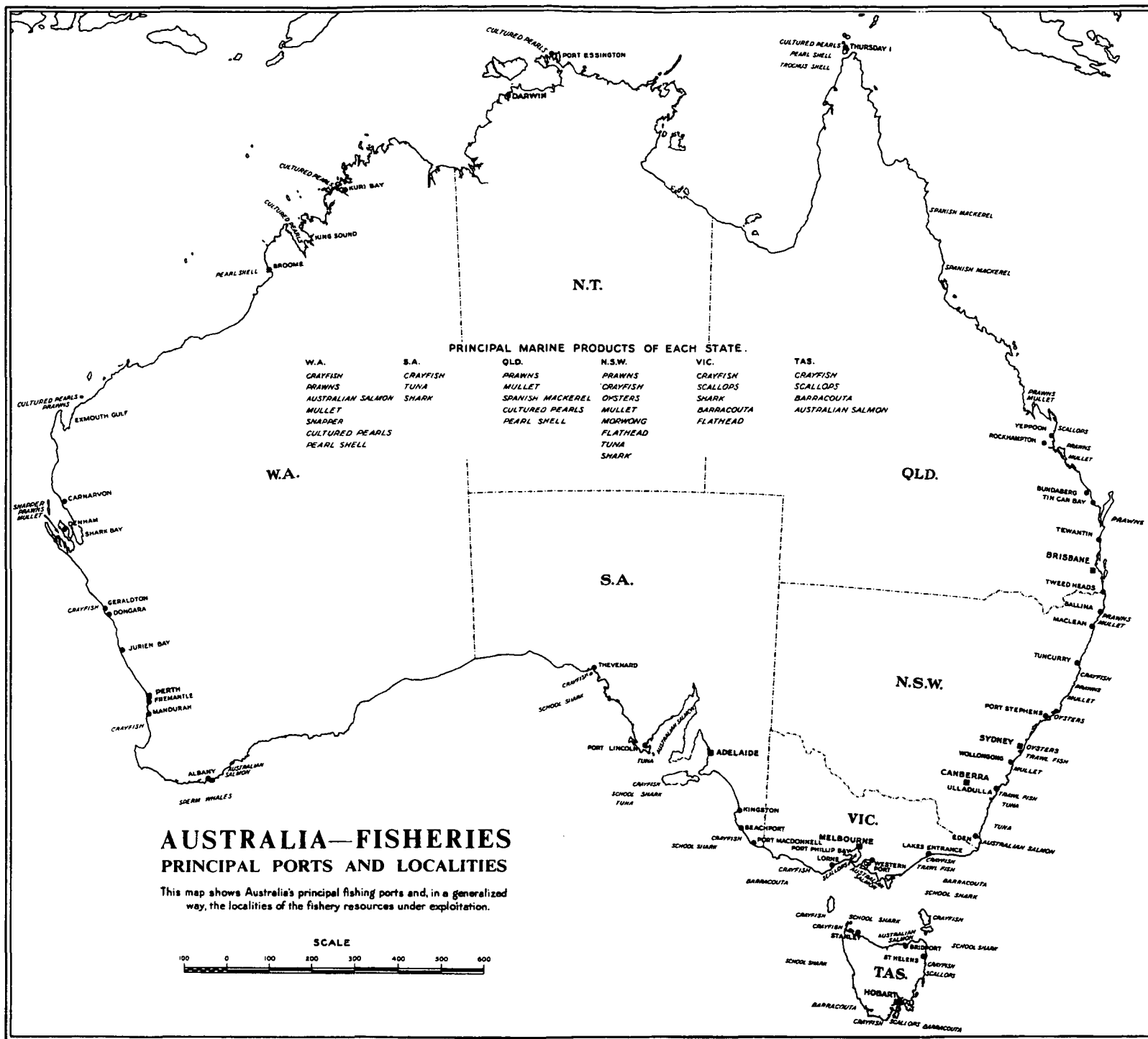
Oversea trade in forest products, timber and timber products**Imports**

Quantities and values of forest products, timber and timber products imported into Australia during the years 1962-63 to 1964-65 are shown in the following table.

**IMPORTS OF FOREST PRODUCTS, TIMBER AND TIMBER PRODUCTS
AUSTRALIA, 1962-63 TO 1964-65**

	Quantity			Value (\$A'000 f.o.b.)		
	1962-63	1963-64	1964-65	1962-63	1963-64	1964-65
Logs not sawn—						
Softwoods(a) . . . '000 sup. ft.	3,226	2,220	1,117	237	152	81
Hardwoods(b) . . . "	47,312	41,223	53,577	2,713	2,523	3,307
Undressed timber—						
Dunnage . . .				8	10	20
Softwoods(a), n.e.i.—						
Douglas fir . . . '000 sup. ft.	154,457	193,291	170,038	13,518	17,697	15,954
Radiata pine . . . "	24,388	25,086	32,432	1,720	1,763	2,333
Other . . .	26,465	41,565	39,855	3,084	4,811	4,790
Hardwoods(b), n.e.i. . . "	64,300	67,987	101,200	6,838	7,559	12,256
Box shooks, n.e.i. . . "	561	567	865	79	95	140
Dressed timber . . .	9,079	6,328	8,055	1,311	966	1,298
Veneers . . . '000 sq. ft.	25,063	23,743	40,693	623	620	1,087
Plywood . . .	26,040	30,398	47,298	1,806	2,326	3,245
Tanning substances . . . cwt.	161,209	151,243	156,328	740	874	965
Sandalwood oil . . . lb.	2,516	1,811	1,475	18	10	18

(a) Non-pored woods. (b) Pored woods.



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

Imports of timber products are mainly veneers and plywoods. Papua and New Guinea and Japan provide most of the plywood imports, and the United Kingdom and Papua and New Guinea supply nearly half of Australia's imports of veneers. Tanning substances are the only other forest products imported in significant quantities. The most important of these is wattle bark produced in South Africa.

Exports

Details of exports of Australian forest and timber products in the years 1962-63 to 1964-65 are given in the following table.

EXPORTS OF AUSTRALIAN FOREST PRODUCTS, TIMBER AND TIMBER PRODUCTS(a): AUSTRALIA, 1962-63 TO 1964-65

		Quantity			Value (\$A'000 f.o.b.)		
		1962-63	1963-64	1964-65	1962-63	1963-64	1964-65
Logs not sawn	'000 sup. ft.	4,392	4,070	2,994	322	371	323
Undressed timber(b)—							
Sleepers	"	22,998	21,578	9,735	2,570	2,263	1,056
Fence posts, girders and pl. e blocks	"	373	650	701	40	80	73
Softwoods(c), n.e.i.	"	112	117	203	22	22	41
Hardwoods(d), n.e.i.	"	13,917	13,499	16,490	1,918	1,856	2,320
Dressed timber	"	1,419	1,907	1,632	414	536	448
Veneers	'000 sq. ft.	1,474	2,453	1,411	66	102	61
Plywood	"	751	735	590	190	174	161
Tanning substances	cwt.	88,317	101,008	92,498	474	611	597
Charcoal	"	6,602	5,793	2,128	62	54	20
Eucalyptus oil	'000 lb.	475	304	295	312	230	269
Acaroid resin, grass tree and yacca gum	cwt.	10,934	6,583	6,774	40	26	21

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

Of the exports of logs in 1964-65, 92 per cent were consigned to New Zealand; of the sleepers exported, 54 per cent were consigned to South Africa and 28 per cent to New Zealand; while of all undressed timber exported, 39 per cent were consigned to South Africa and 37 per cent to New Zealand. Consignments to the United States of America accounted for 74 per cent of the exports of tanning substances in 1964-65.