

The Sandalwood Industry In Australia: A History¹

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Abstract: From its inception in 1805, when it contributed to Sydney merchant incomes from whaling ventures, until today, when it earns several million dollars in export revenue, the sandalwood industry has played a small but significant part in Australia's economic development. The history of the industry falls into three major stages: first is the off-shore exploitation of the wood from Sydney, from 1805 to the 1840's and beyond; second is the free exploitation of Australian grown sandalwood from 1844 to 1929; and finally the period of government controlled exploitation from 1929 to the present.

Sandalwood is a highly aromatic wood that has been highly prized for centuries, particularly by the Chinese and Indians. Powdered sandalwood is burnt in joss sticks as incense and forms an integral part of religious ceremonies (see report on details of joss stick manufacture in *Forests and Forest Products and Industries of W.A.*, 1921), while certain species of the wood can be carved into many delicate forms such as fans, inlaid boxes and ornaments, and incense holders. Large carved sandalwood boxes have been especially valued as bride or trousseau boxes, as the wood is said to deter moths and other insects. Sandalwood cones, again of powdered wood, are used today as mosquito deterrents. Sandalwood oil, when distilled from the heartwood, is equally valuable being used as a fixative in making soaps and perfumes, and for medicinal purposes. It is mostly used today in perfumes and up to the Second World War, before penicillin, it was even used to treat venereal disease (Donovan 1975; Underwood 1954, p. 21).

The many uses of sandalwood and its religious significance to vast populations, on one hand, and the relative scarcity of the wood and its very slow growth rate, on the other, have combined to make it an extremely valuable commodity in many parts of the world. Although sandalwood grows in a number of countries, most consume it domestically, and in several nations where the tree does *not* grow, demand is also high (e.g. Singapore and China). Consequently, a large international demand exists for the fragrant wood. Australia, basically a nonuser, has thus become one of the principal suppliers.

Australia has several native species within the broad genus *Santalum*, but only two—*Santalum spicatum* and *Santalum lanceolatum*—have been used for export because of their "true sandalwood" fragrance. These two types can also be ranked in terms of their export potential. *S. spicatum* (also called *S. cygnaum*) has been the major export earner and flourishes mainly in Western Australia. Originally it grew in a broad range from above the Murchison River to Esperence in the South, and

inland beyond the Eastern Goldfields through to the foothills of the Darling Ranges (Talbot 1983, p. 25; Irwin 1847; Robertson 1958, p. 4). It also grew on the western borders of the Nullabor in South Australia.

S. lanceolatum, the second major type of sandalwood exported, flourishes in Northern Australia, around Shark Bay and the Kimberleys in Western Australia (Talbot 1983) and in Northern Queensland above Cairns and in the Hughendon-Cloncurry area, a basalt region which also contained a small patch of sandalwood of the *album* variety. Interestingly, 4 tons of this last mentioned wood were apparently used at Ghandi's funeral in 1948 (North Queensland Register 22.9.1979). The northern species of sandalwood were, and still are, highly prized by the aboriginals as the wood and its scent are regarded as fundamental elements in sex-magic (Sansom 1980). It is thus possible that the value they placed on the wood prevented its ready exchange with visiting Macassan fisherman and so delayed world cognizance of its existence until the mid-19th century!

The growth patterns, variance, and problems in propagating and cultivating these native species are discussed in other chapters.

STAGE I: THE OFFSHORE INDUSTRY

Australia's romance with the sandalwood industry began very early. Just 15 years after its foundation in 1788, Sydney merchants were looking for cargoes that could be exchanged for tea from China, for which even the convicts had developed a passion. In this period such trade was difficult not only because the Chinese would accept only limited commodities—including fur and sandalwood—in exchange, but because the British East India Company claimed a monopoly on all British trade in the region. To overcome this monopoly, the Sydney traders soon developed trading links with American whalers in the area and transferred to them the whale oil, seal furs and skins, and the sandalwood they had obtained on their own account, receiving tackle and tea in exchange.

No sandalwood grows naturally on Australia's East Coast. It does grow in northwestern Queensland but not in areas that were readily accessible to the eastern coast in the days of bullock transportation (Boland 1984). All wood collected by the Sydney traders in the early years, therefore, came from stands growing on Pacific Islands, principally Fiji.

Initial exploitation of the wood has been attributed to the increasing activity of Sydney-based sealers and whalers in the Pacific region (Hainsworth 1964-65, p. 2; Shineberg 1967, p. 2) because merchants financing such voyages ordered crews to look for payable cargoes in off-season periods. In this manner merchant Simeon Lord brought the first sandalwood cargo into Sydney in April 1805 (Hainsworth 1964-65, p. 3-5). By 1808 Simeon Lord's London agents were gathering in remittances from Nantucket, which totaled some £30,000 (N.S.W. Archives 1822-26)—a fortune when the Governor's yearly salary was only £500. But the risks of sandalwood voyages for the small colonial vessels and their crews were horrendous. Not only were the Fiji Islands guarded by dangerous reefs, their inhabitants

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were cannibal warriors customarily engaged in tribal warfare (Hainsworth 1971, p. 177). Overtime, moreover, the natives became dissatisfied with the beads and nicknacks they had previously accepted in exchange and demanded more valuable goods for the wood they brought to the beaches, hence increasing the costs of each voyage. For all these reasons the sandalwood trade remained small scale, and even during this first boom period total quantities extracted from Fiji did not exceed several hundred tons (Hainsworth 1964-65, p. 18).

Prevailing high prices began to falter in 1809 (mainly due to oversupply) and only sporadic cargoes were collected between then and 1816 when Fijian stands "were to all intents and purposes cut out" (Shineberg 1967, p. 7). Those merchants who had profited had done so, I believe, because the costs of collecting sandalwood had been largely swallowed in the general costs of equipping the whaling and sealing voyages they were already financing; and because, in the early period at least, the wood was exchanged for scrimshaw—the carved whale's teeth that sailors etched during long periods of inactivity (Hainsworth 1971, p. 164). Carved whale's teeth were known as "Tambua" in Fiji and were worn by chiefs on a string of female pubic hair as a symbol of power. The Tambua are still highly prized and have enormous significance in transactions. Presentation of a Tambua is a matter of great honor, and by law they are not allowed to leave the island. One presented to Prince Charles had to remain in Fiji (oral evidence).

Although isolated incidents of trade in sandalwood by the Sydney traders have been traced to the 1820's and 1830's, low prices in China and political difficulties between China and Britain generally depressed the trade until the 1840's. With the end of the Opium Wars in 1842-43 and the recommencement of open trade with China, however, sandalwood prices began to rise, initiating the second main sandalwood boom which lasted—despite fluctuations—to the 1860's (Shineberg 1967, p. 64-70, 72). The Sydney traders were quick to reenter the trade and extended their collections from Fiji to a wide range of Pacific Islands, especially the Marquesas and the New Hebrides. But the Sydney traders this time had American and English competitors for the wood, and supplies on the small islands were not limitless. To counteract diminishing returns, ships and crews had to venture further and further afield, sometimes into uncharted waters, which increased the risks of shipwreck. Problems with the natives of the islands also escalated with their continuing exposure to Europeans, and natives' demands for more valuable trade items also increased. Profits were thus never as high in this second boom as they had been in the first, and by the mid-1860's the Sydney-based industry collapsed—mainly due to the exhaustion of commercially viable stands in the South Pacific (table 1). But by that time the Chinese merchants were being supplied from another Australian source—and this time with native Australian sandalwood.

STAGE II. AUSTRALIAN SANDALWOOD, 1844-1929

In the period 1844 to 1929, Western Australia was a dominant exporter of sandalwood, which was purchased mainly by Chinese merchants in Singapore and Shanghai to be powdered for

Table 1—New South Wales Sandalwood Exports 1842-1862

Year	Tonnage Carried Total	Total Value ¹ Cargos £'s	Imported Exported ² Tons	Value Exports £'s (est.)	Value Whale & Seal Oil £'s (est.)
1842	1,730	24,205	1,485	19,305	77,012
1843	655	11,665	205	2,665	72,989
1844	622	10,326	302	3,926	57,493
1845	529	7,577	429	5,577	96,804
1846	992	17,677	309	4,017	70,126
1847	1,342	23,606	462	6,006	80,528
1848	1,251	22,396	375	4,875	68,969
1849	811	15,289	133	1,729	45,468
1850	388	7,641	17	221	29,368
1851	352	6,410	90	1,170	25,877
1852	712	11,517	389	5,057	34,562
1853	1,136	11,517	389	5,057	34,562
1854	480	7,395	315	4,095	28,155
1855 ³	555	8,825	325	4,225	20,770
1856	n.a.	n.a.	150	1,950	25,355
1857	n.a.	n.a.	346	4,498	32,306
1858	n.a.	n.a.	103	1,339	1,450
1859	n.a.	n.a.	66	858	532
1860	n.a.	n.a.	3 1/4	42	136
1861	n.a.	n.a.	152	1,976	—
1862	n.a.	n.a.	233	3,029	—

Sources: 1842-55: Shineberg, 1967, Appendix I, p. 219-244. 1855-62: N.S.W. Statistical Register—Oil exports from the 1865 NSW Statistical Register.

¹ Cargos sold in China valued at an estimated average £20/ton, cargos sold in Sydney at an estimated average of £13/ton.

² Assuming all wood imported was exported.

³ End Shineberg, begin Statistical Register Series.

incense. An overview of the volumes of wood exported from Western Australia in this period of free exploitation, however, reveals three separate phases. The first phase, 1844-1880, was the era of discovery and initial exploitation when sandalwood cutting was closely linked with the expansion of the pastoral and wheat industries (table 2). The second phase, 1880-1918, was Western Australia's golden era when sandalwood and gold prospecting were closely linked (table 3). The third phase, 1918-1929, was marked by a rapid boom, the entry of other states, and by first attempts to regulate and stabilize the industry (tables 4, 5).

1844-1880

When the Sydney traders experienced rising prices for sandalwood at the end of the Opium Wars, the news quickly travelled to Swan River, on the other side of Australia, where a cessation of immigration and a critical trade deficit were seriously alarming the government of the 15-year-old colony (Statham 1979). News of a potential new export did not go unheeded!

Indian and Chinese laborers introduced in the late 1830's and early 1840's to work for Swan River pastoralists probably first recognized the commercial potential of the wood, which had been noted by the explorer Ensign Dale in 1832. Sufficient interest was then aroused for the government to agree to send a trial shipment of the wood on the colonial schooner *Champion* to Bombay to "test the market" (Perth Gazette 25.1.1845, Inquirer (editorial) 5.2.1845). Enormous excitement greeted the

Table 2—Sandalwood exports 1844-1880, compared with wool exports, from Western Australia

Year	Wool		Sandalwood		
	Quantity (tons)	Value (£'s)	Quantity (tons)	Value (£'s)	Avg.£ per ton
1844	140,155	7,008	—sample cargo only—		
1845	145,254	7,757	4	40	10.0
1846	291,368	13,363	32	320	10.0
1847	229,297	11,464	370	4,444	12.0
1848	301,965	15,098	1,335	13,353	10.0
1849	276,073	14,374	1,204	10,710	8.8
1850	309,640	15,482	n.a.	1,220	—
1851	359,317	17,883	219	1,593	7.2
1852	356,153	16,768	0	0	—
1853	397,428	19,870	0	0	—
1854	442,881	22,341	0	0	—
1855	493,073	24,723	—	—	—
1856	500,996	25,672	—	—	—
1857	478,486	35,886	280	2,524	9.0
1858	543,504	33,969	745	7,455	10.0
1859	594,665	44,599	1,278	17,259	13.5
1860	656,815	49,261	1,687	16,360	9.7
1861	723,965	54,297	2,558	24,945	9.7
1862	806,006	60,450	2,393	21,541	9.0
1863	1,212,183	84,088	2,807	25,265	9.0
1864	550,598	41,294	2,724	24,520	9.0
1865	1,358,874	101,915	1,686	13,490	8.0
1866	1,234,070	92,555	2,965	23,722	8.0
1867	1,312,016	87,467	2,305	18,442	8.0
1868	1,572,068	98,254	3,256	26,045	7.9
1869	1,880,426	94,021	4,124	32,998	8.0
1870	1,787,812	89,390	6,112	48,890	7.9
1871	1,665,915	111,061	3,366	26,926	7.9
1872	1,839,562	122,637	3,942	31,536	8.0
1873	1,761,323	132,099	6,292	62,916	9.9
1874	2,874,992	215,624	7,057	70,572	10.0
1875	2,428,160	182,112	6,646	66,465	10.0
1876	2,831,174	165,152	6,577	65,772	10.0
1877	3,992,487	199,624	4,247	31,851	7.4
1878	3,019,051	150,953	4,675	35,064	7.5
1879	3,505,688	175,284	4,667	35,001	7.4
1880	4,342,606	271,412	5,197	51,970	10.0

Sources: WA Blue Books 1844-1880 and Battye 1924

news, on the *Champion's* return early in 1845, that the wood would fetch £ 10 per ton in Bombay or Mauritius and £20-30 per ton if taken directly to Canton (Inquirer [editorial] 5.2.1845; Inquirer 9.7.1845; W.A. Gov. Gazette 9.12.1848). In contrast, exports of heavy timber and whale oil and bone from Swan River were returning no more than £4.10.0-per ton at that time, and were far more costly to exploit than the light, spindly, and fragrant sandalwood. At first, activity was centered in the Avon Valley (inland from Perth), where trees were simply felled with an axe, stacked, and sent by bullock dray down to Fremantle for export.

When the first commercial cargos reached Bombay, an entrepot for the China trade—as were Singapore and Mauritius—the Australian wood was subject to close scrutiny. Buyers concluded that while inferior to the top Timor and Indian wood (*S. album*) and not suitable for carving given its lower oil content, the aromatic quality of the Western Australian wood was excellent. This was a sought-after characteristic for wood to be

Table 3—Annual sandalwood exports from Western Australia (volume and value) 1880-1918 compared with gold exports

Year	Sandalwood Export, Vol. (tons)	Sandalwood Export Value £'s	Sandalwood Average Price per Ton (£'s)	Gold Export Qty. (ozs)
1880	5,197	51,970	10.0	—
1881	7,716	77,165	10.0	—
1882	9,605	96,050	10.0	—
1883	7,031	56,250	8.0	—
1884	2,620	20,960	8.0	—
1885	4,527	36,216	8.0	—
1886	3,431	27,450	8.0	302
1887	4,317	34,533	7.9	4,873
1888	4,470	33,525	7.5	3,493
1889	6,385	57,465	9.0	15,493
1890	5,136	51,355	10.0	20,402
1891	3,760	37,600	10.0	30,311
1892	5,713	42,580	7.5	59,548
1893	3,892	32,160	8.2	110,891
1894	2,748	23,430	8.5	207,131
1895	3,851	30,863	8.0	231,513
1896	6,848	65,800	9.6	281,265
1897	5,852	49,480	8.4	674,994
1898	4,349	31,812	7.3	1,050,183
1899	4,084	29,719	7.2	1,434,570
1900	5,095	39,038	7.6	1,414,311
1901	8,864	73,931	8.3	1,703,417
1902	7,995	61,771	7.7	1,871,037
1903	4,406	37,913	8.6	1,871,037
1904	4,510	25,417	5.6	2,064,801
1905	5,521	38,817	7.0	1,955,316
1906	8,848	70,958	8.0	1,794,547
1907	9,212	65,999	7.2	1,697,554
1908	9,564	76,668	8.0	1,647,911
1909	4,805	37,456	7.7	1,595,269
1910	8,228	70,775	8.6	1,470,632
1911	6,907	65,506	9.5	1,370,867
1912	3,154	27,533	8.7	1,282,658
1913	6,260	47,589	7.6	1,314,043
1914	4,702	39,800	8.5	1,232,977
1915	8,375	78,929	9.4	121,112
1916	6,270	61,381	9.7	182,670
1917	7,230	72,699	10.1	—
1918	6,504	81,834	12.6	—

pulverized for incense—which was good news for Western Australian exporters as there was a major demand for sandalwood from the joss stick and incense makers. Even the butt and roots of the sandalwood tree were valuable for incense, and so trees were later "pulled" out by horse or camel and chains, rather than felled, before they were trimmed of bark, cut into sticks, and stacked (Richmond 1983). About 200 of the 3-foot sticks constituted a ton, and payment was made by the ton on delivery to the merchants at Guildford (the town at the navigable head of the Swan River) or at the Port of Fremantle.

By mid-1847 sandalwood mania had gripped Swan River Colony's population. Feverish competition arose between landowners and laborers as they laid claim to abundant sandalwood areas. Poaching and trespassing increased, and on unallocated Crown lands stand-up fights between teams were not uncommon. In the more settled areas workmen deserted their employers to go cutting sandalwood or charged exorbitant wages to stay

Table 4—Annual Western Australian sandalwood exports (volume and value) 1916-1929, c/f gold and wool export volumes

Year	S-W Volume (tons)	S-W Value (£'s)	Annual S-W Price/ton (£'s)	Gold Volume (Fine ozs)	Wool Volume (000's lb's)
1916	6,270	61,381	9.7	182,670	29,103
1917	7,230	72,669	10.0	—	24,405
1918	6,504	81,834	12.6	—	10,632
1919	8,998	117,072	13.0	—	29,645
1920	14,355	240,579	16.7	41,296	59,600
1921	10,839	181,801	16.8	66	43,132
1922	3,990	54,769	13.7	—	58,693
1923	7,623	102,912	13.5	—	41,925
1924	14,081	348,713	24.7	90,523	86,234
1925	6,243	186,775	29.9	36,117	35,015
1926	7,771	238,203	30.6	49,619	49,689
1927	6,821	199,754	29.2	91,080	53,788
1928	4,829	147,426	30.5	14,261	61,240
1929	7,582	225,208	29.7	10,535	57,045

Source: Battye 1924

Table 5—Total volumes of Australian sandalwood exports by state, 1918-1945 (in tons)

Year	W.A.	S.A.	Queensland	Total
1918	6,504	—	40	6,910
1919	8,998	—	132	9,130
1920	14,355	—	546	14,901
1921	10,839	—	635	11,474
1922	3,990	—	224	4,214
1923	7,623	—	135	7,758
1924	14,081	—	291	14,372
1925	6,243	347	199	6,789
1926	7,771	1,621	144	9,536
1927	6,821	1,292	96	8,209
1928	4,829	1,543	73	6,531
1929	7,582	2,214	159	9,955
1930	714	895	339	1,948
1931	1,606	543	89	2,238
1932	1,386	1,323	546	3,255
1933	3,068	1,004	446	4,518
1934	2,508	964	463	3,935
1935	2,223	653	310	3,186
1936	1,593	844	169	2,606
1937	2,513	432	169	2,606
1938	747	153	65	956
1940	1,058	354	42	1,454
1941	1,167	102	—	1,269
1942	400	—	—	400
1943	2	—	—	2
1944	—	—	—	—
1945	—	—	—	—

Source: Forests Department Annual Reports

(de Bugh 1981, Irwin 1847). Farmers also complained about the difficulty of procuring transport to bring in supplies and take out their produce, as most of the bullocky teams and horse drays were committed to the sandalwood trade (Erickson 1973, p. 70-71). In fact, the increased road traffic inland put enormous pressure on the colony's few main roads, and the cleared tracks soon deteriorated into deep rutted and pitted nightmares for the wagoners. To rectify the situation, the government decided in

mid-1847 to tax those who were causing the problem and to use the revenue for road improvement. An export tax of £ 1 per ton was imposed on sandalwood, but strong opposition led to its replacement in October the same year by a system of licenses to cut in a particular area and a 10-shilling toll (Perth Gazette 11.9.1847, 27.5.1848; Gov. Gazette [W.A.] 1.10.1847, 22.10.1847; Underwood 1954, p. 9-10). Problems frequently arose when both local and central authorities issued licenses to cut the same area of land (Erickson 1973, p. 71).

Some idea of the extent of the boom can be gauged from export figures of the time, which show sandalwood to have risen from virtually zero in 1844 to a position where, in 1848, it challenged whale oil and wool as a leading export earner (W.A. Blue Books, 1844-50). The sandalwood export figures entered for 1 year tended to represent cutting activity in the previous year due to delays in inland and overseas transport. Given this, the feverish activity that occurred in 1847 can be seen in the peak £ 13,353 earned for the export of 1,335 tons in 1848. By mid-1847 the newspapers reported that there were over 1,500 tons of sandalwood cut over the hills waiting transport (Inquirer 4.8.1847). Some of this was lost in winter floods and December bushfires, but the rest was safely carted to Guildford where it accumulated because bad roads and low water prevented its dispatch to the port. In April 1848 it was said that stacked stocks covered more than 1 acre (Inquirer 5.4.1848). By this time, however, most of the sandalwood stands in the Avon Valley had been exhausted, and cutting teams were having to venture further and further inland for payable loads. Transport costs gradually became prohibitive for, as Eliza Brown recorded, it cost eight or nine times more to send a wagon load from Fremantle out 40 km to the Avon Valley than it did to send it from London to Fremantle! (Cowan 1977).

All would have been well if overseas prices of sandalwood had risen to cover the extra transport costs, or if the wood had been easily regrown within a feasible distance from the Port. But neither of these events occurred. Regrowth was prevented by lack of understanding of the parasitic nature of the tree, by widespread land clearance and by the practice of pulling out the tree roots and all, while oversupply of sandalwood on the Chinese market brought prices tumbling in the second half of 1848 (Lefroy 1848; Shineberg 1967, p. 80). By mid-1949 the boom was over (Gov. Gazette 9.12.1848; Underwood 1954, p. 9). At £8.10.0 per ton on overseas markets further exploitation was unprofitable. Cutting all but ceased. Throughout that year cutting teams slowly returned to the towns to seek alternative work, but their return resulted in rising unemployment in Perth and Fremantle—a fact that flew in the face of the labor-scarcity arguments then being forwarded by the pastoralists who were lobbying for the introduction of convicts! (Statham 1981a).

Sandalwood actually had a lot to do with Western Australia's convict decision. It was the scarcity of manpower caused by the 1846-47 sandalwood boom that brought about the pastoralists' first request for convicts. Later it was the deteriorating state of the roads and the lack of other needed public works that finally convinced the townspeople that a limited introduction of first offending convicts would be a good idea. In any event, the colony was hoodwinked by the British Government, which

declared Swan River to be a full-fledged penal settlement before informing even the Governor. In the long run, however, this declaration had advantages as it gave colonists the moral power to argue for, and get, considerable concessions, such as a commensurate immigration of free settlers, only male convicts, and full financial support from the British Government! (Statham 1981b).

Somewhat surprisingly, the cheap labor of the convict era, 1850-1868, did not bring about any major resurgence of sandalwood cutting activity. Prices remained low until 1859, when they rose to £13 per ton in Singapore and Bombay, and £20 per ton in China (Underwood 1954, p. 13; Ware 1975, p. 4). Between 1861 and 1865, some 2,300 tons of the wood were exported at an average price of £9.3.0 per ton. Of this, the government took £1.10.0 in tax, which was bitterly resented. Tax and license fee revenue, nevertheless, was used to extend and improve inland roads as initially promised (Colbatch 1929, p. 177). Supplies of the wood in the 1860's came increasingly from further afield. The northern and still uninhabited areas of Western Australia had to be serviced by sea and provided wonderful opportunities for evading the Government tax—in fact, it is said that "Smugglers Cove," above Geraldton was so named because of the illegal sandalwood exports shipped from there! (Donovan 1975, p. 3).

From the end of the convict era in 1868 to the second big Western Australian sandalwood boom of the early 1880's, sandalwood cutting and export continued to provide a useful second income for some farmers and a living for a number of independent teams. This was a period of rapid pastoral extension northwards and southwards onto leased, sandalwood-bearing Crown lands. Sandalwood was cut by shepherds in off-peak periods and stacked until a sufficient quantity had been accumulated to arrange transport. It was discovered in this period that sandalwood foliage provided excellent feed for sheep and cattle, so the two activities were mutually supportive in more ways than one.

Extreme yearly fluctuations in exports could occur in this period through shipping delays (both downriver and overseas), natural hazards like bushfires and floods, and supply conditions in overseas markets when sandalwood-laden ships arrived, for prices depended on the season and the frequency of supply vessels. From 1868 to 1880, a total of 58,656 tons were exported, though annual tonnages tended to rise over the period (*table 2*).

During the early 1870's the Mysore sandalwood plantations in India failed to meet domestic demand, and restrictions were placed on export. As a result, Indian import demand increased, and competition was lessened in other markets, allowing the Western Australian industry—marketing mainly in Singapore and Bombay at this stage—to treble in size (Talbot 1983, p. 25-26). The peak of 9,605 tons exported in 1882 was in fact not surpassed for almost 40 years, though annual export tonnages remained high, aided by the construction of railways which significantly lowered the costs of transporting the wood from inland districts to Fremantle.

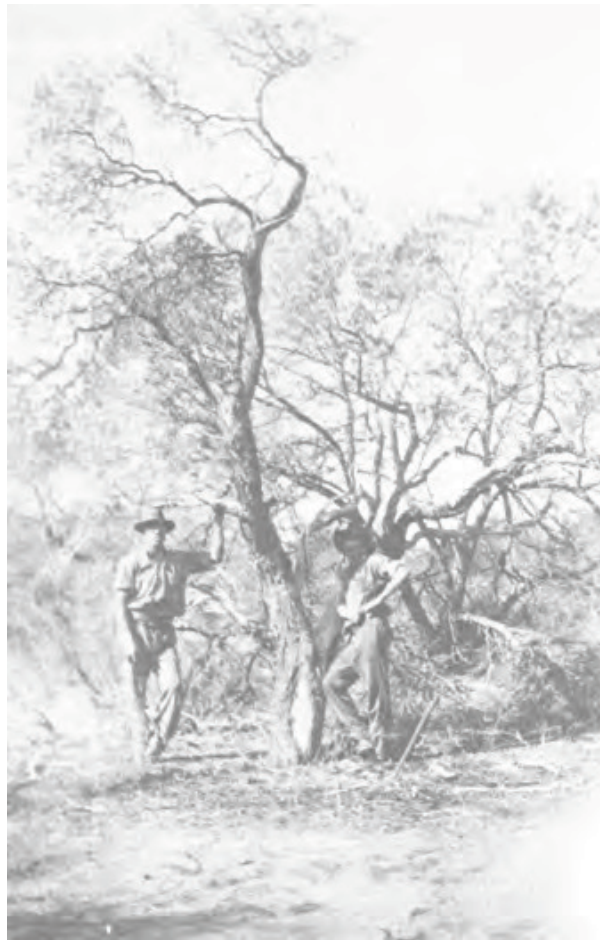


Figure 1—Sandalwood cutters worked in the Goldfields region of Western Australia around 1930. Photo: Neil Mitchell, Battye Library, Western Australia.

1880-1918

Although this period of Western Australia's history was dominated by the discovery of gold, the sandalwood industry also played its part. From the early 1880's, when news of gold finds in the Kimberleys sent many men north, sandalwood began to acquire its reputation as "the Gold-diggers best-friend." When prospectors found Kimberley gold to be elusive (Colbatch 1929, p. 193), they gladly fell back on new stands of sandalwood they came across as a source of finance for provisions and transport—a relationship that was to continue and intensify in future years. (See *table 3* for comparison of sandalwood and gold exports.)

The Kimberley and Pilbara gold finds were soon totally eclipsed by the discovery in the early 1890's of the "Golden Mile," some 300 miles due east of Perth. Conditions in this semi-desert region were appalling, but the lure of gold brought people from far and near. Within 5 years Western Australia's population had increased 46 percent (population 1890—46,290, in 1895—101,1430) and kept on increasing rapidly to the end of the century (Ware 1975).

While alluvial gold was easily obtained there was little incentive to seek out and pull sandalwood, but as surface gold became

harder and harder to find after 1895, sandalwood provided a welcome substitute. As eager prospectors moved east, they discovered new, unexploited stands of sandalwood and, when long unlucky stretches exhausted their provisions, they became sandalwood pullers to earn the funds to continue their search (*fig. 1*) (Talbot 1983, p. 27). Sandalwood stands were (and still are), fairly abundant in the Eastern Goldfields Region, and exploitation of this area led to the third main boom from 1896 to 1911, when annual quantities exported reached 8000 and 9000 tons (Ware 1975 and *table 3*).

As sandalwood's value as an export commodity became more widely recognized, fears arose about the industry's long-term survival. The Department of Woods and Forests, created in 1896 (Robertson 1958, p. 8) attempted to conserve and extend sandalwood resources, particularly through reforestation programs. Few of these proved successful, for even when the matter of a suitable host for the seedlings had been determined, germination was not uniform; and pests and grazing animals (especially rabbits) destroyed most seedlings (Western Australia Woods and Forests Dept. 1897).

A story related in a departmental journal clearly indicates the precarious existence of the sandalwood plantations at this time. A small area was fenced and seeded, with hosts, in the eastern Goldfields, and forestry officers were watching it with pride. Unfortunately a local Arab had also noted the new growth and thought it highly suitable for his camels. He therefore applied to the Government for a lease over the land—and got it! Despite immediate objections from the department, the Arab and his camels won and another sandalwood plantation failed to mature (Austral. For. J. 15.1.1923).

In November 1908 the old license system was repealed, and a royalty of £5.0 per ton was introduced on all sandalwood pulled, to be collected by the Railways Department together with freight charges (Woods and Forests Dept. Report 1909, p. 15; W.A. Gov. Gazette 27.11.1908). Revenues increased immediately, from £215 in 1908 under the licensing system to £1,390 in 1909, the first full year of the royalty system (Woods and Forests Dept. Report 1909, p. 16).

In 1913 another sandalwood venture began in Western Australia when a man named Braddock established a plant at Belmont, just outside Perth, to distill sandalwood oil. By 1917 he was exporting over 3,000 lbs of the oil to England, where there was a ready market (Donovan 1975, p. 7; Underwood 1954, p. 21) due to the British Medical Association's finding that sandal oil, when used in capsule form, helped cure venereal disease (Underwood 1954, p. 22). With the outbreak of World War I the demand for sandal oil for this purpose increased markedly, clearly working to Braddock's advantage. Moreover, the British Pharmacopeia announced that tests on the Western Australian oil (all from *S. spicatum*) had an unusual positive refraction, which gave it a unique advantage in medicinal use (Donovan 1975, p. 7). Since the oil was also used in addition as an antiseptic, a fixative in perfumes, and as a base for soaps and creams, demand was high both at home and abroad.

The export of Western Australian Sandalwood also did well throughout the war years and by 1916 commanded four-fifths of the Chinese market (Schorer 1974, Poole 1923). By this time,

however, Western Australia had another Australian competitor in the sandalwood trade—albeit a minor one. Queensland had begun exporting small amounts of sandalwood from the Cape York Peninsula in the 1890's (North Queensland Register 22.9.79, 6.5.83). This wood, of the *lanceolatum* variety, was exported through a Chinese merchant, See Yick, in small quantities via Thursday Island (Bloodwood 1979). Figures are unobtainable for this period, and annual tonnages were well below 100, but it was a portent of a new era in the history of the Australian sandalwood industry.

1918-1929

Not only was the post-war era characterized by the entry of other Australian states, it was also marked by a boom of unprecedented dimensions and the first Government attempts to control the industry.

Increased post-war activity was stimulated by two factors: first, an increased supply of labor for sandalwood getting, as many men returning from the war saw this as a means of raising the finances to settle on the land; and second, a significant rise in overseas prices. From an average of £10-£13 per ton in China before the war, merchants were receiving an average of £36 by 1920, and even higher prices in the smaller markets of Manila, Singapore, and Bombay (Robertson 1958, p. 16). As a result of these combined forces, Western Australia exported some 14,355 tons of sandalwood in 1919-1920 (Forest Dept. 1920-21), the highest annual export quantity ever recorded (*tables 4, 5*).

During the "frenzied" cutting of sandalwood, some form of Government regulation was necessary. Despite vigorous opposition from the goldfields population (West Australian 11.2.1920, 13.2.1920; Kalgoorlie Miner 11.2.1920), an increase in the royalty payable on sandalwood cut from Crown land from £5.0 to £2 per ton was approved in March 1920 (Forests Dept. Report 1920). The increase in royalty, however, did little to discourage the sandalwood getters, especially as there was a noticeable recession in mining! Overproduction of cut wood in fact led to the accumulation of huge sandalwood stocks on the wharves at Fremantle (Donovan 1975, p. 4; Talbot 1983, p. 30). and to fears that the wood was being overcut. In consequence, strict new regulations were drawn up and introduced in 1923 (W.A. Gov. Gazette 30.10.1923; Underwood 1954, p. 22).

These 1923 regulations were designed to protect the getters, conserve supplies, and ensure that the Crown received due reimbursement for the export of a valuable resource. They called for:

- (a) An overall quota on yearly production, to be determined by the Cabinet and not to exceed 6000 tons.
- (b) The introduction of export licenses to be held by those accepting the wood.
- (c) The increase in royalties to £9 per ton; and
- (d) The appointment of forest rangers to check illegal sandalwood cutting, to enforce the minimum size rules, and to assist with programs of reforestation.

It was hoped that by restricting supply the world price of sandalwood would be forced upwards, allowing maximum benefit to be obtained from the large stocks of wood still held in



Figure 2—Immense stacks of sandalwood awaited shipment at the port of Fremantle in Western Australia in the 1920's. *Photo:* Courtesy of Battye Library, Western Australia.

Fremantle (*fig. 2*) and at country rail sidings. To protect the sandalwood getter in the face of this marketing strategy, the government set minimum prices for clean, average quality wood delivered to Fremantle at £16 per ton, free of royalty. Buyers were forced to pay this both by the license system and by the stipulation that without evidence of payment of the minimum price to getters the royalty payable would be £25 per ton.

These curbs on the industry reduced the record profits of the early 20's and spelt the end for some of the contracting companies that had grown up in the good years. Four firms continued: Paterson and Co., Western Australian Sandalwood Co-op; J. Hector and Sons; and Burridge and Warren, but they were only permitted to remove 500 tons between them per month, with the actual allocations being based on the market share each firm had held in past years (Forests Dept. Report 1930, p. 6). One loophole remained, however, for the regulations only applied to sandalwood cut on crown land, and in no way restricted the pulling of sandalwood from private property (Donovan 1975, p. 8; Robertson 1950, p. 21-22). Consequently, the amount of wood delivered to country sidings ostensibly from private property, but in fact from Crown land, increased markedly (Forests Dept. Report 1924, p. 19; 1925, p. 13). However, resulting legal wrangles ate considerably into the profits of the four export companies until the problem was resolved in 1929.

Another major change was introduced in 1925 when responsibility for the allocation of sandalwood orders was transferred from the licensed private trading companies (about whom complaints had arisen over the distribution of orders) to the Forests

Department, which set up separate advisory boards to deal with the two distinct types of applications normally received (Robertson 1958, p. 23). Unlike the regular getters, who obtained orders of about 30 tons each per annum, prospectors were usually allotted 10-12 tons to be supplied in two lots, one in May and the next in August-October. Actual orders, however, were fairly evenly distributed between the two groups, with the edge going to the prospector (*table 6*). These orders, however, were all for sandalwood obtained from Crown land; and throughout this period the problem of additional cutting from private property continued and the amount of stockpiled wood grew.

Opinion was split over the effectiveness of the 1923 and 1925 regulations, but the four licensed companies now had worries on other fronts, for in 1925 South Australia entered the Sandalwood market (Forests Dept. Report 1926, p. 13). Queensland was still producing sandalwood (and rosewood, which was used as a substitute in the incense market), but this did not worry the

Type	1925-6		1926-7		1927-8		1928-9	
	Persons	Tons	Persons	Tons	Persons	Tons	Persons	Tons
Getters	208	4,115	184	4,270	170	3,498	170	5,962
Prospectors	215	2,000	197	2,286	186	2,076	202	

Source: Annual Reports W.A. Forests Dept.
 Note: The split-up in the type of orders was discontinued after 1929.

Western Australian merchants as they were dealing in very small quantities. South Australia, on the other hand, was attempting to break into markets that the Western Australian merchants had considered entirely theirs, and this was a very different matter (tables 5, 7).

Trading through a single company, The South Australian Co-operative Sandalwood Co., the South Australians proceeded to undercut the Western Australian companies by offering their wood, which was on average slightly inferior in quality, at lower prices (table 7). Also, the South Australians paid no royalty at that time (Robertson 1958, p. 24). In South Australia the wood grew in the west, on the Nullabor Edge, and in the north, and was exploited mainly by marginal wheat farmers settled in those regions on government soldier settlement schemes. Explaining South Australia's late entry into the market, officials stated that the tree had not been recognized until it was drawn to their attention by an ex-West Australian sandalwooder! (oral evidence).

To relieve stress in the industry, representatives of the South and Western Australian governments met in January 1927. They agreed that there should be a measure of joint control of sandalwood pulling, and so total quotas were set for each state—2,600 tons for South Australia and 5400 tons for West Australia—roughly a 1/3-2/3 split (Forests Dept. Report 1927, p. 12). The agreement was successful (neither state reached their quota) and was continued in the next 2 years (table 7). To further reduce the exigencies of open competition, the four licensed sandalwood trading companies in Western Australia formed a Sandalwood Merchants Association in 1928, which then dealt on behalf of the companies with the South Australians and with overseas buyers (West Australian 19.2.1928).

Partly to combat this growth of countervailing power and protect the getters, and partly to close the private-property sandalwood loophole, the W.A. Government decided to introduce further legislation to effectively control the industry. The strict controls that ensued, combined with a world depression, introduced a new and less active stage for the industry as a whole.

Stage III: 1929 to the Present—Government Control

The period of Government control can also be divided into three phases: first 1929-43, when controls were first implemented (table 5); second, 1945-1971, when the oil industry was

Table 7—West Australian and South Australian sandalwood exports 1925-1931

Year	W.A.			S.A.		
	Tons	£ Value	Avg. Price per Ton £	Ton	£ Value	Avg. Price per Ton £
1925:	6,243	186,775	29.9	347	10,409	29.9
1926	7,771	238,203	30.6	1,621	46,986	28.9
1927	6,821	199,754	29.2	1,292	35,712	27.6
1928	4,829	147,208	29.7	2,214	55,887	25.2
1930	714	22,228	31.1	895	18,028	20.1
1931	1,606	43,790	27.2	543	9,642	17.7

Source: Sandalwood Export Committee

active but sandalwood export languished (table 8); and finally, 1971 to the present day, when rising demand overseas has made the Australian industry a multimillion dollar export earner (table 9).

1929-1943

The Western Australian Sandalwood Control Act of 1929 effectively closed all previous loopholes. It legalized the 1923 regulations and the 1927 Export Agreement with South Australia. But it also went much further. A Government-set quota was to be imposed on all sandalwood pulled in Western Australia in any one year, and of that quota only 10 percent could come from private property. All wood taken from private property, moreover, was to be inspected and branded by forest rangers *before* it was removed, with a fee of £1 per ton levied for the service!

By this time the four private trading companies were in a parlous state. China was torn by civil war and demand for sandalwood had collapsed: only 943 tons were shipped out in 1929-30 after a per annum average of over 5000 tons in the previous 5 years (Robertson 1958, p. 27). Huge stocks accumulated, and by June 1930, 7000 tons were stacked at the port. The four companies could not even pay the pullers for orders given, causing great distress in the goldfields area (West Australian 3.4.1930). To relieve the situation the Government of the day

Table 8—Western Australian sandalwood exports 1945-71

Year	Wood		Sandal Oil	
	Tons	Value £'s	Avg. Price £'s	lbs
1945	—	—	—	—
1946	143	7,584	53	28,723
1947	835	100,616	121	—
1948	147	35,571	242	34,726
1949	156	35,635	228	4,200
1950	210	45,546	217	n.a.
1951	429	75,430	176	3,743
1952	468	87,230	186	5,686
1953	558	105,792	190	4,405
1954	438	100,973	230	600
1955	510	101,739	199	5,800
1956	605	119,415	197	7,793
1957	683	140,503	205	6,686
1958	584	113,342	194	10,590
1959	486	112,414	231	4,134
1960	648	140,360	217	6,956
1961	856	198,485	232	13,637
1962	649	183,928	283	10,662
1963	556	159,859	288	6,452
1964	587	179,195	305	5,265
1965	830	237,008	285	4,616
	Tonnes	\$	\$	
1966	804	314,987	392	4,374
1967	691	476,606	690	3,291
1968	620	453,008	731	3,561
1969	585	409,108	699	8,335
1970	939	549,156	585	3,136
1971	842	535,517	636	

Source: Forests Department Annual Reports to 1951; thereafter G. Hughes, Chairman of Directors and ex-manager W.A. Sandalwood Company, from company files.

Table 9—Western Australian sandalwood exports 1971-1989

Year	Tonnes	Total Value Exports Australian \$	Avg. Price Aust. \$ per Tonne
1971	842	535,517	636
1972	954	613,549	649
1973	1,429	906,544	633
1974	1,403	918,208	654
1975	1,051	799,917	761
1976	1,206	1,560,854	1,277
1977	1,222	1,195,322	943
1978	1,267	1,480,249	986
1979	1,502	1,849,032	1,188
1980	1,557	2,275,483	1,377
1981	1,644	2,346,452	1,427
1982	1,653	2,434,716	1,488
1983	1,650	2,434,716	1,622
1984	1,746	3,109,464	1,781
1985	1,829	4,366,017	2,202
1986	1,837	4,366,017	2,376
1987	1,810	6,544,541	3,615
1988	1,816	9,068,841	4,993
1989	1,960	11,480,875	5,857

Source: Western Australian Forests Department Reports and records of the Australian Sandalwood Co.

negotiated an agreement with the four companies to buy up all existing stocks—on the condition that they would combine their sandalwooding interests in one new company (Richmond 1985) In effect this agreement meant that the loose association already formed among the Sandalwood Merchants would become a separate entity—the four companies concerned all being to that time general importers and exporters. This Government proposal was agreed to in 1930, and the Australian Sandalwood Company Ltd. came into being (Forests Dept. Report 1930, p. 6), a company that still operates today.

In its first full year of operation, the new company managed to export only 1,606 tons, despite representation in China. In view of the accumulated sandalwood stocks held by the Government, the Forests Department was forced to severely curtail orders issued to pullers, and that year a mere 212 tons of the wood were obtained from Crown lands (Robertson 1958, p. 29). It was recognized that if the industry was to survive, shipments to China would have to be restricted to their actual market requirements. To that end, control would have to be exerted over *all* Australian exports as Australia, holding 80 percent of the market, was by far the major supplier (Forests Dept. Report 1932, p. 9; Talbot 1983, p. 30). With this in mind the Western Australian Government entered into a new export agreement with South Australia in July 1932. Henceforth the management of the export business of the two states, marketing policy and price setting, were to be vested in a Sandalwood Export Committee, consisting of one representative from each government, and one joint representative from the companies (Talbot 1983, p. 30). The agreement also entailed providing a fixed price to sandalwood getters and royalties to each government, which were to be based on a sliding scale according to the selling price of the wood in China. In Western Australia provision was made for 50 percent of its quota (which was two-thirds of the total

determined by the Export Committee) to be taken from accumulated stocks, and the remainder from new pulling. This provision, it was hoped, would reduce surplus stocks while maintaining employment in the industry (Talbot 1983, p. 30).

Given the aim to control Australian sandalwood supplies arriving in China, it is perhaps strange that no attempt was made at this stage to involve the Queensland Government in the export agreement. In 1932—the year of the agreement—Queensland wood accounted for some 17 percent of total Australian sandalwood exports, although for the rest of the decade its exports remained well below 10 percent of the total Australian sandalwood supply. When the agreement came up for review in 1934, however, Queensland was included (Robertson 1958, p. 32) although its exports were limited to 500 tons per year—except when total Australian exports exceeded 2,750 tons, when Queensland could increase its production by 10 percent (Queensland Parliamentary Acts 1934). The agreement also stipulated that the Australian Sandalwood Co. of Western Australia would act as the sole agent for the Queensland Government in all overseas sales of sandalwood and substitutes such as rosewood, and that a 5 percent commission would be payable for the service! Activity in Queensland ceased in 1940, mainly due to the War, and, apart from a couple of small consignments (under 5 tons), remained inactive until 1982 (North Queensland Register 6.5.83).

For South and Western Australia the policy of restricted supply embodied in the Export Agreement worked well. Prices rose throughout the 1930's (*table 10*), despite continued disruption in China as a result of civil war, abnormal floods, and a fall in the value of their export commodities (Forests Dept. Report 1933, p. 10). With higher prices, the scaled royalties in Western Australia increased to over £11 per ton by June 1933 (Robertson 1958, p. 31). By that time the accumulated stocks in Western Australia had all but been liquidated and the number of orders issued to getters increased not only for wood for export but also for wood for oil distillation (Forests Dept. Report 1933, p.10). Two hundred eighteen orders were issued for 1,420 tons of new wood for export (the highest for four years), and a further 13 orders for 125 tons of wood for oil distillation.

In 1922 Plaimar Ltd., representing the interests of the Plaistow Confectionary Co. and the chemist-cum-manufacturer J.H. Marr, had taken over Braddocks' sandalwood oil distillery, and so became the only sandalwood oil producer in Australia (Robertson 1958, p. 18-20; Forests Dept. Report 1922-3). Marr revolutionized production methods by introducing a method to replace steam extraction, which had proved inefficient with the low-oil wood from Western Australia, by soaking shavings and sawdust in a solvent and then taking the oil out. Although figures are incomplete (*table 10*), they indicate that the industry continued to flourish throughout the 1930's until affected (as was wood exports) by a further deterioration of conditions in China and the outbreak of World War II. Wood cut for oil distillation was apparently ordered over and above the quota set. Although quantities cut for this purpose remained very small, they did help smooth out the pattern of total cutting until the war, and thus helped getters affected by the Government's ruling that half the Western Australian quota for export had to come from accumu-

lated stocks. Moreover, the oil company did not have to pay the royalty per ton imposed on the sandalwood company.

No wood or oil was exported from Australia in 1944-45, and neither Queensland nor South Australia reentered the trade on the cessation of hostilities. In Western Australia, however, activity revived quickly to enter a new phase of increasing market dominance.

1945-1971

In anticipation of increased sandalwood activity after the War, the W.A. Government negotiated a new agreement with the Australian Sandalwood Company. On the sliding scale arrangement pertaining between 1938 and 1941, the royalty levied per ton had averaged £12-14 (Robertson 1958, p. 38), while prices paid to getters had averaged £15.10.0 per ton—just under the agreed £ 16 per ton because of the slightly lower prices paid for below-average quality wood (Forests Dept. Report 1930-34). Before World War II there had been no difficulty in filling orders, as alternative employment was still relatively hard to find and the price offered was considered reasonable. After the War, however, many old-timers were unwilling to reenter the industry. They would need to reequip and, in contrast to opportunities available elsewhere in the buoyant economy, the old price per ton offered to getters was not attractive.

To overcome this lack of interest, the W.A. Government negotiated new terms. The royalty was to be dropped to a flat £ 9 per ton; the getters were to be paid an additional 30 shillings per ton (i.e., £17.10.0), and the Government was to receive a share in the profits of the trade, which would be collected by the Forests Department (Robertson 1958, p. 38; Forests Dept. W.A. file 779/49). The actual dimension of the Government's share in the Australian Sandalwood Company's profit was not stated in the 1946 agreement or in the Forests Department annual reports (Forests Dept. 1946-47, 1947-48); it is still not readily divulged today (Hughes, pers. comm.). Records show, however, that between 1946 and 1949, when prices per ton in

overseas markets were averaging £200, the government was getting some £140 (Robertson 1958, p. 38) (£131 plus £9 royalty), so the share was apparently about two-thirds. As most sandalwood at that time was coming from Crown land and getters were responsible for transport to Fremantle, the Australian Sandalwood Company could not really complain—especially as exports of wood and oil reached record heights in 1947.

With the hefty increase in prices for sandalwood per ton after the war (*table 8*), and the resultant increase in government revenue from this source, some questioned the feasibility of continuing oil distillation—which had been fostered as an industry of some importance to that time. Royalties on wood delivered for distillation were far lower than that on logwood, as they were based on the yield of oil per ton of wood, and on the market price of sandalwood oil. As noted, the oil yield of Western Australian wood is low, and the price of oil differed according to whether the oil was sold locally or overseas—the domestic price being some 46 percent lower than that prevailing in China. From 1937 to 1941 the Western Australia Forests Department received from £2.16.0 to £7.11.0 a ton in royalty payments from distillers and from £8 to 9 a ton during 1942-1946. Even the increase in Royalty to £19 per ton for wood used to produce domestically sold oil and £41 per ton for wood used to produce oil sold overseas between 1946 and 1949 was far below the revenue that could have been obtained if that wood had been exported as such (Robertson 1958, p. 38). Consequently a review of the oil distillation industry was called for in 1949. As the Export Agreement was also due to expire in October 1949, all aspects of the sandalwood trade were to be closely examined.

At the end of August 1949 the review committee recommended that sandalwood oil distillation should continue, but only as secondary to the log export industry, and that the trading agreement between the government and the Australian Sandalwood Company and with the other State governments should be extended (Robertson 1958, p. 39). After various amendments and extensions the Export Agreement was finally reaffirmed in 1952, and the parties concerned decided that it would remain in

Year	W.A.			S.A.		
	Tons	Value	Avg. £/ton	Tons	Value	Avg. £/ton
1931	1,606	43,790	27.2	543	9,642	17.7
1932	1,386	40,546	29.2	1,323	31,217	23.5
1933	3,068	88,846	28.9	1,004	25,111	25.0
1934	2,508	75,424	30.07	964	24,093	24.9
1935	2,223	66,474	29.9	653	19,572	29.9
1936	1,593	44,916	28.2	844	25,274	29.9
1937	2,513	75,670	30.1	432	12,952	29.9
1938	747	22,884	30.6	153	4,568	29.8
1939	1,106	34,571	31.2	285	9,958	34.9
1940	1,058	41,596	39.3	354	11,116	31.4
1941	1,167	47,613	40.7	102	3,584	35.1
1942	400	17,481	43.7	—	—	—
1943	2	80	40.0	—	—	—
1944	—	—	—	—	—	—
1945	—	—	—	—	—	—

Source: Forests Department Annual Reports

force indefinitely (Richmond 1983, p. 1; Forests Dept. 1951-2, p. 8).

Despite problems in attracting getters, exports of sandalwood rose in the early 1950's (*table 8*). The local price to getters was increased to £26 per ton in 1951 but, even so, the Department reported difficulty in filling orders (Forests Dept. 1951-2, p. 8). In 1954 the trade was threatened by the communist take-over in China, as they banned the burning of joss sticks in religious ceremonies. The resulting increase in numbers of expatriate Chinese in Singapore, Hong Kong, Malaysia, Formosa, and Thailand meant that total demand remained high (Donovan 1975, p. 8). Also in 1954, cutters who were operating more than 100 miles from a railway siding were offered a £4 per ton subsidy from the government (Forests Dept. 1954-55, p. 13), which recognized that isolation and high transport costs were discouraging getters from entering the industry. In 1955 there were only 13 registered sandalwooders in Western Australia, a huge drop from the 200 to 400 employed in the 1920's and 1930's (Donovan 1975, p. 8).

To an extent the drop in numbers employed can be explained by changing technology. By the 1950's trucks had replaced the camels and oxen of the 1920's (*fig. 3*), and simple stripping machines took over the backbreaking job of adzing off the outer sapwood, which in the 1920's had been carried out either by a partner or by women (often lubras) (Ware 1975, p. 6-7; Talbot 1983, p. 25). Nevertheless, it was reported in 1955-56 that

overseas demand continued to exceed supply and that more pullers were needed (Forests Dept. Report 1955-56, p. 12).

Availability of stands was also becoming a problem in the 1950's, for lack of success with reforestation projects in the past meant that the wood had to be brought farther and farther distances to the port. Attention to reforestation had increased after the War, particularly in the mid 1950's, when pullers were encouraged to replace trees with sandalwood nuts (Forests Dept. Report 1955-56, p.12). Overall, however, "the results generally from experimental work have *not* warranted any attempt to grow his species on a large scale" (Forests Dept. Report 1954-55, p. 14).

From the mid 1950's to the end of the 1960's, production and export of sandalwood and oil from Western Australia fluctuated considerably but remained highly profitable. Wood exported varied from a low of 486 tons up to 856 tons in 1961, when a maximum export of 13,637 imperial lbs of sandalwood oil was also reached (*table 8*). The distillers of oil throughout this period were absorbing some 10-20 percent of the total tonnage of wood pulled in Western Australia, which included *S. lanceolatum* from the north as it was found to blend well with oil from *S. spicatum* and improve its penetrating quality (Forests Dept. 1954-55, p. 14). The gap between the price distillers were prepared to pay for wood (\$76) and the price the same wood could command on overseas markets (\$731) continued to diverge in 1968. To partly resolve the problem the manager of the



Figure 3—After the war, transport of larger logs over greater distances was made possible by motor vehicles. Photo: Neil Mitchell, Battye Library, Western Australia.

Australian Sandalwood Company arranged in 1964-65 to import a higher oil-bearing sandalwood from Indonesia for the Plaimar Oil Company, as it was more profitable to do so than to lose local supplies for the overseas wood market (Hughes, oral evidence). In 1969 the distillery increased its buying price from \$78 to \$98 per tonne but to little avail, for all distillation of sandalwood oil ceased in 1971 as Plaimar rationalized its undertakings. Plaimar's major profit came from the manufacture of soft drinks, and up to this date the company had been exempt from sales tax because it complied with the 20 percent apple juice requirement which had been imposed to assist the apple industry. When this exemption was removed the company closed its Western Australia operations (oral evidence). There has been no attempt to reactivate this industry since then, perhaps understandably, because the average per tonne price of exported sandalwood increased quite remarkably after 1971 (table 9).

As all wood pulled after 1971 was to be exported, there was a slight rise in the quota fixed for export in the years immediately following to ensure continuity of employment. This was felt necessary as the gold industry was in recession and the Export Committee was always sensitive to this industry in determining sandalwood quotas. It should perhaps be noted that Australia went metric in 1966, and sandalwood volumes changed from tons to tonnes (the tonne is .016 larger than the ton), a break which very slightly deflates the post 1966 figures.

1971 to the Present

During the decade 1970-1980, sandalwood production averaged about 1200 tonnes per year, varying some 300 tonnes either way, while prices rose from \$636 per tonne to \$1,377 per tonne—a 46 percent increase (table 9) and Richmond 1983, p. 1). Although the sharp inflation of the period accounts for much of this price rise, it was interesting because the decade saw a significant increase in the amount of dead wood included in the export figures—wood that previously had been discarded (Richmond 1983, p. 1). Called "pieces" in the trade, dead wood when powdered is only marginally less fragrant than average green wood, although considerably less so than the roots and butts of the green tree—where the greatest percentage of oil can be found. Also during the seventies the condition that sapwood had to be removed from sticks before delivery was lifted, and now wood is delivered "undressed"—but cleaned of bark.

The very recent history of the industry has followed the trend set in the 1970's. Rising Chinese populations in nearby Asian markets have significantly increased demand for joss sticks and, as Australia is still the dominant supplier (94 percent of the joss stick sandalwood market in 1988), it is a sellers' market. Prices are negotiated each year by the company's representatives and have continued to escalate.

The profitability of the trade has resulted in renewed export attempts from Queensland, following the repeal of their Sandalwood Act in 1982. Although quantities exported are still small, interest is considerable from both the government and mining companies operating in Northern Queensland in cutting the wood and reforestation. Since the repeal of the Queensland Act

the question of control over the industry has become contentious as three domestic traders are presently involved, and the Queensland Government would prefer one. Plans are afoot to let a tender for a single export license, which would bring Queensland into line with Western Australia.

With (1988-89) prices averaging \$5757 per ton for green wood and \$7573 per ton for roots and butts, sandalwood has truly become a million dollar tree (Hughes, pers. comm., Company records). Prices paid to Western Australian pullers have increased in line with overseas prices, but by far smaller percentages. Pullers were getting an average of \$540 per ton for green wood in 1985, which rose to \$750 in 1987, and stands at \$970 per ton today (Richmond 1983, p. 1; Hughes pers. comm.). A report written for the Western Australian Lands and Forestry Commission in November 1985 stated that there were 28 licensed pullers in the state: 9 full-time, 14 part-time... (most of whom were also prospectors) and 5 pastoralist producers (Richmond 1985, p. 8). Today the number has fallen to 18 regular pullers who employ around 70 workers, most on a part time basis (Richmond 1985, p. 8; Hughes oral evidence; Department of Conservation and Land Management 1985-86). As already mentioned, the Export Committee can adjust quotas and licenses when circumstances change, and just as prospectors have been helped over hard times by a quota increase, so also have pastoralists. In times of drought, especially, pastoralists can and do obtain licenses to pull a maximum of 20 tonnes each in any one year (Richmond 1985, p. 7). The Export Committee considers this to be an appropriate action to help pastoralists in distress through no fault of their own, and to provide goodwill, as in normal times full-time pullers are licensed to take wood from pastoral leases and the cooperation of pastoralists is important. Today also the Board allows 10 percent of the quota from Crown lands to be taken in addition to the quota from private land. As several mining properties are coming onto the market in the Eastern Goldfields after years of inactivity, a lot of good quality wood is currently being cut from this source.

As most of the wood is now brought very long distances from the Eastern Goldfields to Fremantle, the Australian Sandalwood Company has taken over arranging and paying for contract carriers to transport the wood by road to their factory in Spearwood just outside Fremantle, rail transport having being discontinued some time ago when full truck loads (minimum 16 tons) were made compulsory (Richmond 1985, p. 2). Most pullers sent in only 5-8 tons at a time!

The Company itself employs three staff, eight workmen and a foreman, and their wages are linked to comparable positions in the Australian public service. In the factory, pallets of wood are sorted into logs, pieces, roots, and butts, etc. Logs are wrapped in hessian in 62.5 kg lots and sewn to prevent wharfside pilfering. The valuable roots and butts are separately hessian-bagged in 35.7 kg lots, while dead wood (which makes up an increasing proportion of wood exported) is packed in woven plastic bags of 35.7 kg. All small pieces and offcuts are ground into powder and bagged in plastic, again in 35.7 kg lots. Even the sawdust on the floor is periodically collected for sale at reduced prices (Richmond 1985, p. 3).

In addition to royalties, which are set as a given percentage of

the free-on-board price negotiated for each shipload, and the profit share that the company has to pay to the W.A. Government, an annual amount is also paid to the W.A. Department of Conservation and Land Management to cover administration expenses. These expenses include field inspections, control by the Regional manager (who issues licenses) and secretarial assistance at head office (Richmond 1985, p.2). Taken together this has meant that in 1988-89, out of a gross income of \$11.4 million in export earnings, the government received the following:

\$1,013,217	in royalties
\$76,830	as overheads
\$5,601,337	as profit-share
Total \$6,691,384	for the year

This total was 90 percent of net profit! (figures from Hughes, pers. comm.)

With such a valuable income source available, concern has mounted about the industry's potential life. It was estimated in 1985 that at the existing rate of pulling there were enough commercially viable green stands in Western Australia to last 23 years (Richmond 1985). Estimates of the quantity of available commercially viable sandalwood are based on current prices, markets, transport costs, and pulling methods ... any of which can change. The 1985 estimate was based on 36,325 tons of commercially available wood, which "tends to be conservative." It was also noted that a lot more wood could become commercial if conditions change (Richmond 1985, p. 4). Maturation of immature trees and continued collection of dead wood could extend the 1985 estimate by 30 to 40 more years. Moreover, there has been considerable research and activity in experimental planting, financed in Western Australia partly by the government and partly by the Australian Sandalwood Company (Richmond 1983, p. 2), which is opening up the future of the industry.

Experiments have shown that it takes up to 80 years for planted native species to reach maturity, and though suitable areas have been replanted, the long maturation period and the very high risks of failure through stock grazing, insect plagues, bad seasons, etc. have made it a costly exercise. Current research, however, has indicated that the Indian/Timor species, *Santalum album*, can grow in Western Australia and will take only 30 years to reach commercial size (West Australian 16.2.1987; Hughes and Richmond oral evidence). Suitable hosts have still to be determined, but nurseries of the seedlings are already being established and the future of the industry now seems bright.

As demand for sandalwood incense shows no sign of diminishing, with expanding Asian populations and the Western use of the powdered wood for mosquito coils, potpourri, etc., the Australian industry, if carefully managed, should continue to provide a small but significant contribution to future export earnings.

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