# CHAPTER 24

# FORESTRY

## Source of statistics

Statistics relating to forestry are, in general, provided by the various authorities concerned with forestry administration. Statistics relating to forest products and employment in forestry 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. Statistics of sawn timber and by-products and manufacturing establishments engaged in their production have been compiled from the annual censuses of manufacturing undertaken by the Statisticians in the several States. Data on imports and exports of forest products and sawn timber and timber products have been compiled in the Commonwealth Bureau of Census and Statistics as part of the statistics of overseas trade. The figures shown relate, in general, to years ended 30 June.

## Forestry in Australia

### Objects of forestry

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

### General account of forests and timbers

The area of land in Australia suitable for the production of commercial timber as a primary crop is very small in comparison with the size of the continent. Broadleaved forests (hardwoods) cover 76 per cent of the total forested area, and approximately 95 per cent of the broadleaved forest area is occupied by eucalypts.

*Eucalypts.* The genus *Eucalyptus* is remarkable in that it includes some 500 known species, ranging in size from the mighty forest giants, mountain ash (*E. regnans*) of Victoria and Tasmania, and karri (*E. diversicolor*) of Western Australia, down to the small mallee species which inhabit vast areas of the inland. The habitats range from the inland plains to the high mountain areas in the Australian Alps, and from areas with the annual rainfall as low as 10 inches to those where it is 150 inches. Of the 500 species, only about 100 are used for sawmilling, and not more than 40 of these are exploited extensively.

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

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

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

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

*Other broadleaved timbers* (*hardwoods*). Broadleaved genera other than *Eucalpytus* cover a comparatively small portion of the forested land in Australia; however, the areas concerned provide a great variety of timbers suitable for a multitude of uses. There are two basic types of forest containing supplies of broadleaved timbers other than eucalypts, namely, the tropical and sub-tropical rainforests of coastal Queensland and New South Wales and the temperate rainforests of southern Victoria and Tasmania, both of which yield species known collectively as rainforest or brushwood species.

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

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

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

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

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

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

**Extent of forested areas**

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

CLASSIFICATION OF FOREST AREA(*a*): AUSTRALIA

(*Source:* Forestry and Timber Bureau)

('000 acres)

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

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

**Forest reserves**

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

FOREST RESERVES: STATES AND TERRITORIES, 31 MARCH 1972

(*Source:* Forestry and Timber Bureau)

('000 acres)

| | *N.S.W.* | *Vic.* | *Qld* | *S.A.* | *W.A.* | *Tas.* | *N.T.* | *A.C.T.* | *Aust.* |
|---|---|---|---|---|---|---|---|---|---|
| Production reserves(*a*)— | | | | | | | | | |
| Productive | 5,865 | 4,042 | 9,402 | 228 | 4,109 | 3,327 | 3 | 31 | 27,007 |
| Unproductive | 806 | 1,327 | .. | 29 | .. | 1,279 | 138 | .. | 3,579 |
| Unstocked | 660 | 116 | .. | .. | 713 | 512 | 1 | .. | 2,002 |
| *Total production reserves* | *7,331* | *5,485* | *9,402* | *257* | *4,822* | *5,118* | *142* | *31* | *32,588* |
| Protection reserves(*b*)— | | | | | | | | | |
| Productive | .. | .. | .. | 3 | 33 | 425 | .. | 14 | 475 |
| Unproductive | 30 | 957 | 2,551 | 47 | 110 | 22 | 1,200 | 97 | 5,014 |
| Unstocked | .. | .. | .. | .. | 28 | .. | 314 | .. | 342 |
| *Total protection reserves* | *30* | *957* | *2,551* | *50* | *171* | *447* | *1,514* | *111* | *5,831* |
| All other reserves(*c*)— | | | | | | | | | |
| Productive | 641 | .. | .. | .. | .. | .. | .. | .. | 641 |
| Unproductive | 296 | 151 | .. | .. | .. | .. | .. | .. | 447 |
| Unstocked | 49 | .. | .. | .. | .. | .. | (*d*) | .. | 49 |
| Total area all reserves | 8,347 | 6,593 | 11,953 | 307 | 4,993 | 5,565 | 1,656 | 142 | 39,556 |

(*a*) Land permanently dedicated to timber production. (*b*) Includes flora and fauna reserves, scenic reserves, state and national parks, and water catchment areas. (*c*) Includes other timber reserves, land reserved for fuel supply, and vacant forested crown land. (*d*) Excludes Aboriginal reserves in the N.T. totalling 62,348,000 acres which are estimated to be 90 per cent forest.

**Categories of forest reserves**

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

(ii) *Protection reserves* consist of reserved lands, the management of which is principally aimed at the protection of natural resources, of fauna and flora, or at other purposes not directly related to the production of wood (e.g., parks, watersheds, soil conservation areas, etc.). Industrial cutting may or may not be allowed in these protection reserves. Industrial cutting includes the cutting of logs, pulpwood, pit props, poles, posts or fuelwood for commercial purposes. The cutting of logs for the production of sawnwood for local consumption is considered as industrial cutting; however, the cutting of poles and fuelwood for personal consumption on a casual or occasional basis is not considered as an industrial cutting.

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

A considerable proportion of the permanently reserved areas is in inaccessible mountainous country, and many of the forests contain a mixture of species, only some of which are at present of commercial value. Much of the area consists of inferior forest, and a large proportion of the whole has been seriously degraded by recurrent fires.

## Softwood plantations*

**General**

The term "softwood" has long been used to represent the wood of the Coniferae, of which the most important family is the Pinaceae. This family consists primarily of trees and includes such well known producers of commercial timbers as the genera *Pinus* (pines), *Picea* (spruces), *Abies* (firs) and *Pseudotsuga* (Douglas fir).

The timber of the Coniferae is, in general, relatively light, of satisfactory strength in relation to weight, straight-grained, moderately soft and easy to work, machine and nail. In contrast, hardwoods as a group, and particularly the genus Eucalyptus, are heavy, strong, hard, not straight-grained and not readily nailed or worked by hand. Certain other properties, especially microscopic cell structure, result in softwoods seasoning much faster and more evenly than hardwoods. Because of these properties softwood sawnwood has a greater range of uses than Eucalypt sawnwood. Conifers also produce the bulk of the world's pulpwood although hardwood wood chips and woodpulp are now a significant feature of world trade in forest products.

**Timber resources, production and consumption**

Compared with countries of the temperate regions in the northern hemisphere, the indigenous forest resources of Australia are markedly deficient in softwoods.

A Forestry and Timber Bureau estimate of the total volume of softwoods and hardwoods in the forests of Australia is set out below.

TIMBER CONTAINED IN AUSTRALIAN FORESTS AS AT 31 MARCH 1970

(*Source:* Forestry and Timber Bureau)

| *Type of timber* | *Volume of timber (Million $m^3$ true volume under bark)* | *Percentage of total timber* |
|---|---|---|
| Hardwoods | 974.1 | 92.5 |
| Softwoods | 79.1 | 7.5 |
| **Total** | **1,053.2** | **100.0** |

In contrast to the above, the estimated supply (corresponding approximately to consumption) of sawn timber for the year 1970–71 is set out in the following table.

* This section, outlining the growth and present extent of Australian softwood plantations, was prepared by the Forestry and Timber Bureau. The part dealing with Commonwealth loans to expand softwood plantations was contributed by the Department of the Treasury.

ESTIMATED SUPPLY OF SAWN TIMBER, AUSTRALIA, 1970-71
(*Source:* Forestry and Timber Bureau)

| *Type of timber* | *Volume ('000 m³)* | *Percentage of total timber available* |
|---|---|---|
| Hardwood timber— | | |
| Australian production | 2,443 | |
| *Plus* imports | 302 | |
| *Less* exports | 21 | |
| *Total supply of hardwood timber* | *2,724* | *65.45* |
| Coniferous timber— | | |
| Australian production | 769 | |
| *Plus* imports | 673 | |
| *Less* exports | 4 | |
| *Total supply of coniferous timber* | *1,438* | *34.55* |
| **Total supply of all timber** | **4,162** | **100.00** |

The trend of Australian softwood sawn timber production during recent years is given in the following table.

AUSTRALIAN SOFTWOOD SAWN TIMBER PRODUCTION, SELECTED YEARS 1955-56 TO 1971-72
(*Source:* Forestry and Timber Bureau)
('000 m³)

| | *Rain forest species* | *Cypress pine* | *Plantation grown species* | *Total softwood* |
|---|---|---|---|---|
| 1955–56 | 91.2 | 173.9 | 382.3 | 647.3 |
| 1960–61 | 71.6 | 169.1 | 396.4 | 637.1 |
| 1965–66 | 53.8 | 148.1 | 586.2 | 788.1 |
| 1970–71 | 34.0 | 135.9 | 599.0 | 768.9 |
| 1971–72 | 36.8 | 145.8 | 634.3 | 816.9 |

Notable in the above table is the steady decline in the production of softwood species from the virgin rain forests of Queensland and northern New South Wales, and the striking increase in plantation grown timber. The latter is mainly Pinus radiata, but already includes a small amount of plantation grown hoop pine.

In the future, rain forest production will probably stabilise at a figure approximating yearly production in 1970, whereas plantation grown timber will increase considerably as a result of the harvesting of increased planting areas established under the Softwood Forestry Agreements Acts of 1967 and 1972 (*See* page 882 for further reference to these Acts).

**Early plantation establishment in Australia**

The first steps in the creation of government plantations in Australia were taken in 1870, most appropriately, by the State which had the poorest natural resources—South Australia. Planting commenced in 1876, and has continued without interruption ever since, though it was not until shortly before the 1914–18 war that appreciable areas were established each year. These very early plantings here and elsewhere provided valuable evidence in later years as to the suitability of various sites for Pinus radiata and other species. The commencement of plantings in South Australia also led to the formation of the Woods and Forests Department of that State, one of the oldest forest services in the British Commonwealth.

Under the aegis of Lands Departments and other State organisations, small plantations were established in other States, notably Victoria, shortly after that time, although it was not until much later that independent forest services were created.

**Commonwealth loans to expand softwood plantations.**

Planting was continued at a steady rate between the two World Wars. After the Second World War, planting programs were re-commenced, 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 40,000 acres a year to 75,000 acres a year for the next thirty-five years. The recommendations envisaged a phased increase in the rate of Government plantings by the various State Governments up to a level of some 63,000 acres per annum together with plantings by the Commonwealth in the Territories of 2,000 acres per annum, and an average of at least 10,000 acres per annum by private forest owners. The Council considered that such a program would make a major contribution towards meeting Australia's future requirements for softwood products.

In February 1966 the Commonwealth Government endorsed this recommendation and agreed, as a first step towards achieving the proposed annual target of 75,000 acres, to provide financial assistance to each State, over a five-year period commencing 1 July 1966, to enable them to accelerate their rate of softwood plantings. The assistance, which 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 *Softwood Forestry Agreements Act* 1967 authorised the Commonwealth to enter into agreements with each of the States to provide financial assistance by way of loans during the financial years 1966–67 to 1970–71 inclusive.

In February 1969 the Australian Forestry Council recommended a continuation of Commonwealth financial assistance to the States for softwood timber planting for a further five-year period. The Commonwealth Government agreed in principle to the Australian Forestry Council's recommendations and following negotiations with the States it was agreed that the Commonwealth would assist towards a State planting program of 54,680 acres per annum. The *Softwood Forestry Agreements Act* 1972 authorised the Commonwealth 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 by the Commonwealth 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 (estimated), $9,100,000; 1973–74 (estimated), $5,200,000. It is estimated that of the payment of $9.1 million for 1972–73, $4.1 million will be made available to cover expenditure incurred in 1971–72.

**Relative demand for softwood and hardwood**

Because of the general suitability of softwood for many purposes it seems likely that the future demand for it will trend upwards until it reaches at least sixty per cent of total consumption. It is interesting to note that in South Australia, the only State which has significant home-grown softwood supplies in relation to population, softwoods at present comprise more than eighty per cent of the total sawn timber consumption. The present figure for Australia as a whole is approximately thirty-five per cent.

**Forestry and land utilisation**

Many species of the genus *Pinus* can grow satisfactorily on relatively poor sandy soils with a mean annual rainfall which may be less than thirty inches. Under such conditions only the poorer types of eucalypts will grow and the mean annual increment in timber is very low, whereas with the pines it may average 4.67 cubic metres of timber in the ground per acre. Since land of the above type is usually not good enough for agriculture and only of moderate value for pasture, utilisation for softwood plantations may produce the greatest benefit to the nation. The main species of introduced pines now grown in Australia will grow to maturity within forty years, whereas the better types of eucalypts require double that length of time to mature and, unless on exceptionally favourable sites, do not produce as high a mean annual increment of timber.

**Adequacy of timber supplies**

Since most of Australia's timber imports consist of softwoods a policy directed towards increasing self-sufficiency in timber supplies has been formulated, thus reducing foreign exchange requirements. The present target based on existing population projections is designed to achieve self-sufficiency by the year 2000. By this time a plantation resource of three million acres will be available, if the annual planting rate recommended by the Australian Forestry Council is maintained. The periodic re-examination of trends in timber usage in the future will enable the program to be modified as necessary to meet any revised targets.

**Extent of existing softwood plantations**

The following tables outline the growth of Australian softwood plantations to 31 March 1972.

**AREA OF CONIFEROUS PLANTATIONS, BY TYPE OF PLANTATION, 31 MARCH 1972**

(*Source:* Forestry and Timber Bureau)

(Acres net)(*a*)

| | *N.S.W.* | *Vic.* | *Qld* | *S.A.* | *W.A.* | *Tas.* | *N.T.* | *A.C.T.* | *Aust.* |
|---|---|---|---|---|---|---|---|---|---|
| Government— | | | | | | | | | |
| Exotic conifers— | | | | | | | | | |
| Pinus radiata | 185,871 | 114,012 | 4,883 | 155,883 | 30,132 | 46,767 | .. | 28,773 | 566,321 |
| Other pinus species | 20,159 | 7,464 | 104,563 | 16,478 | 44,000 | 198 | 75 | 2,235 | 195,172 |
| Other exotic conifers | 3,131 | 2,552 | 405 | .. | .. | 322 | .. | 369 | 6,779 |
| Native conifers | 3,044 | .. | 80,636 | .. | .. | .. | 6,524 | .. | 90,204 |
| *Total* | *212,205* | *124,028* | *190,487* | *172,361* | *74,132* | *47,287* | *6,599* | *31,377* | *858,476* |
| Private— | | | | | | | | | |
| Pinus radiata | 25,330 | 128,528 | 866 | 40,549 | 8,984 | 19,357 | .. | .. | 223,614 |
| Other conifers | 17,100 | 8,976 | 47,429 | 18 | 548 | 10 | 50 | .. | 74,131 |
| *Total* | *42,430* | *137,504* | *48,295* | *40,567* | *9,532* | *19,367* | *50* | .. | *297,745* |
| **Grand Total** | **254,635** | **261,532** | **238,782** | **212,928** | **83,664** | **66,654** | **6,649** | **31,377** | **1,156,221** |

(*a*) Excludes firebreaks and other areas not actually forested.

**AREA OF CONIFEROUS PLANTATIONS, BY TYPE OF PLANTATION, AUSTRALIA 31 MARCH, 1968 TO 1972**

(*Source:* Forestry and Timber Bureau)

(Acres Net)(*a*)

| | *1968* | *1969* | *1970* | *1971* | *1972* |
|---|---|---|---|---|---|
| Government— | | | | | |
| Exotic conifers— | | | | | |
| Pinus radiata | 395,215 | 438,097 | 483,080 | 522,304 | 566,321 |
| Other pinus species, Other exotic conifers, Native conifers | 207,176 | 228,291 | 248,529 | 271,435 | 292,155 |
| *Total* | *602,391* | *666,388* | *731,609* | *793,739* | *858,476* |
| Private— | | | | | |
| Pinus radiata | 161,326 | 187,035 | 190,986 | 203,524 | 223,614 |
| Other conifers | 47,224 | 52,865 | 55,964 | 66,211 | 74,131 |
| *Total* | *208,550* | *239,900* | *246,950* | *269,735* | *297,745* |
| **Grand Total** | **810,941** | **906,288** | **978,559** | **1,063,474** | **1,156,221** |

(*a*) Excludes firebreaks and other areas not actually forested.

The above table shows the predominance of Pinus radiata in all States except Queensland and Western Australia. This species is not climatically adapted to growing in the former State, where the native hoop pine is the most important plantation species, with slash pine (*Pinus elliottii var. elliottii*) in second place. The main species in Western Australia is maritime pine (*P. pinaster*), which is particularly adapted to growing on sandy soils too poor for the satisfactory growth of other species.

Private plantations have now assumed a position of importance in the softwood economy. The bulk of them comprise relatively large areas belonging to tree-planting or sawmilling companies, or to larger organisations in the pulp and paper industry. The first phase of extensive private planting was in South Australia and Victoria during the decade 1925–35, and these plantations now form the basis of expanding timber-using industries. The second phase began after the 1939–45 War, when the pulp and paper industry commenced planting on a fairly large scale in order to provide part of the raw material for its future requirements. Investment companies and companies engaged in forest products processing have also contributed to production in the private forestry sector.

**Types of softwood species used in plantations**

*Native species.* Hoop pine—*Araucaria cunninghamii.* Hoop pine is a high quality softwood. Where it occurs naturally in the rain forests, it attains very large dimensions, reaching 150 feet in height and

four feet or more in diameter. To grow hoop pine to this size in plantations would take too long, and a height of 100 feet and diameter of 20 inches is considered satisfactory for utilisation. On good sites this would require a rotation of fifty to sixty years.

All tests to date indicate that the rapid, controlled growth possible in plantations does not affect the quality of the wood in the case of hoop pine; in fact, the wood properties of rapidly grown plantation trees are equal to and sometimes superior to those of average wood from virgin forests. On the evidence available, branch size (with its effect on the knottiness of the timber) appears to be a factor that can be more readily influenced by genetic rather than silvicultural measures. The Forestry Department of Queensland is conducting research on this and other aspects of tree breeding.

The timber of hoop pine is in strong demand for most purposes where durability is not a prime consideration.

Bunya pine—*Araucaria bidwillii.* This species, which is closely related to hoop pine, is planted to only a limited extent on account of its slow growth. It is more heavily-branched and more difficult to establish than hoop pine.

*Exotic species*

Radiata pine—*Pinus radiata.* This pine was first introduced into Australia, as well as into New Zealand and South Africa, about a hundred years ago, and has become one of the most important softwood species. It is a native of the Monterey Peninsula in southern California, where it is of negligible importance. When it was introduced to countries overseas it frequently showed a far superior rate of growth and attained much greater dimensions than in its native habitat, with the result that one of its common names is "remarkable pine". Heights at twenty years of age may vary from sixty feet to over a hundred feet, and at maturity attain 130–140 feet. In Australia its planting is mainly restricted to the winter rainfall regions where the summers are dry and warm. Successful plantations have been established in south-eastern South Australia, southern Victoria, Tasmania, on the southern and central tablelands and the south-western foothills of New South Wales, and in the Australian Capital Territory. The mean annual increment of timber pre acre varies from about 4.67 to 8.5 cubic metres in the round, true volume. Expressed in terms of a forty-year rotation, an average acre can be expected to produce a total volume of about 283 cubic metres including approximately 259 cubic metres of sawlogs and about 24 cubic metres of pulpwood or small case logs. The timber, like that of most species, needs to be mature, and requires careful milling and seasoning. Under these conditions it is at least equal in quality to red deal (the timber of *Pinus sylvestris)* which is one of the main building timbers of northern Europe.

Slash pine—*Pinus elliottii var. elliottii.* This species replaces Pinus radiata as the main exotic species in Queensland and in coastal New South Wales north of Newcastle, which are areas of summer rainfall. Slash pine is one of the main timber species of the southern States of the United States of America, and in that country it is used extensively for pulp, sawn timber and veneers. Thinnings from plantations in Queensland have yielded sawn timber of good quality and there is no reason to expect that the quality will be in any way inferior to that of timber in its natural habitat. The rotation will probably be much the same as for P. radiata—about forty years. Slash pine was first introduced into Queensland in 1925 and after 1930 began to play an important part in the planting program of the State.

Loblolly pine—*Pinus taeda.* This is another species from the sourthern and eastern parts of the United States of America, where it grows on a wide variety of soils and under a similar range of climatic conditions to slash pine. It is not generally quite as uniformly healthy and vigorous as slash pine, and for this reason has not been planted as extensively, though, if certain aspects of development can be controlled, it is likely to receive increased attention.

Maritime pine—*Pinus pinaster.* This is the most important exotic pine in Western Australia, where it grows on sandy soils which are too poor for satisfactory development of P. radiata. It is also used in similar areas in South Australia. Maritime pine is a native of the Mediterranean region and very large areas of it have been planted for sand dune control in Les Landes region of France.

Maritime pine does not attain a height comparable with P. radiata, eighty to ninety feet being common for well-grown mature trees, but diameters are relatively large. The timber is useful for a wide range of purposes.

*Pinus carribea var. hondurensis.* Carribean pine is fast growing and of excellent form. Presently it is being planted in frost-free areas north of Brisbane where it could replace slash pine as the major exotic conifer in coastal areas.

*Callitris intratropica.* This tree is a member of the cypress family. It is one of the few species of tree which is resistant to the termites of the Northern Territory. Callitris intratropica is presently being planted at the rate of one thousand acres per year in the Northern Territory.

*Other species*

Interest in the past has been shown in Douglas fir (*Pseudotsuga menziesii*) in high rainfall areas of Victoria and southern New South Wales and limited areas of this species have been established. Canary Island pine (*P. Canariensis*) has been tried under conditions too hot and dry for most other exotic conifers. However, major developments in the future are likely to be in tree improvement within the major species rather than the introduction of new species or artificial hybrids.

The first seed orchard in Australia was planted in Queensland in 1953. The Australian forest services now have 1,200 acres of seed orchards available to them. Through controlled breeding programs, tree improvement can be made with respect to form, disease and drought resistance. Australia can expect to be self-sufficient in seed requirements for all major species by 1980.

## Forest administration and research

*Commonwealth Forestry and Timber Bureau.* The functions of the Commonwealth Forestry and Timber Bureau are laid down in the *Forestry and Timber Bureau Act* 1930–1953 and include forestry research and education, the study of timber supply, and advice to the Government on forestry matters. The administrating department is the Department of Primary Industry.

In 1961 the Commonwealth Government expanded its activities in forestry research in Australia. The existing Forestry and Timber Bureau Divisions of Silvicultural Research and Forest Management Research were combined to form the Forest Research Institute as a separate branch of the Bureau. The purpose of the Institute is to provide complete coverage in forestry research, ensuring that all problems of primary importance to the practice and development of forestry in Australia are investigated. In developing a 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: factors affecting tree growth, tree breeding, introduction of exotic species, forest nutrition, forest botany, forest entomology and pathology, fire protection, watershed management, forest mensuration, forest management and management economics, aerial inventory, biometrics, and tree seed. The Forest Research Institute maintains six regional establishments in the Commonwealth, two of which have an outstation in addition to the regional headquarters. These research stations are run on a co-operative basis with State forest services and private forest companies or other government instrumentalities.

The Forestry and Timber Bureau also maintains a 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. Advice on timber supply matters is currently made available to government departments and private enterprise. Research is also undertaken on matters associated with the marketing of timber products.

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

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

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

The Forestry and Timber Bureau advises the Administrations of the Australian External Territories on the management of the forests in those Territories. Forests in the Northern Territory are under the control of the Forestry Branch of the 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. State forest authorities control over 15 million acres of timber reserves, national parks, etc. They also usually control all timber on unoccupied Crown lands.

*Private forestry.* Privately owned lands contribute considerably to the total production from Australian forests. The most important areas of managed native forest in private ownership are the forests owned by pulp and paper companies. Schemes of financial assistance to individual land owners—designed primarily to encourage establishment and management of coniferous plantations—have been introduced by the Governments of New South Wales and Victoria.

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

The area of coniferous plantations established by private companies and individuals is included in the table on page 883.

### Forestry education

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

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

### The Australian Forestry Council

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

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

The Council is supported by a Standing Committee, consisting of the Director-General of the Forestry and Timber Bureau, the heads of each of the six State Forest Services, the Chief of the Division of Building Research, C.S.I.R.O., and the secretaries of the Commonwealth 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 47 million acres of forest land, of which a relatively accessible area of 23 million acres is

given a high degree of protection, about 17 million acres in the more inaccessible areas receive a lesser degree of protection, and about 7 million acres are at present not protected. Other extensive forest areas consisting mainly of vacant Crown land, but including land under private ownership or leasehold, are either not protected or are given some degree of fire protection by rural fire-fighting organisations or Government-financed fire protection associations.

During the 1971–72 fire season a total of 1,195 fires were recorded over the area of 40 million acres of forest land afforded either intensive or extensive protection by forest authorities. The area burnt by these fires totalled 457,280 acres or 1.1 per cent of the area protected.

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

**NUMBER OF FIRES AND FOREST AREA BURNT, 1962-63 TO 1971-72**

(*Source:* Forestry and Timber Bureau)

| | *Protected forest areas(a)* | | |
|---|---|---|---|
| *Year* | *Number of fires* | *Forest area burnt* | *Percentage of forest area burnt* |
| | | '000 acres | |
| 1962–63 | 1,299 | 275 | 0.7 |
| 1963–64 | 1,494 | 549 | 1.5 |
| 1964–65 | 2,307 | 1,626 | 4.1 |
| 1965–66 | 1,865 | 465 | 1.2 |
| 1966–67 | 1,422 | 388 | 1.0 |
| 1967–68 | 1,754 | 754 | 1.9 |
| 1968–69 | 2,165 | 1,885 | 4.7 |
| 1969–70 | 905 | 130 | 0.3 |
| 1970–71 | 1,018 | 176 | 0.4 |
| 1971–72 | 1,195 | 457 | 1.1 |

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

Very intensive fire protection is afforded to the coniferous plantation area of Australia. This area is increasing rapidly and the annual planting program is now between 60,000 and 70,000 acres. During the 1971–72 fire season a total of 313 acres was burnt, representing 0.03 per cent of the area of 1,059,000 acres 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, 1962-63 TO 1971-72**

(*Source:* Forestry and Timber Bureau)

| *Year* | *Number of fires* | *Area burnt* | *Area of coniferous plantations(a)* | *Percentage of coniferous area burnt* |
|---|---|---|---|---|
| | | acres | acres | |
| 1962–63 | n.a. | 475 | 492,000 | 0.10 |
| 1963–64 | | 418 | 515,000 | 0.08 |
| 1964–65 | | 3,130 | 556,000 | 0.56 |
| 1965–66 | | 1,520 | 610,000 | 0.25 |
| 1966–67 | | 461 | 660,835 | 0.07 |
| 1967–68 | | 288 | 729,928 | 0.04 |
| 1968–69 | 39 | 2,247 | 781,000 | 0.29 |
| 1969–70 | 51 | 149 | 874,000 | 0.02 |
| 1970–71 | 40 | 1,404 | 993,000 | 0.14 |
| 1971–72 | 113 | 313 | 1,059,000 | 0.03 |

(*a*) This area does not include certain privately owned coniferous plantations for which fire statistics are not available. In 1969–70 the area for which no statistics were available was 105,000 acres; in 1970–71, 30,000 acres; and in 1971–72, 97,000 acres.

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 Northern Territory, the Forestry and Timber Bureau in the relevant States and Territories, and the private sector of the forestry industry at 30 June 1972. The table excludes staff of forestry training establishments.

PERSONS EMPLOYED IN FORESTRY, STATES AND TERRITORIES, 30 JUNE 1972

(*Source:* Forestry and Timber Bureau)

| *Occupational group* | *N.S.W.* | *Vic.* | *Qld* | *S.A.* | *W.A.* | *Tas.* | *N.T.* | *A.C.T.* | *Aust.* |
|---|---|---|---|---|---|---|---|---|---|
| Professional staff— | | | | | | | | | |
| Foresters | 230 | 260 | 100 | 57 | 56 | 96 | 18 | 52 | 869 |
| Others | 85 | 32 | 98 | 36 | 13 | 19 | .. | 11 | 294 |
| Field and other technical staff | 305 | 348 | 115 | 42 | 252 | 235 | 50 | 43 | 1,390 |
| Clerical staff | 295 | 324 | 249 | 137 | 68 | 131 | 18 | 63 | 1,285 |
| Labour(*a*) | 1,360 | 1,310 | 1,760 | 295 | 899 | 676 | 75 | 94 | 6,469 |
| Extraction(*b*) | 3,600 | 1,095 | 2,600 | 244 | 846 | 2,656 | 8 | 41 | 11,090 |
| **Total** | **5,875** | **3,369** | **4,922** | **811** | **2,134** | **3,813** | **169** | **304** | **21,397** |

(*a*) Staff engaged in silvicultural forest works, etc. (*b*) 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 censuses of Manufacturing for 1969–70 and 1971–72. For further details of the Manufacturing Census *see* Chapter 21, Manufacturing Industry. An annual Manufacturing Census was not conducted in respect of the year ended 30 June 1971.

MANUFACTURING ESTABLISHMENTS—LOG SAWMILLING (A.S.I.C. CLASS 2511)(*a*)
SUMMARY OF OPERATIONS, 1969–70 AND 1971–72

| | | *N.S.W.* | *Vic.* | *Qld* | *S.A.* | *W.A.* | *Tas.* | *N.T.* | *A.C.T.* | *Aust.* |
|---|---|---|---|---|---|---|---|---|---|---|
| **1969–70** | | | | | | | | | | |
| Establishments in operation at 30 June | No. | 432 | 270 | 304 | 42 | 116 | 183 | .. | 3 | 1,350 |
| Employment(*b*) | ,, | 5,080 | 3,224 | 3,409 | (*c*) | 2,383 | 1,575 | .. | (*c*) | 16,442 |
| Turnover | $'000 | 55,690 | 35,024 | 32,400 | (*c*) | 23,871 | 13,481 | .. | (*c*) | 172,244 |
| Value added | ,, | 31,151 | 20,524 | 18,319 | (*c*) | 15,907 | 7,146 | .. | (*c*) | 98,806 |
| Fixed capital expenditure (outlay on fixed tangible assets less disposals) | ,, | 1,979 | 1,441 | 1,137 | (*c*) | 526 | 523 | .. | (*c*) | 5,688 |
| **1971–72** | | | | | | | | | | |
| Establishments in operation at 30 June | No. | 424 | 257 | 300 | 40 | 102 | 172 | .. | 5 | 1,300 |
| Employment(*b*) | ,, | 4,960 | 3,222 | 3,163 | 616 | 2,132 | 1,581 | .. | 51 | 15,725 |
| Turnover | $'000 | 63,225 | 39,370 | 34,935 | 12,151 | 20,657 | 17,679 | .. | 516 | 188,534 |
| Value added | ,, | 37,584 | 23,113 | 21,845 | 4,282 | 14,908 | 8,521 | .. | 256 | 110,510 |
| Fixed capital expenditure (outlay on fixed tangible assets less disposals) | ,, | 2,968 | 1,138 | 1,644 | 125 | 344 | 543 | .. | 3,020 | 9,783 |

(*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 (ASIC CLASS 2513)(*a*): SUMMARY OF OPERATIONS, 1969–70 AND 1971–72

| | | *N.S.W.* | *Vic.* | *Qld* | *S.A.* | *W.A.* | *Tas.* | *N.T.* | *A.C.T.* | *Aust.* |
|---|---|---|---|---|---|---|---|---|---|---|
| **1969–70** | | | | | | | | | | |
| Establishments in operation at 30 June | No. | 38 | 12 | 25 | 7 | 4 | 3 | .. | .. | 89 |
| Employment(*b*) | ,, | 2,807 | 721 | 2,361 | 547 | (*c*) | (*c*) | .. | .. | 7,339 |
| Turnover | $'000 | 35,129 | 11,825 | 27,936 | 9,166 | (*c*) | (*c*) | .. | .. | 98,590 |
| Value added | ,, | 16,609 | 5,058 | 11,086 | 4,912 | (*c*) | (*c*) | .. | .. | 43,787 |
| Fixed capital expenditure (outlay on fixed tangible assets less disposals) | ,, | 998 | 687 | 926 | 506 | (*c*) | (*c*) | .. | .. | 3,345 |
| **1971–72** | | | | | | | | | | |
| Establishments in operation at 30 June | No. | 37 | 12 | 30 | 7 | 3 | 3 | .. | .. | 92 |
| Employment(*b*) | ,, | 2,775 | 772 | 2,474 | 647 | (*c*) | (*c*) | .. | .. | 7,498 |
| Turnover | $'000 | 39,970 | 14,499 | 31,394 | 11,167 | (*c*) | (*c*) | .. | .. | 112,997 |
| Value added | ,, | 19,007 | 6,573 | 15,124 | 5,264 | (*c*) | (*c*) | .. | .. | 52,699 |
| Fixed capital expenditure (outlay on fixed tangible assets less disposals) | ,, | 1,877 | 565 | 607 | 3,316 | (*c*) | (*c*) | .. | .. | 6,686 |

(*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*): STATES AND TERRITORIES, 1971–72

| | | *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 m³ | 1,491 | 2,168 | 514 | 16 | 1,111 | 2,185 | 1 | .. | 7,486 |
| Rain forest species | ,, | 128 | .. | 242 | .. | .. | .. | .. | .. | 370 |
| Coniferous— | | | | | | | | | | |
| Indigenous forest 'pines'— | | | | | | | | | | |
| Cypress | ,, | 140 | .. | 191 | .. | .. | .. | 2 | .. | 333 |
| Other | ,, | .. | .. | 67 | .. | .. | 4 | .. | .. | 71 |
| Plantation grown 'pines' | ,, | 216 | 574 | 155 | 890 | 92 | 57 | .. | 61 | 2,045 |
| *Total* | ,, | *1,976* | *2,742* | *1,169* | *906* | *1,203* | *2,246* | *3* | *61* | *10,305* |
| **Gross value of forest products(*b*)—** | | | | | | | | | | |
| Logs(*c*) | $'000 | 24,012 | 34,864 | 15,884 | 8,826 | 7,810 | 18,858 | 33 | 640 | 110,927 |
| Hewn and other timber (incl. firewood)(*d*) | ,, | 17,034 | 4,709 | 4,519 | 3,037 | (*e*)6,180 | 3,069 | 15 | 24(*f*) | 38,587 |
| Other forest products(*g*) | ,, | 576 | 125 | 741 | 72 | (*h*)5 | .. | .. | 3 | (*i*)1,522 |
| *Total* | ,, | *41,622* | *39,698* | *21,143* | *11,935*(*j*) | *14,660* | *21,927* | *47* | *667* | *151,699* |
| **Local value of forest products(*k*)** | | | | | | | | | | |
| *Total* | ,, | *40,781* | *39,304* | *15,147* | *11,905* | *13,288* | *18,193* | *47* | *667* | *139,332* |

(*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, 1967–68 to 1971–72, below. (*d*) Includes also sleepers, transoms, girders, bridge timbers, mining timber, poles, piles, etc. (*e*) Excludes value of timber used for tannin extract, which is not available for publication. (*f*) Incomplete; *see* footnote (*e*). (*g*) Includes charcoal (forest production only), tanning bark, essential oils, eucalyptus leaves, crude rutin, etc. (*h*) Excludes value of sandalwood and substitutes, which is not available for publication. (*i*) Incomplete; *see* footnote (*h*). (*j*) Includes value of timber used for tannin extract and sandalwood and substitutes. (*k*) Gross production valued at place of production; *see* footnote (*b*).

FOREST PRODUCTION(*a*): AUSTRALIA, 1967-68 TO 1971-72

| | | *1967–68* | *1968–69* | *1969–70* | *1970–71* | *1971–72* |
|---|---|---|---|---|---|---|
| **Production of logs for sawing, peeling, slicing or pulping—** | | | | | | |
| Broadleaved— | | | | | | |
| Eucalypt and related species | '000 m³ | 7,185 | 7,213 | 7,234 | 7,220 | 7,486 |
| Rain forest species | „ | 361 | 376 | 378 | 363 | 370 |
| Coniferous— | | | | | | |
| Indigenous forest 'pines'— | | | | | | |
| Cypress | „ | 345 | 322 | 344 | 330 | 333 |
| Other | „ | 98 | 105 | 92 | 66 | 71 |
| Plantation grown 'pines' | „ | 1,674 | 1,860 | 2,048 | 2,143 | 2,045 |
| *Total* | „ | *9,664* | *9,875* | *10,095* | *10,121* | *10,305* |
| **Gross value of forest products(*b*)—** | | | | | | |
| Logs | $'000 | 89,552 | (*c*)90,340 | (*c*)96,607 | (*c*)104,363 | (*c*)110,927 |
| Hewn and other timber (including firewood)(*d*)(*e*) | „ | 27,702 | (*f*)28,070 | (*f*)29,623 | (*f*)33,692 | 38,587 |
| Other forest products(*g*)(*h*) | „ | 851 | (*i*)774 | (*i*)843 | (*i*)1,079 | 1,522 |
| *Total*(*j*) | „ | *118,769* | *119,717* | *127,669* | *139,955* | *151,699* |
| **Local value of forest products(*k*)—** | | | | | | |
| *Total* | „ | *109,759* | *110,344* | *117,797* | *128,960* | *139,332* |

(*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: States and Territories, 1971–72 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 charcoal (forest production only), tanning bark, essential oils, eucalyptus leaves, crude rutin, etc. (*h*) 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*) Includes value of timber used for tanning extract and sandalwood and substitutes in Western Australia. (*k*) Gross production valued at place of production. *See* footnote (*b*) to the above table.

## 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 1969–70 are not strictly comparable with previous years because of changes in the census units and scope.

OUTPUT OF AUSTRALIAN-GROWN TIMBER: ALL MILLS STATES AND TERRITORIES, 1969-70(*a*)

('000 super ft)

| | *N.S.W.* | *Vic.* | *Qld* | *S.A.* | *W.A.* | *Tas.* | *A.C.T.* | *Aust.*(*a*) |
|---|---|---|---|---|---|---|---|---|
| Sawn, peeled or sliced timber produced from logs— | | | | | | | | |
| Broadleaved | 362,604 | 273,161 | 145,556 | 4,378 | 180,645 | 165,857 | .. | 1,132,200 |
| Coniferous | 77,707 | 40,425 | 65,509 | 106,549 | 7,920 | 4,576 | (*b*) | 302,687 |
| **Total timber produced** | **440,311** | **313,585** | **211,065** | **110,927** | **188,566** | **170,433** | (*b*) | **1,434.887** |

(*a*) Nil production was recorded in the Northern Territory. (*b*) Included in figure for New South Wales.

OUTPUT OF AUSTRALIAN-GROWN TIMBER, ALL MILLS: AUSTRALIA(*a*)
1965-66 TO 1969-70

('000 super ft)

| | *1965–66* | *1966–67* | *1967–68* | *1968–69* | *1969–70* |
|---|---|---|---|---|---|
| Logs treated— | | | | | |
| Broadleaved(*b*) | 2,371,263 | 2,313,256 | 2,341,895 | 2,260,762 | 2,249,016 |
| Coniferous(*b*) | 569,521 | 554,838 | 532,965 | 545,779 | 552,531 |
| **Total logs treated(*b*)** | **2,940,784** | **2,868,093** | **2,874,860** | **2,806,541** | **2,801,547** |
| Sawn, peeled or sliced timber produced from logs above— | | | | | |
| Broadleaved | 1,178,473 | 1,143,814 | 1,165,376 | 1,113,679 | 1,132,200 |
| Coniferous | 329,532 | 317,591 | 307,684 | 295,594 | 302,687 |
| **Total timber produced** | **1,508,005** | **1,461,405** | **1,473,059** | **1,409,273** | **1,434,887** |

(*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 pages 889–90.

**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, 1965-66 TO 1969-70

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

| *State* | *1965–66(a)* | *1966–67(a)* | *1967–68(a)* | *1968–69(b)* | *1969–70(b)* |
|---|---|---|---|---|---|
| New South Wales | (*c*) | 58,791 | 64,903 | 71,083 | 79,249 |
| Queensland | (*c*) | (*c*) | (*c*) | 85,396 | 100,402 |
| Other States | 52,296 | (*c*) | (*c*) | 76,448 | 80,059 |
| **Australia** | **187,258** | **200,451** | **230,018** | **232,927** | **259,711** |

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

Of the total plywood produced in 1969–70, 134,066,000 square feet ($\frac{3}{16}$-in. basis) were classed as 'Commercial', 96,555,000 as 'Waterproof', 6,821,000 as 'Case', and 22,269,038 as 'Sliced fancy'.

During 1969–70, 789.8 million square feet ($\frac{1}{16}$-in. basis) of veneers were produced by the rotary process for the manufacture of plywood. In addition, 71.9 million square feet of sliced veneers were produced.

**Manufactured boards**

Particle board, resin or cement bonded of acoustic and other composition, amounted to 156,825,000 square feet during 1969–70.

**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 recently 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 1969–70 wood pulp production was 464,992 tons of chemical, mechanical and other pulp. During the previous year production was 403,907 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. 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, 1968-69 TO 1971-72**

(tons)

| *Type of paper* | *1968–69* | *1969–70* | *1970–71* | *1971–72* |
|---|---|---|---|---|
| Newsprint | 123,935 | 170,576 | 175,860 | 178,610 |
| Blotting | 521 | 488 | 492 | 427 |
| Duplicating | 10,898 | 9,564 | 12,199 | 14,336 |
| Printing and writing | 121,013 | 123,248 | 126,807 | 127,841 |
| Wrapping— | | | | |
| Kraft } | 231,458 | 269,719 | 267,923 | 278,938 |
| Other } | | | | |
| Paper felts | 1,366 | 1,476 | 1,544 | 961 |
| Paper boards | 342,406 | 370,677 | 379,142 | 375,974 |

# Overseas trade in forest products, timber and timber products

## Imports

### IMPORTS OF FOREST PRODUCTS, TIMBER AND TIMBER PRODUCTS AUSTRALIA, 1969-70 TO 1971-72

| | | *Quantity* | | | *Value ($'000 f.o.b.)* | | |
|---|---|---|---|---|---|---|---|
| | | *1969–70* | *1970–71* | *1971–72* | *1969–70* | *1970–71* | *1971–72* |
| Crude wood, timber and cork— | | | | | | | |
| Wood waste and charcoal | | .. | .. | .. | 18 | 16 | 23 |
| Wood in the rough or roughly squared | '000 m³ | 129 | 107 | 97 | 3,671 | 3,165 | 2,806 |
| Wood shaped or simply worked— | | | | | | | |
| Timber, sawn lengthwise, sliced or peeled, but not further prepared, of a thickness exceeding 5 mm— | | | | | | | |
| Conifer— | | | | | | | |
| Douglas fir | ,, | 390 | 416 | 416 | 21,479 | 19,970 | 20,462 |
| Hemlock and balsam | ,, | 47 | 59 | 72 | 1,791 | 2,040 | 2,636 |
| Radiata pine | ,, | 67 | 70 | 51 | 2,214 | 2,423 | 1,858 |
| Redwood | ,, | 5 | 5 | 4 | 487 | 510 | 328 |
| Western red cedar | ,, | 75 | 66 | 71 | 5,963 | 4,963 | 4,958 |
| Other | ,, | 37 | 45 | 45 | 2,609 | (*a*)3,405 | 3,304 |
| *Total conifer* | ,, | *621* | *661* | *659* | *34,543* | (*a*)*33,310* | *33,546* |
| Non-conifer(*b*) | ,, | 245 | 243 | 216 | 13,089 | 13,964 | 12,154 |
| Timber (including blocks, strips, etc.), planed, tongued, grooved, rebated, etc., but not further manufactured— | | | | | | | |
| Conifer | '000 m³ | 11 | 13 | 12 | 844 | 1,050 | 1,087 |
| Non-conifer | ,, | 7 | 10 | 19 | 618 | 862 | 1,678 |
| Cork, raw and waste | | .. | .. | .. | 295 | 426 | 503 |
| Selected items of forest origin, other than crude wood, timber and cork— | | | | | | | |
| Tanning extracts of vegetable origin | tonnes | 3,227 | 2,887 | 2,752 | 570 | 543 | 544 |
| Wood and cork manufactures (except furniture)— | | | | | | | |
| Veneers, plywoods, 'improved' or reconstituted wood and other wood, worked, n.e.s.(*c*) | '000 sq ft | 192,753 | 206,090 | 220,906 | 9,024 | 10,333 | 10,246 |
| Wood manufactures n.e.s. (household utensils, domestic utensils, building carpentry, etc.) | | .. | .. | .. | 4,967 | 5,274 | 5,852 |
| Cork manufactures | | .. | .. | .. | 1,399 | 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 1969–70, 1970–71 and 1971–72 include values of $33,000, $94,000, and $184,000 respectively, for which no quantities have been included. (*c*) Total values for this item for 1969–70, 1970–71 and 1971–72 include values of $699,000, $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, 1969-70 TO 1971-72

| | | Quantity | | | Value ($'000 f.o.b.) | | |
|---|---|---|---|---|---|---|---|
| | | 1969–70 | 1970–71 | 1971–72 | 1969–70 | 1970–71 | 1971–72 |
| Crude wood, timber and cork— | | | | | | | |
| Wood waste and charcoal (including shell and nut charcoal) | '000 m³ | .. | .. | .. | 23 | 13 | 3 |
| Wood in the rough or roughly squared | ,, | 7,594 | 14,272 | 6,652 | 476 | 612 | 358 |
| Wood, shaped or simply worked— | | | | | | | |
| Railway sleepers | ,, | 19,383 | 20,962 | 37,329 | 1,279 | 1,541 | 2,683 |
| Timber, sawn lengthwise, sliced or peeled, but not further prepared, of a thickness exceeding 5 mm— | | | | | | | |
| Conifer | ,, | 399 | 1,456 | 1,305 | 46 | 136 | 120 |
| Non-conifer—Jarrah | ,, | 13,384 | 4,988 | 3,898 | 940 | 363 | 503 |
| Other | ,, | 15,447 | 15,032 | 17,379 | 1,248 | 1,258 | 1,510 |
| Timber (including blocks, strips, and friezes for parquet or wood block flooring, not assembled), planed, tongued, etc.— | | | | | | | |
| Conifer | ,, | 1,326 | 1,895 | 2,289 | 130 | 211 | 205 |
| Non-conifer | ,, | 1,069 | 342 | 2,150 | 121 | 47 | 198 |
| Cork, raw and waste | tonnes | 2 | .. | 2 | 1 | .. | 2 |
| Selected items of forest origin other than crude wood, timber and cork— | | | | | | | |
| Natural gums, resins, gum-resins, balsam and lacs | | | | | | | |
| Eucalyptus oil | ,, | 398 | 367 | 423 | 61 | 51 | 68 |
| Wood and cork manufactures (except furniture)— | ,, | 138 | 111 | 108 | 180 | 153 | 165 |
| Veneers, plywood boards, etc.— | | | | | | | |
| Wood sawn lengthwise, sliced or peeled, not further prepared, veneer sheets and sheets for plywood, of a thickness not exceeding 5 mm | '000 sq ft | 9,228 | 7,156 | 4,443 | 383 | 303 | 244 |
| Plywood, blockboard, laminated wood products, inlaid wood and marquetry, cellular wood panels— | | | | | | | |
| Plywood | ,, | 2,090 | 2,181 | 4,468 | 400 | 533 | 487 |
| Other | ,, | 633 | 1,548 | 1,708 | 57 | 107 | 145 |
| Reconstituted wood, in panels, sheets or strips | ,, | 1,844 | 2,358 | 1,811 | 311 | 351 | (b)308 |
| Wooden beadings and mouldings | | .. | .. | .. | 143 | 103 | 59 |
| Improved wood, and wood simply shaped or worked, n.e.s. | | .. | .. | .. | 12 | 30 | 18 |
| Wood manufactures n.e.s., and plants and parts of plants used in dyeing and tanning | | .. | .. | .. | 622 | 1,122 | 1,117 |
| Cork manufactures n.e.s. | | .. | .. | .. | 118 | 159 | 265 |

(a) Excludes re-exports. (b) Includes a value of $3,000 for which no quantity has been included.