

TASMAN, Abel Janszoon (1603?–59), seaman, was born in the Netherlands in about 1603. In 1633 Tasman sailed for Batavia as an able seaman, but by May 1634 he was commanding a Dutch East India Co trading vessel. He was appointed second-in-command of an exploratory expedition to the north Pacific in 1639. In 1642 the Dutch East Indies governor-general, Anthony van Diemen, chose him to command an expedition to explore the rich southern and eastern lands thought to exist in the Pacific, especially seeking gold and silver. On this voyage he reached and named Van Diemen's Land (Tas) and New Zealand; he also discovered the route from Europe south of Australia to the Pacific Ocean and South America. An exploratory expedition along the northern coast of Australia in 1644 showed that Eendrachtland (WA) and Carpentaria (Qld) were parts of the same land mass, but separated by sea from New Guinea and the East Indies. As a result of these voyages Tasman's rank of commander was confirmed and he was appointed to the Council of Justice in Batavia. He led a voyage to Sumatra in 1646, conducted a successful diplomatic mission to Siam (Thailand) in 1647, and tried unsuccessfully to raid the Spanish silver fleet in 1649. He was suspended from office for mistreating the men under his command while he was drunk. Reinstated in 1641, he retired from the company soon afterwards, became a private trader, and died a wealthy man.

TASMANIA Some 12 000 years ago the seas began to rise when increased solar activity led to the partial melting of the polar ice caps. One result of this was the flooding of land which connected the continent of Australia proper to a southern appendage. Thus was formed what became known as Bass Strait, and the island later named Tasmania.

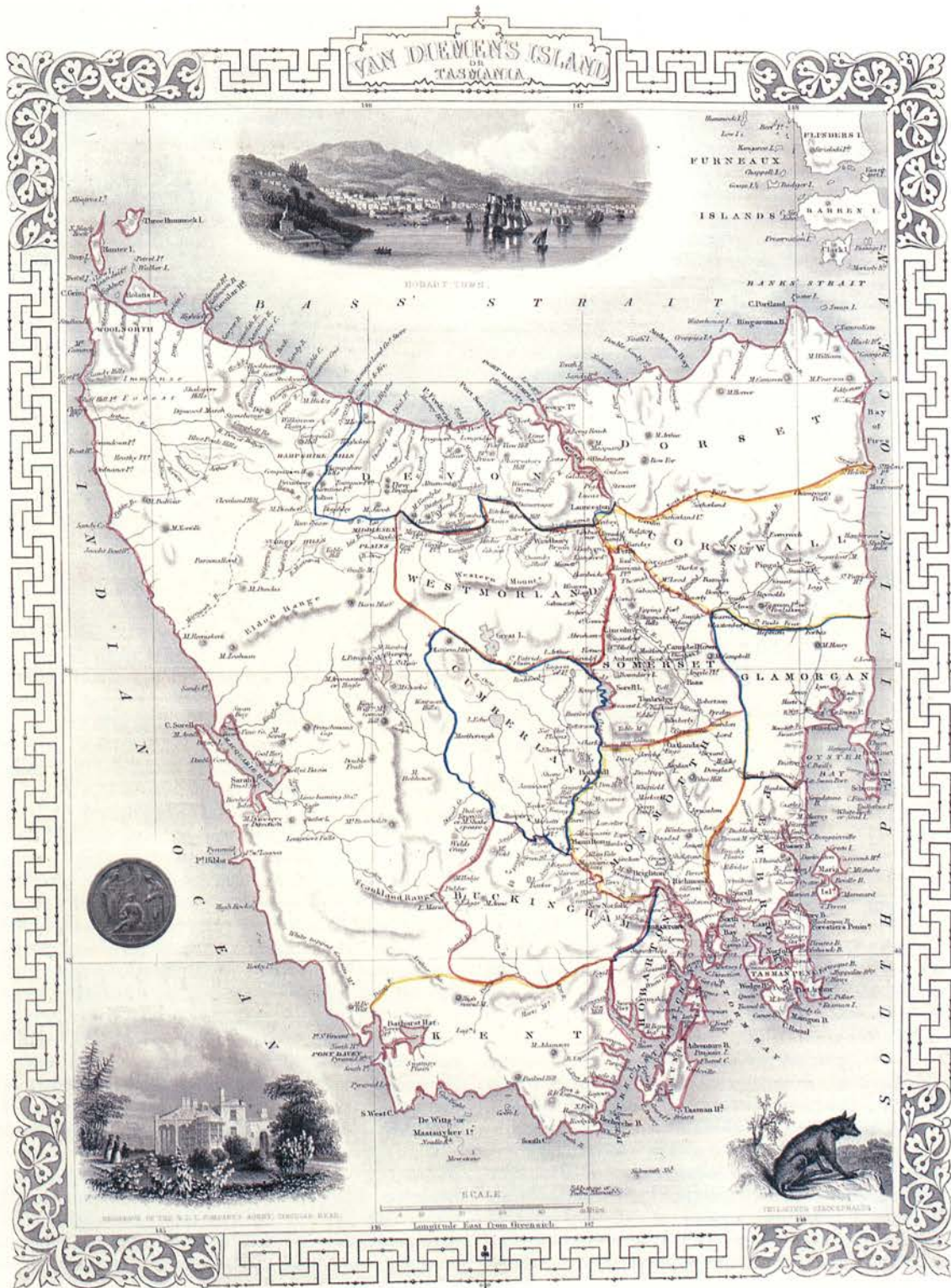
This part of Australia was inhabited at the time by Aboriginal people. How long they had been there is unknown; recent archaeological research suggests perhaps 20 000 years, but the evidence is unclear. These people were dark-skinned nomads and formed

a number of clans or groups which developed differing cultures and languages. They were probably a little shorter in height than the eighteenth-century Europeans who first observed them. They habitually went naked or nearly so, and had distinctively curly hair. Their diet was land animals such as kangaroo, wallaby and possum, as well as birds' eggs and shellfish. A distinctive feature was their use of red ochre as a pomade for the men's scalp hair; extensive ochre mines have recently been discovered.

The Aborigines were monogamous and men and women had distinct roles in hunting and preparation of food, which they consumed raw or semicooked. Their principal weapons were spears, waddies, and stones hurled with great effect and accuracy. No coherent system of agriculture was practised, but the bush was regularly set on fire to form paths and encourage plant growth to which hunted animals might be attracted. They used snares for hunting. Some groups used canoe-rafts to cross rivers or visit off-shore islands in search of food such as seal. As hunter-gatherers, they constructed simple windbreak shelters as occasion demanded. Baskets were woven and necklaces formed from shells and the hide of animals, skinned with hand-shaped stone tools which were also employed for sharpening spears.

When the Dutch explorer Abel Tasman discovered the island in 1642 he saw no Aborigines, but several French and British expeditions observed them in the late eighteenth century. It is not known how many Aborigines occupied the island, which Tasman named Van Diemen's Land after an officer of the Dutch East India Company, but the population at the time of European settlement has been estimated at between four thousand and six thousand.

In 1803 Governor King at Port Jackson, fearing that the French intended to colonise the island, sent Lieutenant John Bowen south to the Derwent to establish a British presence there with convicts, guards and a few free settlers. At the same time London despatched David Collins as lieutenant-governor to occupy the area known as Port Phillip. Collins dis-



Map of Van Diemen's Land, c1851, drawn and engraved by Rapkin and published by John Tallis & Company, London and New York. The name of the colony was officially changed to Tasmania in 1854.

BOOROWA PRODUCTIONS

approved of the site and moved his party to the Derwent, taking over Bowen's initial expedition and establishing Hobart Town in 1804. In the same year William Paterson was ordered from Sydney to occupy the northern part of Van Diemen's Land at Port Dalrymple. These two settlements led a precarious existence for the first decade or so. Provisions were irregularly supplied, and from time to time the settlers had to subsist on fish and native animals such as the kangaroo. Most settlers were convicts or ex-convicts. In 1812 the governments of the two settlements were combined and the capital was settled at Hobart Town. In 1825 Van Diemen's Land secured administrative independence from New South Wales.

Frequently prisoners 'went bush', and a bandit subculture developed in the hinterland. Leaders of these bushrangers coolly negotiated with the government and led the British garrison and settlers a merry dance. Bushranging was endemic during the administrations of Collins (1804–10), Thomas Davey (1813–17) and William Sorell (1817–24). The colony was in a continual state of crisis, but with increased free settlement following the Napoleonic wars, land occupation extended and slowly banditry was reduced.

As European occupation expanded, conflict between the Aborigines and the invaders grew in ferocity, the original occupants waging a form of guerilla war against the whites. Heavily outnumbered, the Aborigines fell victim to superior firepower and European diseases. By the late 1820s they were a demoralised, bewildered remnant of the people observed by eighteenth-century visitors.

Little effort was made to understand or communicate with them until the late 1820s, when Gov George Arthur appointed George Augustus Robinson as a conciliator. Robinson undertook a series of arduous journeys into the interior to induce such Aborigines as survived to surrender. When they did, they were placed in isolation on Flinders Island, where they pined away or sickened. Transferred to D'Entrecasteaux Channel, south of the capital, the last full-blood Tasmanian Aborigines were extinguished in 1876 with the death of Truganini. However, descendants of the offspring of Aborigines and Europeans still survive, and they have recently revived a sense of Aboriginal identity.

The purpose of the colony's existence remained closely related to the transportation of Britain's convicts and their assignment as forced labour. During Gov Arthur's term (1824–36), the allocation of convict labour to government and private projects was brought to a peak of administrative perfection. Public works gathered pace, trading and the wool industry flourished, and wheat farming and whaling assumed considerable importance. The economy was fuelled by British capital and the large and cheap labour force. Fortunes were made, elegant Georgian buildings, both private and public, were constructed in town and country, and a generation arose which associated its future more and more with the colony, in the safety afforded by British garrisons. The government established schools at public expense and supported



The Gordon River area has become famous for its rugged natural beauty.

ARCHIVES OFFICE OF TASMANIA

churches of all denominations. These churches and schools reflected the alterations that English culture had undergone in response to the practicalities of colonial life.

Sir John Franklin succeeded Arthur in 1837, and tried to encourage the development of education and culture. An economic depression was created by the ending of the assignment system on orders from Britain and its replacement with a fresh system of probationary discipline, under which convicts were to be placed in work camps. Failing to retain the confidence of the all-powerful Colonial Office in London, Franklin was replaced by Sir John Eardley Eardley-Wilmot, who was later dismissed for improper conduct and neglect of duty by W.E. Gladstone and in turn replaced by Sir William Denison.

A new, partly elective legislative council was created, which reflected the strong feelings against the continuation of convict transportation. The last convict ship to Van Diemen's Land docked at Hobart Town in 1853, and three years later members of the first fully elective parliament took their seats when establishment of a house of assembly and legislative council was approved by imperial legislation. The council, elected on a particularly restricted franchise, was granted substantial powers which it used for more than a century. The change in name from Van Diemen's Land to Tasmania reflected a wish to dissociate the colony from its history as a penal settlement.

After the end of transportation, large sums of imperial money were no longer injected into the colonial economy. The growth of population slowed considerably, affected by the superior attraction of the booming gold colony of Victoria. Industrialisation was slow and by the 1860s Tasmanian governments found difficulty in balancing budgets. Visitors reported a degree of sloth and indifference which was blamed on the heritage of the convict system. These judgments, however, were made by comparisons with Victoria and New South Wales. A more instructive parallel would have been with Western Australia.

Birth rates remained high; the 1851 population of 70 000 had grown to nearly 100 000 by 1870. But Tasmania did not reap what was thought to be the benefit of increased population. Large-scale emigration persisted, especially to Victoria, which had been largely settled by Van Diemen's Land colonists from the 1830s. Occupation of the heavily-forested areas of the Huon Valley, the northeast and the northwest of Tasmania was slow, and the colony became more convinced that its lack of development was attributable to poor communications and the intractable problem of costly transport across Bass Strait. From the early 1870s the discovery of large deposits of tin at Mount Bischoff (Waratah) renewed investment and increased income, and a greater spirit of enterprise on the part of governments gave the colony hope for the future.

An increasing perception of the island as the sanatorium of the south induced hopes for increasing tourist trade. The consolidation of agricultural settlement and the commercial enterprise of Launceston led to the establishment of a railway from that city to Deloraine, followed by a rail link between Hobart and Launceston, regarded at the time as essential for economic advance. Considerable north-south rivalry affected politics, however, as the population centre of gravity continued to move north, and a notable strengthening of regional loyalties reflected the rugged character of the island and difficulties of communication. Awareness of Victoria's growth reinforced the Tasmanian feeling of inferiority and discontent. Public works were vigorously initiated from the 1880s but their acceptance as a necessity for development led to many roads and railways being constructed where there was little prospect of these enterprises breaking even, let alone being productive. They became an increasingly serious charge on the public purse.

In the late nineteenth century governments became more active in the public interest. Increasing concern about mortality due to typhoid led Tasmanian governments to be more aware of the effects of poor housing. The discovery of an apparent connection between poor sanitation and outbreaks of disease led to the sewerage and improved drainage of Hobart and Launceston, and the milk and meat industries were subjected to more careful regulation.

Education came to be nominally compulsory but local boards of advice exerted a strong influence. Parents continued to pay fees, but teachers were not held in high regard and their qualifications remained questionable. Seasonal farm work caused irregular attendance among the children. At the beginning of the twentieth century steps were being taken to tighten up educational standards and administration. A sign of new confidence in the colony came with the establishment of a university in 1890.

Mineral discoveries assumed great importance by the end of the nineteenth century, gold and tin being overtaken in importance by silver, copper and silver-lead mined in the rugged areas of the west coast. The outstanding success stories were those of silver mining at Zeehan and, of greater long-term importance,

copper mining at Mount Lyell (Queenstown). The population of the west boomed with the mineral discoveries, but the isolation of the region led it to focus as much on Melbourne as on Hobart. Railways and roads were constructed in this geographically inhospitable region of the island.

By the turn of the century the riches of the west coast mines and increased farming settlement in the northwest and northeast had changed the profile of the Tasmanian economy, though the production of fine wool from the Midlands remained a cornerstone of Tasmanian primary production. Experiments with the freezing of apples encouraged important production in the Huon area and exports to British markets assumed considerable significance. Small fruit production also flourished, as did the jam factories of Henry Jones and Company.

The terrain and rainfall of the central highlands and western portions of the island encouraged experi-



Mount Ida, in the Cradle Mountain-Lake St Clair National Park in central Tasmania.

NATIONAL MUSEUM OF AUSTRALIA

ments with hydro-electricity. In the mid-1890s Launceston became the first Tasmanian urban centre to light its streets with electricity. By the outbreak of war in 1914 the state government had taken over the Waddamana works, a source of hydro-electric power in the Great Lake area. Carbide works south of Hobart were encouraged, and electrolytic zinc works were established at Hobart during the war and fed with hydro-electric power.

During the latter half of the nineteenth century Tasmanian governments supported initiatives for inter-colonial federation, concluding that the island could only benefit from membership of a free trade zone. Andrew Inglis Clark was noteworthy in the federation movement which gathered strength in the 1890s, and he was largely responsible for the initial draft of the act which received Australian and imperial approval by 1901. Though there were those who feared that Tasmania would lose when its income from customs and tariffs was removed by federation, it was unthinkable that the colony would not be a part of the federal movement. The popular votes of 1898

and 1899 were overwhelmingly in favour of a union of the colonies, especially when a clause was inserted in the act to safeguard Tasmania's income under the new arrangements.

Tasmanian responses to Queen Victoria's jubilee celebration demonstrated the loyalty of the colony to the British connection, reinforced by the strength of the Church of England, the relative weakness of Catholicism, and awareness of the island's vulnerability to physical attack. Tasmanian soldiers fought in the Boer War, and criticism of Britain's conduct in South Africa was met in the island with antagonism by the respectable.

Political labour movements gathered strength, especially from west coast mining areas favouring the liberal-Labor ideology that gained much ground on the Australian mainland in the Edwardian period. The radical newspaper *The Clipper* appeared, and its uninhibited style and cheeky sentiments helped jolt Tasmanians into the twentieth century.

Increasing discontent with the failure of federation to deliver prosperity commensurate with Tasmania's wishes was for a time masked by the outburst of Australian patriotism which swept the state at the beginning of World War I. Labor had come to power in the island but, as elsewhere, the strains of war and the conscription issue were lethal, and the Labor government went down in 1916, to return only in 1923 under the premiership of J. A. Lyons. The loss of young Tasmanians to the war was probably of greater importance to Tasmania than elsewhere in Australia and the state continued to be particularly affected by the emigration of its youth.

After the war, schemes for soldier settlement were established eagerly, but they proved a further drain on the state's resources. There were some success stories but, as elsewhere, the cost to taxpayers was substantial. The schemes were constructed on the basis of closer settlement of the land, a program started at the end of the century. The large estates occupied as a result of free land grants were seen as uneconomical and as preventing young Tasmanians from taking up farming.

Tasmanians were preoccupied with the development of both agriculture and secondary industry. Energy generated by hydro-electricity, perceived by Tasmanians as a glorious bounty of nature, encouraged the growth of secondary industries. Paton's & Baldwin's Pty Ltd and Kelsall & Kemp Ltd began woollen mills; Cadbury-Fry-Pascall began manufacturing confectionery at Claremont. Tasmania was heavily forested and, despite some opposition from those who supported conservation and tourism, it exported quantities of timber. Numerous efforts were also made to utilise this resource for pulp and paper production, but these were not successful until the end of the 1930s.

Various experiments were conducted with farm schools, and technical education was regularised. Government subsidies and the appointment of medical officers and nurses led to a great improvement in children's health, and children in isolated areas were

offered transport to viable schools. The small bush school, however, did not disappear. Pioneering work was accomplished, especially in infant learning.

In 1934 Labor came to power again, and under a series of vigorous governments the party remained in office for many years. The ideology of Labor in Tasmania was less characterised by talk of class struggle than elsewhere in Australia: various forms of state assistance, and policies of co-operation rather than confrontation, ensured continuing support for the ALP, which was voted in time after time, though sometimes with very narrow margins or reliance on an Independent member. It is debatable whether the intricate Hare-Clark system of proportional representation adopted in Tasmania helped maintain the Labor hegemony, but it is possible that multi-member constituencies blunted the cutting edge of party politics.

By the end of the 1930s much of Tasmania was traversed by hydro-electric lines, and refrigeration and electrical household equipment were generally available, except in remote areas. The cost of this electrification was substantial. Grants of federal money to the state had been systematised and the effective power of state administrations proportionally decreased. With the beginning of federal taxation in 1942, Tasmania came more and more to depend on grants from the central government.

Tasmanian farmers in particular profited from the war economy and from the controls over prices and incomes imposed by the federal government. Nevertheless the island depended on sea transport for carriage of its exports and imports, and the effect of maritime industrial disputes on the mainland and the policies of shipping companies continued greatly to irritate the local people.

The state shared in the postwar economic boom, during which immigration increased and extensive public works and housing programs were undertaken. Immigrants were fewer in number than elsewhere in Australia, however, although the Hydro Electric Commission employed large numbers of European migrants on its works in the interior of the island. Hobart regained some of its supremacy in terms of population during this period, notably from the influx of young men and women pursuing post-war tertiary education courses. In spite of the development of Bass Strait car ferries and better aviation facilities, however, the population grew at a slower rate than in other states, and Tasmania still exported many enterprising young citizens.

Tasmania has recently been the scene of strenuous disagreement. On the one hand the government and its agents would see development and employment at all costs; on the other, environmentalists are affronted by what they regard as short-sighted if not wilful destruction of the natural environment. As well, there is a strong and bitter element in Tasmania which sees the conservation movement as an attack on states' rights. It has become common to brand environmentalists as a hired crowd of troublemakers and meddlers, making mischief against the sturdy locals.

Historically, outsiders have frequently been blamed for local troubles. Some Tasmanians have difficulty coming to terms with those who deny the validity of old assumptions about development that have been reinforced by two centuries of strong regional identity.

L. L. ROBSON

Further reading L.L. Robson, *A short history of Tasmania*, Melbourne 1985.

TASMANIAN HYDRO ELECTRIC COMMISSION A hydro-electric department was established by the Tas government in 1914 to take control of a number of small private schemes and also a larger, partially completed scheme involving Great Lake and the Waddamana power station. In 1930 the Hydro Electric Commission was created as a statutory authority outside direct ministerial control. The commission has planned and built a large number of dams and power stations to supply almost all of the electricity consumed in the state. Major conflict arose over the environmental effects of its plans to flood Lake Pedder and to dam the Gordon and Franklin rivers in the southwest of the state. The former was achieved in 1972, the latter dropped in its original form after intervention by the federal government. The controversy generated by the Gordon and Franklin schemes caused the fall of the state Labor government and generated bitterness rarely if ever witnessed in Tas, affecting political, social and even family groupings.

TATTERSALL'S SWEEP Sweepstakes, lotteries based on horse races, became popular in Australia from the 1870s. One that thrived was run by George Adams, who in 1878 had bought Tattersall's Hotel in Sydney. The 'Tatts' sweep soon became a popular institution. When anti-gambling reformers succeeded in persuading the NSW government to suppress

sweeps, Adams moved the business to Qld in 1893, and in 1895 to Tas. After Adams' death in Hobart in 1904, his trustees maintained the business. In 1954 'Tatts' transferred its headquarters to Melbourne.

JOHN O'HARA

TAXATION forms a major part of the total revenue sources of government in Australia. Apart from such miscellaneous items as fines and fees, some of which might be regarded as taxation, the other two primary revenue sources are various forms of loan issues and the earnings of public enterprises and statutory bodies, such as railways and the post office.

Taxation can be divided into two classes: indirect taxation levied on the volume or value of different transactions; and direct taxation imposed on incomes, on property or on increases in property or capital values.

The first taxes levied in Australia were property and income taxes imposed during the Napoleonic wars by the British government on military and civil officials resident in Australia. Indirect taxation was first levied as customs charges on imports into New South Wales and Norfolk Island in 1800 by Gov Hunter. This was an illegal imposition that was nevertheless continued for twenty years until challenged in 1819. In response, the British government made a temporary assignment of customs raising powers to the colony and confirmed this authority in 1823. From that point began the legal indirect tax system of Australia, though the British government continued to place restrictions on colonial freedom of action until 1873.

Customs taxation was the primary source of tax revenue for the colonies in the nineteenth century until the customs power was passed to the commonwealth in 1901. Different principles were adopted in each colony, chiefly determined by policy conflicts over a 'free trade' versus 'protectionist' tariff. The principle of a protectionist tariff was accepted for the commonwealth, but it was not until the beginning of the 1920s that high levels of protection were adopted. Since that date, Australia has remained a high protection country, notwithstanding pressures from and adaptation to the General Agreement on Tariffs and Trade adopted internationally after World War II.

Until 1901, the main supplementary source of taxation was a variety of indirect taxes, particularly excise, at the colonial level and such devices as assessment on stock (a form of property tax). The depression of the 1890s brought pressures for new sources of tax revenues. Earlier depressed conditions in South Australia had made that colony the first to impose an income tax (1885); New South Wales and Victoria both introduced income taxation in 1895 and were followed by Queensland and Tasmania in 1902 and Western Australia in 1907. Different rates were adopted for income from personal exertion and from property, including taxation on companies. The states had the income tax field to themselves until World War I when fiscal pressures brought the commonwealth government into competition. From then until 1942, a complex system of dual commonwealth



Tatts tickets throughout the ages.

FAIRFAX PHOTO LIBRARY

and state taxation on personal exertion and property income existed in Australia.

Until the depression of the 1930s, rates of taxation were low and applied only to relatively high incomes. Depression and war changed that picture. During the 1930s the level at which incomes were subject to tax fell and during World War II few income recipients escaped income taxation, while rates of taxation rose steeply. Taxes on private income and companies became and remained the most important source of tax revenue.

The constitution created formulas for some of the commonwealth's customs collections to be returned to the states. These provisions created tension between the commonwealth and states. The introduction of a single income tax system in 1942 brought new revenue sharing formulas and new tensions. The states were left with a variety of indirect and property taxes as a means of supplementing the reallocations of revenue made through the successive premiers' conferences.

The fiscal dominance of the commonwealth was accentuated when it moved into indirect taxation on domestic transactions (sales tax), from the 1930s. Again, depression conditions triggered a shift of fiscal control to the states, but the overwhelming fiscal needs of World War II placed the commonwealth in a commanding position, limiting the opportunities of the states in the development of domestic indirect taxation. However, indirect taxation on domestic Australian transactions did not become a dominant source of tax revenue, even though a large variety of sales taxes were adopted by the states after the war. Taxation revenues continued to come primarily from income and property taxes and from customs duties and federal excise.

The relatively high levels of income taxation and graduated scales imposed for different levels of income became a major source of political debate as inflation developed, particularly after 1970. As all incomes rose, those on lower incomes were subjected to higher and higher tax rates. At the same time, inflation brought opportunities for capital gain through rising property values (including company share values). For both high and low income earners, there were strong incentives to minimise or evade income taxation through a transfer into the 'cash economy' at the lower end and through concentration on capital gains and 'fringe benefits' at the upper. These encouraged a revolt against taxes, and led to proposals for tax reform, including a shift from income tax to indirect taxation.

N.G. BUTLIN

TAYLOR, Thomas Griffith (1880–1963), geographer and Antarctic explorer, joined Scott's Antarctic expedition in 1910 and led the western parties during Scott's ill-fated expedition to the South Pole. In 1920 he became associate professor of geography at the University of Sydney, and he was professor of geography at the University of Chicago (1928–35) and at the University of Toronto (1935–51). In 1951 he returned to Australia. He wrote over 40 books, including *Australia, environments and settlement* (1940).

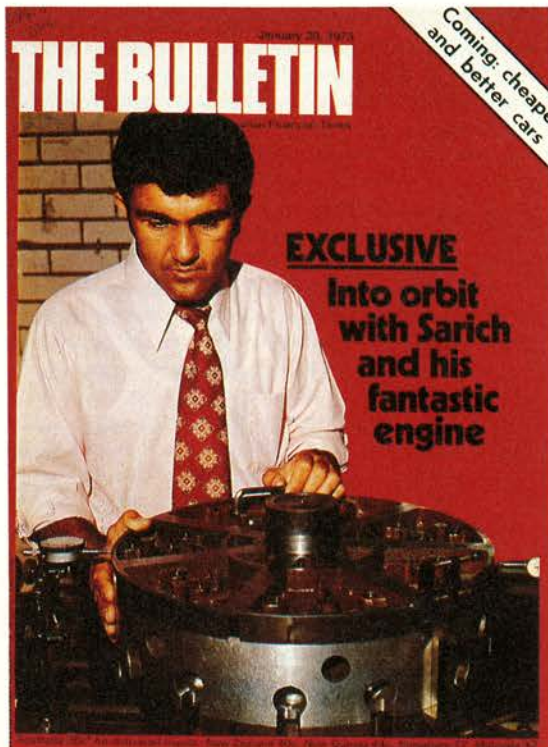
TECHNOLOGY The development of technology in Australia has depended on two related influences: the shifts from one source of motive power to another; and the capitalist economic system, which has quickly developed and exploited the changes in energy use.

In Australia, as elsewhere, each shift from one power source to another has stimulated the growth of new industries, services and products. The development of steam engines during the nineteenth century caused a shift away from power derived from wind, running water and animal and human muscle, and was followed this century by the transition to combustion engines and electric motors, and the more recent move towards electronically based technologies. Each of these technological revolutions spawned a host of connected applications and processes.

The most recent of the technological revolutions, that since World War II, resulted in the electronics industry, marketing transistor radios, sound recording devices, television sets and computers; the chemical industry, producing plastics, artificial fibres, detergents, fertilisers and pesticides; and the pharmaceutical industry, producing antibiotics, anti-histamines, tranquillisers and contraceptive pills. Other industries experiencing technological change were vehicle manufacturing, concrete building construction and aviation.

During each successive technological revolution popular fears arose about the social effects of industrial change. The labour-reducing effect of new technologies became obvious with the onset of recession in 1974–75, when many firms introduced automation in order to remain competitive. The results could soon be seen. In Sydney, for instance, while the number of factories actually increased by 102 in the year 1974–75 to 1975–76, the workforce in manufacturing declined by 18 420. At the same time computerisation spread to the service industries. Word-processing systems in offices, computerised switching equipment in telephone services, electronic cheque handling and automatic cash dispensing machines in banks, point-of-sale terminals in retail stores, computerised ticketing in passenger transport systems, and computerised warehousing, all accelerated rapidly. To what extent these developments eliminated jobs was a matter of contention: their promoters maintained they increased jobs and job satisfaction; unionists argued that de-skilling and loss of jobs were direct and inevitable results.

At each stage of the nation's technological development individual Australians have made inventions that not only met specific domestic needs but also gained worldwide acceptance. Significant innovations developed in Australia in the nineteenth century include John Ridley's wheat stripper (1843); the rack wool press (1865); the first mechanical shearing machine (J. A. B. Higham's, 1866), later superseded by F. Y. Wolseley's (1885); Robert and Clarence Smith's stump-jump plough, which enabled scrublands to be cultivated (1876); the Mullins mallee scrub roller (about 1880); H. V. McKay's harvester, which



Technology took a step forward with the development of a working prototype of the Sarich engine in 1973. Former fitter and turner Ralph Sarich designed his orbital engine—described as a hybrid of the conventional reciprocating and Wankel rotary engines—with the backing of BHP. The engine, with the revolutionary orbital movement of its piston, was hailed as a light but powerful alternative which would reduce pollution and be cheap to produce. Bulletin, 20 Jan 1973.

simultaneously stripped, threshed and cleaned grain crops (1885); James Alston's self-operating windmill for pumping sub-artesian water (1880s); and the aircraft designs of Lawrence Hargrave (1850–1915). Early twentieth-century inventions included John Pomeroy's exploding bullet, first demonstrated in 1904; Anthony Mitchell's thrust bearing, enabling axial load to be removed from a revolving engine shaft, thus boosting the engine's motive power (1905); Walter Hume's centrifugal method of manufacturing concrete pipes (1910); and George Julius's electrically operated totalisator, first used in 1913. More recently, there have been Alan Walsh's atomic absorption spectrophotometer, which measures minute traces of metallic elements in substances as diverse as soil, blood, urine, wine, oil, plant tissue and minerals, and has widespread use in laboratories, hospitals and factories; David Henshaw's self-twist yarn spinner for making two-ply yarn (1970); Ralph Sarich's orbital engine (1972); Don Weiss's sirotherm desalinators, with widespread application in the demineralisation of fluids and in pollution control; and Paul Wild's Interscan system for controlling the flight paths of aircraft taking off and landing.

An obstacle to the introduction of new Australian technologies has been the lack of facilities and funds for research and development. Governments and industries in Australia have been cautious, with the result that some worthwhile Australian discoveries languished or were profitably taken up and exploited elsewhere. Other Australian inventions were exported rather than produced locally because the inventors worked for overseas employers who saw greater gain in developing the inventions abroad. In 1851 Dr William Bland designed what could have been the world's first airship, intended to reduce travel time to Britain to five weeks. As this was to be a hydrogen-filled dirigible powered by a steam engine, it was perhaps fortunate that the 'atmotic ship' progressed no further than the design stage. In 1852 James Harrison of Geelong discovered a freezing process and built the world's first iceworks. Harrison was bankrupted by his next enterprise, an iceworks in Melbourne capable of producing ten tonnes of ice daily, but his invention enabled overseas firms to develop freezing room refrigeration and the household refrigerator. In 1885 Henry Sutton produced the first feasible scheme for television, as a means of relaying the Melbourne Cup to Ballarat's citizens. His plans were not carried out, but his ideas were subsequently taken up by overseas experimenters. In the same year, Louis Brennan invented a workable torpedo in Australia; realising its potential, the Royal Navy sent him to Britain to develop his idea. During the 1930s Laurence Hartnett designed and built in Australia the first utility truck, an idea subsequently developed by the Ford company in the United States.

The loss of Australian discoveries to overseas developers continued during the technological revolution after World War II. In many cases Australian industry imported technologies which had been invented in Australia but developed overseas. In the late 1940s, for instance, a Melbourne concreting firm built a prototype of a truck for delivering pre-mixed concrete to building sites. The idea was subsequently taken up by overseas manufacturers, who mass-produced the trucks and sold them to Australian building construction firms. In Adelaide the laboratories of the commonwealth department of supply invented the process of electrophoretic deposition during the 1950s. This was an important contribution to the development of xerography, and was the process the Canon company of Japan subsequently used as the basis of their photocopying machines. In 1958 Ian McWilliam, an employee in the ICI chemical company's Australian branch, invented the flame ionisation detector, a device permitting rapid and highly accurate chemical analyses, which was subsequently developed abroad. In the late 1970s the Howard Florey Institute in Melbourne devised a process employing genetic engineering in the production of relaxin, a rare hormone with important applications in obstetrics and rheumatology. The process was sold to a US company.

The Commonwealth Scientific and Industrial Research Organization has played a significant role in

devising and developing new appliances and processes within Australia. Some of the inventions already mentioned depended on development by CSIRO—the Walsh spectrophotometer, the self-twist yarn spinner, the Weiss desalinator, and the Interscan system of flight path control (development rights to which were subsequently sold to a US firm, but with substantial Australian equity in the project). The CSIRO also developed Sirotem, a mineral exploration instrument with wide geophysical applications, and a process for removing methane gas from mines. CSIRO's contributions to agriculture included improved strains of livestock and crop plants, the addition of trace elements to soil for higher crop yields and pasture improvement, controls for livestock diseases, and non-chemical methods for managing rabbits and plant and insect pests. In wool textile technology the CSIRO developed processes to enable woollen fabrics to be shrink-proofed, moth-proofed, permanently pleated, and given wash-and-wear capability. It has also been a world leader in solar energy research, and solar water heating units based on its designs are now in widespread use around the world.

Australian science and technology have made other contributions of international significance. The Commonwealth Serum Laboratories have commercially produced antivenenes to counteract snake and spider bites. Since 1980 Australian medical scientists have played a leading part in developing in vitro fertilisation techniques. In 1978 Australian radioastronomers achieved the first optical viewing of a neutron star; in 1981 they discovered the first protostar to be found beyond our own galaxy, and developed new techniques to make the first verifiable discoveries of pulsars outside our own galaxy. Australian biotechnologists have also made importance advances in identifying bacterial organisms which act more effectively in producing liquid fuels through fermentation.

IAN HOWIE-WILLIS

Further reading B. Jones, *Sleepers, wake!: technology and the future of work*, Melbourne 1982; R. Myers (ed), *Technological change in Australia*, Canberra 1980; K. Windschuttle, *Unemployment: a social and political analysis of the economic crisis in Australia*, Melbourne 1980.

TELEGRAPH The first telegraph service in the Australian colonies opened between Melbourne and Williamstown in 1854, ten years after the world's first morse telegraph system. Sydney, Melbourne, Brisbane and Adelaide were linked by 1861. Tas was joined to the mainland by submarine cable in 1869; the Overland Telegraph line from Adelaide to Darwin, giving a link to England, opened in 1872; and the trans-Nullarbor link from Adelaide to Perth opened in 1877. Meanwhile a network of local lines was being erected. Radio telegraph services began in 1912, and manual morse operation was generally replaced by machine operation from about 1920. In recent years the widespread availability of telephone services has resulted in the decline of hand-delivered telegrams in Australia.

TELEPHONE The first use of telephone in Australia occurred in 1878, two years after Alexander Graham Bell first demonstrated it in the United States. The lines, set up between Maitland and Sydney in NSW and Semaphore and Port Augusta in SA showed the importance of the telephone in defeating the 'tyranny of distance' within Australia. By 1880 the telephone was in use in Brisbane, Sydney and Melbourne, with the first government-owned exchange opening in Sydney in 1882. Soon a telephone network became the responsibility of each colonial government and at Federation the networks were taken over by the post-master-general's department. Growth of the system was slow in the first half of the twentieth century. For most of those years the telephone was confined to business use, though it was also a status symbol for private subscribers. In 1930 an overseas radio-telephone communication system was established but by 1939 there were still only half a million telephone subscribers in Australia. The system expanded rapidly in the postwar decades. In 1953 there were 1.4 million subscribers, rising to 5.3 million in 1982. In 1975 telephone business was separated from the post office when the Australian Telecommunications Commission (Telecom) was established.

TELEVISION was established in Australia in 1956, some twenty years after its beginnings in Britain and



Frank Little, News 1974. In News Little gives a dominant role to James Dibble, the ABC's best-known television newsreader in the 1960s and 1970s.

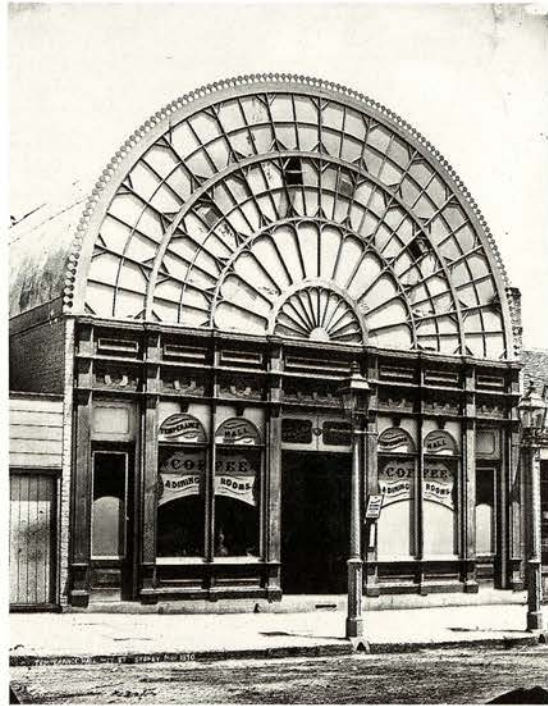
AUSTRALIAN NATIONAL GALLERY

America. The Menzies government decided that the service should be split between national and commercial interests, as had been done in radio. The Australian Broadcasting Commission was to establish a national network financed by a federal budget allocation (licence fees, collected until 1974, did not go to the ABC) and commercial licences were to be awarded in planned stages, beginning with Sydney and Melbourne, and spreading to the other capital cities, then to the country areas. These were not to be commercial networks in the strict sense of the term, as it was thought that stations in regional areas should be run by groups familiar with the concerns of those areas.

In the lucrative urban markets, where the licences had gone for the most part to companies controlled by newspaper and magazine proprietors, these companies lost no time in forming strong networking links between the capital city stations. Especially successful was Frank Packer of Consolidated Press, who secured controlling interests in both TCN9 in Sydney and GTV9 in Melbourne.

There have been several changes to the structure of television administration since the 1950s and to the rules governing the licensing process and programming standards. In 1977 the original regulatory authority, the Australian Broadcasting Control Board, was replaced by the Australian Broadcasting Tribunal in an effort to refine the procedures governing censorship, advertising standards and provision for Australian content and children's programming; in 1983, after an inquiry into the ABC chaired by Alexander Dix, the Australian Broadcasting Commission became the Australian Broadcasting Corporation, with a board of directors to replace its commissioners. The Dix committee also brought up the question of corporate sponsorship (a practice by which companies sponsor particular programs in return for an acknowledgment) as a possible answer to the ABC's funding problems which have become more acute than ever in the 1980s. But this scheme was rejected as posing a risk to ABC independence.

Australian television programs, like Australian films, have had to compete for the attention of audiences against the best and worst of British and American production. But in recent years, partly because of the revival of the Australian film industry, locally made programs have grown more popular and Australian soap operas, mini-series and current affairs programs have begun to dominate the ratings surveys which play such an influential part in television programming in Australia. Commissioned by the commercial television stations and their advertisers, these surveys are conducted by market research companies to gauge audience percentages for particular programs and are frequently criticised for exerting a conservative influence on programming policy. In a climate where the ratings are the only measure of success, say these critics, the unfamiliar and the innovative becomes automatically risky, and new programs which do not attract immediately high ratings are often taken off the air without being given time to build an audience.



The Temperance Hall in Pitt Street, Sydney, Nov 1870.

NSW GOVERNMENT PRINTING OFFICE

Colour television was introduced in 1975. In 1980 the two sectors of the television service were augmented by a third—a multicultural network with subtitled foreign language programs run by the Special Broadcasting Service, initially with channels in Sydney and Melbourne. The development of the video recorder was also welcomed by Australian audiences.

But perhaps the greatest technological development of the 1980s in television is Australia's satellite system, which was working by late 1985. With its potential for revolutionising the process of networking, the satellite system poses almost as many problems as it solves. It not only gives the ABC the means to deliver its programs to people living in the remotest parts of Australia, it has necessitated a new set of policies for regulating control of commercial television outlets. The guidelines for operation of the satellite will affect the shape of Australia's television system for some time to come.

SANDRA HALL

TEMPERANCE The temperance movement in Australia had its origins in eighteenth-century England. Many observers of society then believed that what they perceived as loose sexual values, inhuman attitudes to children, the debasement of sport and the abuse of alcohol in too many lives, were indicators of the need for temperance in all things, particularly in alcohol.

Many of Australia's first settlers shared the same concern. The NSW Temperance Society was the first Australian temperance society, formed in 1832 by

Reverend W.P. Crick, with the motto, 'Temperance is moderation in things innocent and abstinence in things hurtful'. The governor, Sir George Gipps, became president of the society after his arrival in 1838, and gave personal and financial support.

The Total Abstinence Society (1838) followed and, as its name implies, took the temperance movement a step further. Its members were required to adopt the Total Abstinence Pledge.

Over the years many societies were established—the Band of Hope, the Sons and Daughters of Temperance, the Local Option League (LOL) and others. They were active in many social areas, and their influence spread throughout city and country areas and to other colonies. The LOL, established in Orange in 1876 by F. B. Boyce, emphasised the principle of 'local option', which gave people the right to decide whether to have liquor on sale in their electorate. The LOL became colonywide in 1882 and supported state prohibition in 1925. The body is now known as the NSW Temperance Alliance.

In 1881 Sir Henry Parkes, supported by the temperance movement, initiated the law which enforced Sunday hotel closing and established the principle of 'local option'. The movement campaigned for 6 pm closing (1916 and 1947), prohibition (1928) and breathalyser testing (1968 and 1982) and campaigned against 10 pm closing (1954), Sunday hotel trading and alcohol on university premises.

TENNANT, Kathleen (Kylie) (1912–), writer, was born in Manly, NSW. Her award-winning novels include *Tiburón* (1935) which won the S.H. Prior Prize and *The battlers* (1941) which won both the S.H. Prior Prize and the Australian Literature Society's gold medal. *All the proud tribesmen* (1959) won the 1960 Children's Book Award. *Ride on stranger* (1943) has been dramatised by the ABC. As well as plays and stories, she has written a biography of H.V. Evatt (1970), and an autobiography (1986). She was made AO in 1980.

TERRA AUSTRALIS (south land) is the term used to describe a great southern continent which geographers believed to exist before the discoveries in the Pacific in the eighteenth century, especially those of James Cook, proved that it did not. It was often referred to as *terra australis incognita*. However, Matthew Flinders described *Terra Australis* in 1814 as embracing both New Holland and NSW. A.G.L. SHAW

TERRA NULLIUS (land of none) is the term used in international law to describe a region which is either uninhabited or in which the inhabitants are thought to have neither developed an organised system of government nor improved or cultivated the land. In the latter case it has been argued that the indigenous inhabitants have no claim to the territory and it might be seized by a European or other 'civilised' nation. In the eighteenth century, Australia was regarded as *terra nullius*; in Cook's words it was 'in the pure state of Nature, the Industry of Man has had nothing to do with any part of it'. A.G.L. SHAW

TERRY, Samuel (1776–1838), speculator and pioneer, arrived in Sydney from England in 1801, having been convicted of theft of 400 pairs of stockings and sentenced to transportation for seven years. After labouring in a stonemason's gang in Parramatta, he set up a retail shop and in 1810 was granted a liquor licence. Terry became one of the biggest speculators in the colony and a major shareholder in the Bank of NSW. In his obituary, the *Sydney Gazette* described him as 'the Rothschild of New South Wales'; he left a personal estate of £250 000 and vast amounts of land and city property.

THEATRE European theatre in Australia commenced with a performance of Farquhar's *The recruiting officer* (1706) at Sydney on 4 June 1789. During the next 40 years, there were sporadic performances in Sydney and by convicts at Norfolk Island and Emu Plains. Many people, fearing that theatres encouraged crime and vice, thought them inappropriate to penal colonies. Continuous commercial theatre dates from 1832, when Barnett Levey obtained a licence for his Sydney Theatre Royal. Samson and Cordelia Cameron brought professional theatre to Hobart in 1833. By mid-century, theatres had been established in Adelaide, Launceston, Melbourne and Geelong.

The 1850s gold rushes produced an influx of visiting stars from Britain and America, as well as new prosperity for other pioneer actor-managers, like George Coppin. One of Coppin's imports was the American James Cassius Williamson, who arrived in 1874. In 1882 Williamson founded the theatre company 'The Triumvirate' (later 'The Firm') with George Musgrove and Arthur Garner. 'The Firm' gradually came to dominate Australian commercial theatre, maintaining its hold until the 1970s. The earlier stock companies, attached to one theatre and playing a constantly changing repertoire, were replaced by touring companies and companies specially assembled for long-running hits.

While the nineteenth-century theatre relied heavily on works from Britain and Europe, plays with Australian settings usually proved popular. A number of original plays were produced at the Sydney Royal Victoria Theatre in the 1840s, including Edward Geoghegan's *The currency lass* (1844). Local scenes and characters were introduced into the Christmas pantomime, which flourished in the second half of the century. The 1880s and 1890s were the heyday of Australian melodrama, with Alfred Dampier's adaptations of *Robbery under arms* and *For the term of his natural life* being particularly successful.

After World War I melodrama became the preserve of the cinema. Commercial theatres concentrated on musical comedy, variety and vaudeville, featuring Australian stars like Nellie Stewart, Gladys Moncrieff and Roy Rene. Serious plays, including the new national dramas written by Louis Esson and others, were left to amateur and semi-professional companies, the repertory and little theatres. Subsidised professional theatre began in the 1950s, just in time for Ray Lawler's classic *Summer of the seventeenth doll*

(1955). The National Institute of Dramatic Art was established in 1959 and is the most important training ground for actors, directors and technical specialists.

Since the 1960s professional companies have been set up in all state capitals and many regional centres, often housed in new arts complexes. The 'new wave' Australian drama of the late 1960s, however, came less from these companies than from alternative theatres like Melbourne's La Mama and The Australian Performing Group. Australian plays are now a regular part of the repertoire of professional companies, with non-naturalistic works and plays by women, Aborigines and migrants increasingly being performed.

ELIZABETH WEBBY

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THEODORE, Edward Granville (1884–1950), politician and businessman, was born and educated in Adelaide. He worked as a miner in WA, Broken Hill, and Irvinebank, where, aged 23, he founded the Amalgamated Workers' Association, later the Australian Workers' Union (Qld Branch). Entering Qld parliament in 1909, he became deputy-premier, treasurer

and public works secretary in 1915 and was the architect of new labour legislation and agrarian reforms. He succeeded to the premiership in 1919. After dealing with the postwar recession, Theodore resigned in 1925 to enter federal politics.

Elected member for the House of Representatives for Dalley, Qld, in 1927, Theodore was deputy prime minister and treasurer in the Scullin government. His unorthodox remedies for unemployment and banking problems created strong opposition, and he lost his seat in 1931. Thereafter he devoted his immense energy and financial skills to mining ventures in Fiji and publishing ventures in Sydney. From 1942 to 1945 he served as director of the Allied Works Council. Always a controversial figure, he has been acclaimed as an outstanding Labor leader whose career was cut short by his resignation over the Mungana scandal in 1930. A Qld royal commission had found that when he had been premier in 1919 he had defrauded the government of £30 000 over the sale of mining interests at Mungana. He was exonerated in subsequent court action and returned briefly to cabinet before losing his seat.

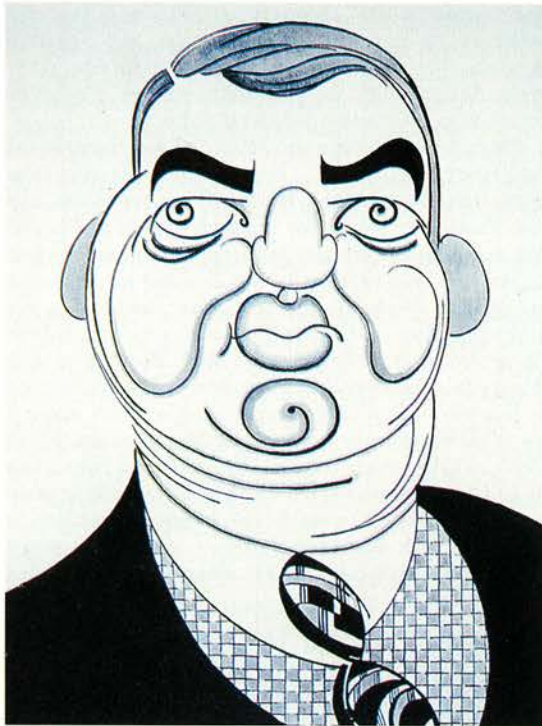
K.H. KENNEDY

THOMSON, Edward Deas (Sir Edward Deas-Thomson) (1800–79), was born in Edinburgh and came to NSW in 1828 as clerk of the legislative council. In 1837 he was appointed by his father-in-law,



Actors rehearse a performance of 'Shakespeare by the sea' at Balmoral Beach rotunda, Sydney, in January 1987. Photograph by David Trood.

FAIRFAX PHOTO LIBRARY



The Honourable Edward Granville Theodore, caricatured by George Finey. Art in Australia, 1931.

Gov Bourke, to replace Alexander Macleay as colonial secretary, a position he held until the introduction of responsible government in 1856. He played a prominent role in goldfields administration and the foundation of the University of Sydney.

TICKET OF LEAVE The 'ticket' was a pass issued to convicts as a reward for good conduct, after four, six or eight years, according to whether their sentences were for seven or fourteen years or for life. Notwithstanding criticism in England that tickets were given too readily, the colonial governors took great trouble in assessing convicts' petitions for tickets, which, up to 1840, seem to have been granted to about 30 per cent of those entitled by time to receive them. While holding a ticket, which could be withdrawn for misconduct, the convict could work for himself, but had to reside in a prescribed area and report regularly to the police. A.G.L. SHAW

TITTERTON, Sir Ernest (1916–), British-born physicist, worked on the Manhattan Project which developed the atomic bomb during World War II. After gaining his PhD at Birmingham University he trained as a schoolteacher before working on night-fighter radar and then going as part of the British contingent to Los Alamos. An ardent supporter of both nuclear power and atomic weapons, he became professor of nuclear physics at the Australian National University in 1951. He was knighted in 1970. In 1985 the report of the McClelland royal commission into

British nuclear tests at Maralinga, SA, found that Titterton, who had been appointed to oversee safety, had concealed information from the Australian government in the interests of the British.

TOBACCO Australian Aborigines chewed or sucked the leaves of several native plants (*Nicotiana gossei*, *Nicotiana excelsior*, *Duboisia hopwoodii*) containing nicotine. Mixed with wood ash, this *pituri* was traded over long distances and was valued as a stimulant and a means of deadening hunger. Aborigines came to appreciate the white man's tobacco, and plug tobacco formed part of their rations on pastoral stations.

Soon after 1788 settlers were growing *Nicotiana tabacum* near Parramatta and at the Hawkesbury River, thus supplementing the imported Brazilian tobacco or *canasta*. The penal stations at Emu Plains and Port Macquarie in the 1820s grew considerable quantities for sale to the public or for supply to well-behaved prisoners as an 'indulgence'. Local production was encouraged by the imposition of an import duty in 1818; the colonies did not levy excise on local leaf until the 1880s. By that time Chinese sharefarmers were growing much of the coarse leaf which was made up into plug to be cut with the bushman's 'dover' or knife, and into cavendish, which was a dark plug sweetened and softened. Cigarettes, first produced in the colonies in the 1880s, required light, bright leaf and in the early twentieth century the demand for the heavy air-dried leaf supplied by the Chinese and Australian farmers disappeared. Leaf production declined until 1929 when the Scullin government imposed heavy duties on imported tobacco.

Between 1929–30 and 1932–33 the Australian crop increased sixfold but smokers accustomed to 'pure Virginia' disliked the local leaf, considering it inferior. The industry was put on a sound basis by the statutory percentage scheme of 1936. Local leaf production increased until it supplied half of the Australian demand by 1965, when a stabilisation plan was implemented, imposing production quotas on states and growers under the control of the Australian Tobacco Board. Qld now produces more than half of Australian leaf, and Vic and NSW the remainder. The main growing districts are Mareeba and Dimbulah in north Qld and Myrtleford, Vic.

In the nineteenth century most men but few women smoked. Pipe smoking, at first with a clay and later in the century with a briar pipe, predominated. Plug was more favoured in Australia than it was in Britain because it did not dry out in the hot climate. The imported cigar was associated with wealth and privilege, but locally made cheap cigars were also on sale. Cigarettes in the early twentieth century attracted juveniles, women and male pipe smokers. Until the 1950s and the victory of the filtertip, hand-rolled cigarettes remained most popular.

During the 1950s the public first became aware of the health risks of cigarette smoking. The National Health and Medical Research Council issued the first of many warnings in 1957, but governments were slow to act. Since 1973 health warnings have been

required on cigarette packets, and in 1976 cigarette advertising on radio and television was banned. Governments were less inhibited in raising taxes on tobacco as a luxury, and in 1975–76 most states imposed licence fees on tobacco retailers. Taxes now account for more than half the price of a cigarette.

Tobacco was first processed on the farm or in retailers' shops but by 1900 manufacture, except of cigars, was concentrated in large factories in the capital cities. In 1903 local manufacturers combined to resist overseas interests but in 1904 they joined the British American Tobacco Company to form the British Tobacco Company (Australia). This combine dominated local manufacture and sales until the 1950s, when the multinationals Philip Morris and Rothmans opened factories in Australia. Oligopoly succeeded monopoly as the three companies each came to hold about one-third of the market. Together they form a strong lobby in the Tobacco Institute of Australia. Nevertheless, they have not been able to stem a decline in the consumption of tobacco. Average annual consumption of tobacco in Australia per head was 1.19 kg in 1903, and reached a peak after World War II, at 2.49 kg in 1960, but declined to 2.4 kg in 1970. In the 1970s leaf consumption fell slightly but cigarette output rose as the leaf was used more economically. Tobacco continued to take its toll as cigarette smokers succumbed to lung cancer, cardiovascular and other diseases. In 1980, according to official estimates, tobacco smoking contributed to 16 169, or almost 15 per cent, of all deaths in Australia.

R. B. WALKER

Further reading R. Walker, *Under fire: a history of tobacco smoking in Australia*, Melbourne 1984.

TODD, Sir Charles (1826–1910), SA postmaster-general and government astronomer, arrived in SA in 1855 to take up the positions of astronomical observer and superintendent of telegraphs. He vigorously pushed ahead with telegraph extension, opening lines to Melbourne (1856) and Sydney (1857), and promoting the construction of the Overland Telegraph between Adelaide and Darwin, built from 1870 to 1872 under his supervision.

TOLPUDDLE MARTYRS, George and James Loveless, Thomas and John Standfield, James Hammett and James Brine, agricultural labourers from Dorset, were transported to Australia in 1834. Alarmed at a threatened wage reduction in Tolpuddle in 1833, the Loveless brothers had formed a Friendly Society of Agricultural Labourers. The six were convicted, under an outmoded law, for administering an unlawful oath at the inaugural meeting. Sentenced for seven years, George Loveless worked in Hobart while his companions were assigned in NSW. After persistent agitation in England the men were pardoned in 1836, and they returned home. All but Hammett migrated to Canada.

TORRENS TITLE A system of establishing legal title to land where a government body issues a certificate guaranteeing ownership rather than the old sys-

tem of common law conveyancing where the burden of proof of ownership falls on the individual. Under Torrens title, named after the Irish-born Registrar-General of Deeds for SA, Sir Robert Richard Torrens, who first introduced such title legislation in 1856, the government maintains a register recording a description of the land, the owner's name and any rights another person may have over the land. The system is used throughout Australia and in parts of the USA and Canada. Some parcels of land remain under Old System title, but because of the complexity and higher legal expenses involved in buying such land, it is not as attractive to lending institutions and purchasers as Torrens title land.

TORRES STRAIT ISLANDERS, are one of two peoples indigenous to Australia, the other being the Aborigines. A seafaring and horticultural Melanesian people with a society based on totemic clans, they inhabit seventeen islands located between Cape York and Papua New Guinea. Traditionally they used large double outrigger canoes to hunt fish, turtle and dugong, and to undertake long voyages for trading and warfare. From the late 1860s, when pearling became established in the islands, the Islanders provided the crews of many of the pearling luggers; and, with the encouragement of the London Missionary Society, which had begun activities in the islands in 1871, they increasingly took part in pearling as boat owners from the early 1900s.

The islands had become part of Qld in 1879 as a result of legislation by the Qld and British parliaments; and after 1904, when the Qld government included them under its Aborigines' protection legislation, the Islanders lost their autonomy. Official 'reserves' were set up for them, and restrictions placed upon their freedom of movement and the management of their boats. From 1939 a series of Torres Straits Islanders acts restored a measure of self-management to Islander communities, but Islanders remained resentful of the paternalistic provisions of such legislation. In 1978 one Islander mounted an ultimately unsuccessful high court challenge against Qld's annexation of the islands. Dissatisfaction with their lack of sovereignty continued, and found expression in a growing movement for the granting to the Islanders of freehold titles to their islands.

The demise of the pearling industry in the 1950s left most Islanders without paid employment, forcing many of them to seek work in mainland Qld and beyond, often as unskilled labourers. By 1981 about half of their population of 15 230 was living outside the islands, and Islander communities existed in each state and territory. Even though they were thus scattered, they remained a cohesive group, strongly linked by language, family ties, tradition and race. Their sense of separateness from other Australians was greatly heightened during the late 1970s by the negotiations between the governments of Australia and Papua New Guinea over the position of the border between the two countries: Islanders' resistance to proposals for moving the boundary south (and thus ceding to Papua New Guinea the islands above the 10°

parallel) not only led to the line remaining unchanged but firmed their resolve over the issues of land rights and Qld's Islander legislation.

Further reading J. Beckett, 'The Torres Strait Islanders and the pearling industry: a case of internal colonialism', *Aboriginal history* 1–2, 1977; D. Walker (ed), *Bridge and barrier: the natural and cultural history of Torres Strait*, Canberra 1972.

TOURISM Organised tourism began to be a feature of Australian life with an increase in middle-class leisure in the late nineteenth century. The extension of the railways to 'tourist resorts' enabled railways departments to become involved in promoting tourism. They set up tourist bureaus, the first in 1888. These developed into state government tourist bureaus in the early twentieth century. The popular resorts of the day were hill resorts which offered purer air and relief from the heat. The Blue Mountains, Jenolan Caves, Dandenong Ranges, Tamborine Mountain and the Mount Lofty Ranges were particularly popular with honeymooners. For country people a trip to the state capital was a typical holiday. At the same time the coastal shipping companies were beginning to promote pleasure trips as well as trade, and by the 1930s a cruise to the Barrier Reef, Tas, New Zealand or the South Seas became a popular way for wealthier Australians to spend a holiday. For most people, however, an extended holiday generally involved staying with relatives.

By the 1930s the beach was replacing mountain resorts as a place to spend holidays, and the latter were falling into decay. This change coincided with increased leisure, with the introduction of paid annual leave in the 1930s and long service leave in the 1950s.



Preparing to board the omnibus from Katoomba to the Jenolan Caves. The dual functions of these premises—estate agents handling rental accommodation and tour operators—reflects the importance of both the Blue Mountains and the caves as holiday destinations for Sydney people until private cars and aeroplanes enticed them further afield after World War II. Holiday dress: semiformal. Pix, 5 Mar 1942.

MAGAZINE PROMOTIONS

Tourism became a mass activity. As the family car became ubiquitous in the 1950s and coastal roads were upgraded, caravan holidays at the beach became common.

Domestic tourism was always more important than international tourism, which was the preserve of the elite. Although some had always travelled to Europe for business, education and culture, the introduction of steamships and the opening of the Suez Canal made that journey faster and more pleasurable. The twentieth century saw a widening of opportunities for overseas travel. By the 1920s, 42 000 Australians were departing annually. After World War II, more and faster ships, cheaper fares and greater affluence allowed still more Australians to make what was often a 'once in a lifetime' trip to Europe. The introduction of jets in 1960, and more particularly jumbo jets in 1970, brought overseas travel within the reach of a large number of Australians. In the ten years to 1980 overseas travel quadrupled to 1.2 million departures annually. Short trips to Asia and Oceania accounted for most departures, but about one-third were to Europe.

Australian tourists overseas have usually outnumbered visitors to Australia. The Australian National Travel Association was established in 1929 to encourage tourism in Australia, but it was the establishment of the Australian Tourist Commission in 1967 and a greater awareness of Australia in the rest of the world that helped tourism develop into a significant industry. Competition for the 'tourist dollar' has coincided with a greater interest in Australian history within Australia. Historical towns and precincts, National Trust properties and recreations such as Sovereign Hill and Old Sydney Town now draw as many tourists as the Barrier Reef, Ayers Rock and other natural attractions opened up by better transportation.

RICHARD WHITE AND LINDA FROW

TRADE An abundance of natural resources, relative to population, has provided the basis for the long-distance export trade of Australia in products capable of bearing the costs of haulage to the northern hemisphere. The earliest export of lasting significance was wool.

The rise in wool exports was so rapid that by the start of the first mineral boom—that of gold in the 1850s and 1860s—Australia supplied half of Britain's wool imports. Expansion of the pastoral industry was, however, brought to a halt during the second mineral boom, from the late 1880s until World War I, by pasture depletion and by international recession so that, except during the Korean War, wool never again supplied more than half of Australia's exports. Indeed, during the third mineral boom, after the mid-1960s, the export values of coal, iron ore, bauxite and manganese each generally exceeded that of wool.

By 1860 the share of imports represented by consumer items, chiefly food and drink, clothing and textiles, had fallen to two-thirds. Rising in importance were imports of producers' goods like materials and machinery, including those for railways. The food group declined further as the colonies moved toward



'Part of the wharves at Pt. Adelaide fronting the Bonding Warehouses, 7 miles from Adelaide.' Photograph, Duryea's Adelaide album, 1866.

NATIONAL LIBRARY

a capacity for exports of food, which was achieved in the 1890s. It was then that, encouraged by improvements in ocean and inland transport, and in agricultural methods, export shipments began of large quantities of refrigerated meat and dairy products, wheat and, later, fruits and sugar.

With Federation, Vic's policy of diversifying its economic base by protecting manufacturing against imports became national policy. The additional element was New Protection, linking domestic wages and, therefore, population growth, to the protective tariff. The first effectively protective commonwealth tariffs were enacted in the 1920s to assist, with the guidance of the Tariff Board (1921), the new transport, light engineering and chemical industries.

By then, most of the labour-intensive rural activities had run into trouble, and were being further assisted by government subsidy and by marketing schemes that hid behind Australian import barriers.

The protection emphasis in rural industry policy carried over to manufacturing when World War II forced Australian manufacturers to produce goods that could no longer be imported. This was achieved in the 1950s by quantitative restrictions on imports (justified under the General Agreement on Tariffs and Trade as being necessary for balance of payments reasons), by tariffs in the 1960s and 1970s and, more recently, again by quotas. By the late 1960s the huge costs of the policy were increasingly being criticised. By the middle of the 1980s, because most Australian imports were of materials, semiprocessed and capital goods, the truth that protection harms other Australian producers was obvious. Australia in the 1980s is remarkable for its relatively small engagement in world trade and for its high import protection.

Periods of rapid growth in the world economy have accompanied rapid growth in world trade. One such period, the long boom in Australia from the early

1950s until the early 1970s, began with an official attitude of export pessimism. Australia could no longer ride on the sheep's back; new markets for agricultural exports could not easily be found in a Europe which was forming discriminatory trading blocks, so Australia's discrimination in favour of Britain was relaxed and finally removed, and trade ties were cemented with Japan, and later with China.

J.J. PINCUS

Further reading E.A. Boehm, *Twentieth century economic development in Australia*, Melbourne 1979 (1971), 84–122, 156–211; R.V. Jackson, *Australian economic development in the nineteenth century*, Canberra 1977, 49–74; R.H. Snape, *International trade and the Australian economy*, Melbourne 1973 (1969).

TRADE DIVERSION was the policy adopted by the Lyons government in 1936 to provide a larger portion of the Australian market for British textiles and motor vehicles. Customs duties were imposed which discriminated against the United States and Japan, and caused the latter, in retaliation, to reduce its purchases of Australian wool.

TRAMWAYS were the major form of urban public transport in the larger Australian cities in the late nineteenth century and in the first half of the twentieth century. By 1890 Sydney, Melbourne, Brisbane and Adelaide all had the beginnings of a tramway system and in the next three decades Perth, Hobart and a number of smaller cities also set up systems. Until the early 1900s most of the trams were horsedrawn, cable-traction (as in Melbourne) or powered by steam, but the capital city systems were gradually electrified. By 1924 trams were carrying 744 million passengers a year, almost three-quarters of them in Sydney and Melbourne. Tramlines continued to be extended in all the capital cities in the interwar years. By 1930 Sydney's electric trams had a route-length of 261 kilometres, making the system the largest in Australia. But in the same decade the state government decided to replace some routes with buses. Trams reached their maximum patronage—1087 million—in 1944–45 when the wartime rationing of petrol and car production curtailed the use of cars.

Trams, which had long been criticised by motorists for impeding traffic in inner-city streets, fell from favour in the 1950s and 1960s. Most British and American cities scrapped their tramway systems in favour of the apparently cheaper oil-powered buses and, following their example, by 1969 all Australian capital cities except Melbourne had abolished their tram networks: Perth and Adelaide (1958), Hobart (1960), Sydney (1961), Brisbane (1969). Adelaide retained one line, to the beachside suburb of Glenelg, while a few other cities, such as Bendigo, retained a short section of track for tourists. Melbourne, which had more tram rights-of-way than any other city, retained its system and has gradually expanded it. By 1980 it had a route length of 220 kilometres, all within 19 kilometres of the GPO. Suburbs further out were served by trains or buses.

PETER SPEARRITT



The slogan 'TAA – the friendly way' survived until the airline changed its name to Australian Airlines in 1986. Poster, c1960.

BOOROWA PRODUCTIONS

TRANS AUSTRALIA AIRLINES Created in 1945 to provide interstate air services, the Australian National Airlines Commission, trading as Trans Australia Airlines (TAA), operated its first Melbourne–Sydney flight on 9 September 1946. On 18 October it introduced pressurised turbo-prop Convairs on the Melbourne–Brisbane route. Vickers Viscount aircraft followed on 18 December 1954, and Lockheed Electras on 8 July 1959. Its first jet aircraft, Boeing 727s, were introduced in 1964. During the 1980s TAA's future came under discussion as conservative politicians advocated that it be sold to help privatise the economy. In August 1986 it changed its name to Australian Airlines.

J.D. WALKER

TRANSPORT Changing transport technology has played a vital role in the European settlement and development of Australia. This was inevitable, given the island continent's distance from Europe and other points of economic and cultural contact. Vast distances within Australia and its sparse population similarly ensured a prominent role for internal transport.

Sailing ships were the only contact with the rest of

the world in the early days of each of the Australian colonies. The relatively primitive ships of the first fleet gave way in time to the sophisticated, swift clipper ships of the England–Australia run. The bulk of shipping, however, relied on simpler cargo vessels. The last clippers carried wheat exports to Britain from the St Vincent Gulf ports of SA as late as the 1930s. There was thus a full century of overlap between sail and steam, since the first steamship, the schooner-rigged paddle-steamer *Sophia Jane*, arrived in Sydney from England in 1831. A monthly mail service to England by sailing ship was established in 1844, while the first mail steamer, P & O's *Chusan*, arrived in Australia in 1852, establishing a service that included an overland leg across the Suez isthmus. The two forms of propulsion overlapped in another way: the majority of steamships also carried sails into the early years of this century, as the steam boilers and engines of the day were inefficient and only limited amounts of coal could be carried. Vessels powered only by steam gained supremacy from the 1890s onwards.

A series of other changes significant to overseas shipping occurred in the nineteenth century. First, pilot services were provided in Australian ports from the 1830s. Second, in 1849 repeal of Britain's Navigation Act ended the British monopoly over colonial trade, and foreign vessels began to appear more frequently in Australian ports. Third, the conference method of setting charges and conditions by collusion between the companies involved in shipping on particular routes began in the late 1870s. Fourth, the first successful refrigerated shipment (of frozen meat to England) took place in 1879–80.

Coastal and river shipping was also important in the nineteenth century. For people living in or near port towns far from the capital cities, coastal shipping was a link with the outside world, in some cases until after World War II. They used it not only to carry their produce to market, but also as the only means of travelling any distance away from their immediate area. Coastal shipping was significant by 1815, linking Sydney to the coastal areas of NSW and to Van Diemen's Land. The Hunter River trade was particularly important from the 1830s. Shipping companies began to develop in the late 1830s and 1840s; for example, the Hunter River Steam Navigation Co was dominating the steamer trade from Moreton Bay to Adelaide by 1842, becoming the Australasian Steam Navigation Co in 1851. As with overseas shipping, sail and steam competed with each other throughout the latter part of the century. Riverboats emerged as a vital form of communication in inland southeastern Australia in the 1850s, reaching their peak of importance in the 1870s, then declining rapidly owing to competition from railways. Their role was essentially limited to the Murray–Murrumbidgee–Darling rivers system. Services in the coastal estuaries in NSW and elsewhere, and on the Gippsland lakes, were a cross between coastal and river services.

Land transport was slower to develop. Roads worthy of the name were few and far between for many years after initial settlement in most parts of

Australia. Land communication was frequently by mere tracks, often not capable of accommodating any form of wheeled vehicle. Even those regularly used by carts and drays were normally in an appallingly inadequate condition, leading to difficult, slow and expensive transport. This affected pastoralists and farmers in inland districts in particular. Farming, especially if bulky or perishable produce was involved, was not viable until railways or improved roads were built. Light loads were carried by packhorse or on horse-drawn light carts. Heavier loads such as bales of wool and logs were most often hauled by large teams of bullocks, better capable of coping with the mires that passed for roads. In inland areas such as western NSW and the goldfields of WA, camels replaced bullocks. Both bullock and camel teams remained important to the end of the nineteenth century.

Roads were gradually improved in the more settled parts of the colonies. In NSW finance for trunk road construction was raised by a turnpike or toll system introduced in 1810 and continued until 1877. Tolls were also common in Van Diemen's Land, but occurred less frequently in other colonies. Progress was otherwise slow, as all minor roads were a local responsibility. Trunk roads, often little more than tracks in the early days, were completed in the southeastern colonies in the early decades of the nineteenth century: the first 'road' over the Blue Mountains was completed in 1814; the Great North Road from Hobart to Launceston in 1818; the identically named road from Sydney to the Hunter valley in 1830; and a track from Sydney to Melbourne in 1835. Even main roads such as these remained primitive by modern standards until well into the twentieth century. Experiments with improved surfaces such as macadam or wood blocks were usually restricted to the capitals.

Railways revolutionised inland transport in the second half of the nineteenth century, while tramways had a similar impact in the major cities. Australia's first steam railway opened in 1854 with the line from Melbourne to Williamstown. The first railway in NSW, also a suburban line, opened the following year after the government had nationalised the company charged with building and operating it. Thus began the almost total government monopoly on railway services in Australia, the only major exceptions being the long private lines operated by mining companies since the 1950s. Railways opened new areas for agriculture much more effectively than roads, and were used as a tool in settling and developing large areas of inland Australia. Trains gradually replaced riverboats and, more slowly, coastal shipping. Road improvement became less pressing, and years of neglect resulted. Suburban railways and tramways enabled the larger cities to expand outwards in ever-increasing rings of suburbs. Again, lines were often built in advance of development.

Roads again became the focus of attention with the advent of motor vehicles. A consolidation of government involvement began with the creation of the Country Roads Board in Vic in 1913 and similar bodies in other states during the 1920s. Change was

gradual: the Hume Highway between Sydney and Melbourne remained a route for the adventurous or foolhardy until World War II; the Sydney–Brisbane link was only fully bitumenised in 1958, the road from Adelaide to Perth in 1976. Increased road traffic led to a decline in rail traffic and, especially in the 1950s and 1960s, to the closure of many branch lines. Passenger services in particular decreased, although Tasmania in 1976 became the only state to eliminate them altogether. Urban railways and tramways were revitalised by the introduction of electric traction from the 1890s, but tramways in particular were also hard hit by the advent of motor vehicles. After 1969 Melbourne was the only capital city to retain a tramway network, and the last provincial network was closed in 1972. Diesel buses are now the most common form of urban transport in Australia.

Aviation has been the latest important influence on travel to and within Australia. The country's first airmail flight took place in 1914, the first scheduled passenger service in 1921. Services increased rapidly in the 1920s, and companies such as Western Australian Airways (1921), Qantas (1922) and Australian Aerial Services Ltd (1924) entered the field. Regular overseas services began in 1934 with a scheduled twelve and a half day service to London. Air travel remained the preserve of the wealthy, however, until after World War II. The Europe–Australia passenger trade remained dominated by shipping companies until the late 1960s; cheaper and more reliable air travel finally relegated

the liners to cruise work in the early 1970s. Air and road travel lessened the importance of interstate railways and led to the cessation of intercapital passenger shipping services in the postwar period.

There have been signs in the 1980s of renewed interest in both railways and urban tramways as the full costs of road transport have become better known. Major expenditure, however, continues to be devoted to building urban freeways and improving the standard of trunk routes. The Hume Highway, for example, is to be a divided road approaching motorway standards by 1988. The aviation industry continues to expand, and may soon face a major upheaval as the two-airline policy comes under increasing pressure. Shipping has been revolutionised with most freight (wheat, minerals, crude oil and other products) now being shipped in bulk, in containers or on roll-on, roll-off vessels. At the same time, intrastate coastal shipping has all but disappeared, a victim of roads and railways. The combination of air travel, express trains and modern roads has reduced Australia's isolation in world terms and effectively reduced the negative impact of large internal distances.

TRUGANINI (Trugernanner) (1812?–76), Tasmanian Aborigine, was born near D'Entrecasteaux Channel in Van Diemen's Land. After her people had been brutally disrupted by European sealers, whalers and timbergetters, Truganini married Woorraddy at



Small river steamers on the Clarence River, Grafton, New South Wales. Such vessels provided vital links until largely replaced by road and railway bridges. Postcard, c1900.

NATIONAL MUSEUM OF AUSTRALIA

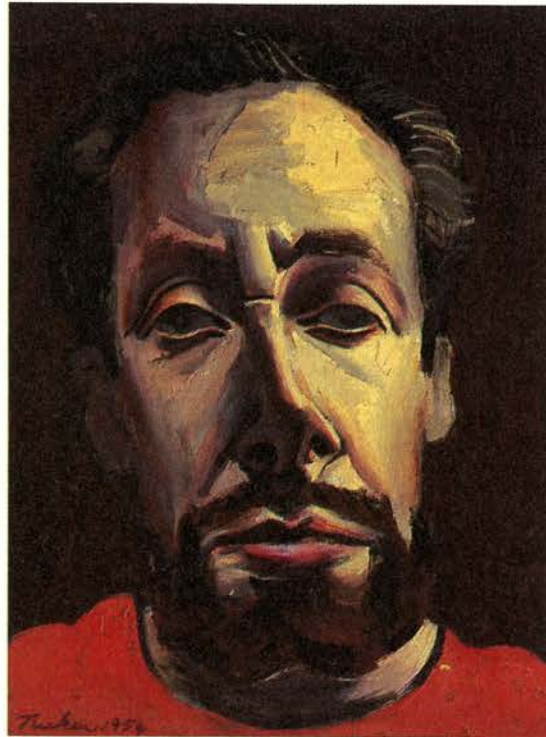
Bruny Island in 1829. The couple helped G.A. Robinson to collect the remnants of her people, in order to protect them from European violence, and later joined him at the settlements of Flinders Island (1835) and Port Phillip (1838). Truganini moved to Oyster Cove in 1847 and resumed her traditional lifestyle. She moved to Hobart in 1874 and died at the Dandridge family home two years later. After burial, and against her previously stated wishes, her body was exhumed (1878) by the Royal Society of Tas for scientific research. Her skeleton was placed on display at the Tas Museum (1904–47). One hundred years after her death, her bones were cremated and the ashes scattered on the D'Entrecasteaux Channel. Truganini is thought to have been the last 'full blood' Aborigine to have lived in Tasmania.

TUCKER, Albert (1914–), artist, is a self-taught painter whose early work has much in common with the strong colours and forms of German expressionism. His paintings of Melbourne during World War II, 'Images of modern evil', have a macabre, surrealist quality, charged with symbolism. In 1960 Tucker returned to live and work in Australia after a number of years in Japan, Europe and the United States.

TUCKER, Margaret (1904–), Aboriginal rights worker, spent her childhood at the Cumerogunga and Moonahcullah stations, NSW, from where she was forcibly removed in 1917 and sent to the Cootamundra Domestic Training Home. She worked in Sydney before moving to Vic where, during and after the war, she organised numerous social functions including, in 1949, the first Aboriginal debutante ball. She was a founding member of the Australian Aboriginal League (1956) and one of the few Aboriginal women involved in the Aboriginal rights movement in its early days. In 1958 she was awarded the MBE for service to her people. She was appointed to the Aboriginal Welfare Board (Vic) in 1964 and to the ministry of Aboriginal affairs in 1968; in both cases she was the first Aboriginal woman to be nominated for appointment. In the 1960s she formed the United Council of Aboriginal and Islander Women, of which she is president.

TUCKIAR, (?–1934), was tried and sentenced to death in Darwin by Mr Justice Wells in 1934, charged with the murder of Constable McColl at Woodah Island. Tuckiar was an Aborigine and Wells's refusal to take cultural factors into account caused protests from humanitarian and mission groups throughout Australia and led to an appeal which was upheld by the high court. Tuckiar was released but did not reach his home and was never seen again.

TURNER, Ethel Sibyl (1872–1958), writer, was born in England and emigrated with her mother and sisters to Sydney in 1879. From 1883–88 she attended Sydney Girls' High School where she ran a paper, the *Iris*. In 1889–91 she and her sister Lilian edited the *Parthenon* and it was here, as a major contributor, that Turner learned much of her craft. Transferring this



Albert Tucker painted this self-portrait in 1954. Oil on cardboard.

AUSTRALIAN NATIONAL GALLERY

knowledge to the *Illustrated Sydney news* she wrote its children's page under the pseudonym 'Dame Durdin'. From 1921–23 she was the *Sun's* 'Chief Sunbeamer' or editor of its children's supplement.

The *Bulletin* accepted her short story 'The little duchess' in 1892, but it was *Seven little Australians* (1894) which won Turner immediate recognition, both in Australia and overseas. A radical departure from earlier local fiction, her story of the Woolcott family depicted children in an ordinary Sydney suburban setting, with insight, humour and charm.

Despite her marriage to Herbert Curlewis in 1896 and the birth of her children in 1898 and 1901 Turner was prolific in literary output: between one and two novels a year until 1911 and thereafter one a year until 1928, as well as short fiction in publications such as *Lone hand*, *Smith's weekly* and the *Windsor*.

Turner's readership extended beyond children, but publishers' notions of what was suitable for children restricted her choice of subject matter. However, Turner still managed to extend the boundaries of the Australian children's novel by examination of adult emotions and social problems.

A reading of her diaries shows the close correlation between her own life and her fictional work. *St Tom and the dragon* (1918) grew out of her involvement in the early closing campaigns in 1915–16 and the 'Cub' series reflect her dedication to the war effort. In Turner's novels life in a large family in a comfortable suburban home is idealised. A mother is essential

but a father can be absent or ineffectual. The outback of Australia is alien and threatening; inner-city living leads to poverty and despair; and luxury is stultifying. She is always an acute observer. In *John of Daunt* (1916) she not only indulges her love of detail, but she also presents a shrewd portrait of a child's emotions, motivations and interactions with adults.

Additionally, Turner wrote occasional series for newspapers; weekly pieces for the *Daily Telegraph* based on her European travels in 1910 (reprinted as *Ports and happy havens*); and in 1914 a series of articles 'Women and wartime' for the *Sydney Morning Herald*. She also campaigned for various causes, including drought relief in 1903 and the 'Yes' vote for the conscription referendum of 1917. Turner lived most of her life in Mosman and she retired from writing in 1931.

J. MacCULLOCH

Further reading B. Niall, *Seven little billabongs*, Melbourne 1979; B. Niall, *Australia through the looking glass*, Melbourne 1984; H.M. Saxby, *A history of Australian children's literature 1841-1941*, Sydney 1969.

TWO AIRLINES POLICY The Chifley government's failure to nationalise the airline industry left two major airlines, the privately-owned Australian National Airways (ANA) and the government-owned Trans Australia Airlines (TAA), competing on interstate routes. The Menzies government, taking office in 1949, was unwilling to forego its revenue from TAA, but feared the creation of a government monopoly. From 1952 a series of airline agreement acts assured the survival of both government and private airlines, neither obtaining a monopoly. This led to criticism and charges of inefficiency, but Australia's small population made unrestrained competition impracticable.

J.D. WALKER

TWO-UP Once referred to as Australia's national game, two-up now largely survives as something of an anachronism in Australia's legal casinos. Possibly the simplest game of chance, two-up is played by toss-



“‘Ow are yeh on a little gamble, Kid?’” *The Sentimental Bloke*, drawn by Hal Gye, sees the error of his ways at a two-up school. C. J. Dennis, *The songs of a Sentimental Bloke*, Sydney 1917 (1915).

DUNBAR COLLECTION

ing two coins in the air and gambling on whether they will fall heads or tails. Two-up schools flourished when there were few other opportunities for gambling. The game was a traditional Anzac Day activity connived at by police everywhere, though in 1985 ex-diggers were arrested and convicted for playing two-up in Perth.